



# Further insights into aspects of the illicit EU drugs market

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# Further insights into aspects of the EU illicit drugs market

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# General introduction

Franz Trautmann

## 1 Introduction

This report provides the results from an analysis of characteristics and operations of the EU's illicit drugs market as called for by the European Commission. The study is a follow-up of the earlier European Commission study presenting an analysis of the developments of the global illicit drugs market, the drug problems and drug policy responses in the period 1998-2007 (Reuter and Trautmann 2009). The discussions of that study resulted in a number of further research questions considered important for future drug policy making in the EU. The questions regarded as most important by the European Commission have been put together in a call for a further analysis of the EU illicit drugs market and responses to it, focusing on a number of aspects in the following four areas:

- A. An analysis of specific characteristics, mechanisms and factors that govern the EU illicit drugs market, including a conceptual framework for thinking about the structure of the supply side of that market, an assessment whether there have been significant shifts in how drugs are supplied in the EU and an assessment of the extent to which drug suppliers are involved in different drugs and other criminal activities.
- B. A detailed analysis of the size and share of the EU illicit drug market, providing an estimate of the volume of the 'EU market' in illicit drugs (production and trafficking) and of the profits generated by this market, analysing whether the EU drugs market is more supply or demand driven and exploring various aspects of drug use: user types, availability and consumption estimates.
- C. A detailed analysis of a number of potential policy impacts on the EU drug market(s) in recent years, assessing the impact of opioid substitution treatment (OST) on the European heroin market and the impact of policy changes on two EU drug markets.
- D. Scanning the future – exploring expert views on future key trends of the illicit drug markets and policy responses in the EU.

## 2 Approach

The European Commission's call covers a gamut of research questions under these four areas, which resulted in a complex, extensive research agenda. Some of the questions were addressed by applying new methods to existing data (e.g., estimating the size of the EU cannabis market, analysing law enforcement files to learn more about cocaine traffickers), by conducting qualitative interviews with those who shape illicit drug markets (e.g., medical cannabis producers, coffee shop owners, intelligence and law enforcement officials), and others required primary data collection. These new data allowed us to improve upon the previous market estimates generated in the earlier global illicit drug markets study (Kilmer and Pacula 2009).

While our focus was on the EU, we did not have the resources to conduct primary research in every Member State. So we limited our focus on a sample of seven Member States. In these sample Member States we carried out surveys of drug users and expert interviews with respect to supply, consumption and other drug related activities (see for further detail the next section and the introduction of part I). The surveys yielded data relevant for different research tasks. They formed the basis for our studies on user types and availability and for producing consumption estimates (see part I). We also used them to collect information for analysing policy impacts on the EU drug market(s) in recent years, assessing the impact of opioid substitution treatment (OST) on the European heroin market and the impact of policy changes on two EU drug markets (see report 3.3 in part I and reports 1 and 2 in part III).

For exploring expert views on future key trends of the illicit drug markets and policy responses in the EU we relied on Delphi methods for utilizing the only available data, namely the expertise of those engaged in drug problems and policy (see report 3 in part III).

## 2.1 Member State sample

For a more in-depth analysis we selected a sample of seven EU Member States that varied substantially with regards to drug problems and drug policy. Diversity was the main criterion for selecting countries for our Member State sample. In selecting our sample states we used the following criteria to assure diversity:

- Substantial differences in drugs problems (production, trafficking and use). For example, Bulgaria is of particular interest because it is a major transshipment country for heroin, while the Netherlands is thought to be a principal producer of cannabis. In Italy there is a strong connection between drug trafficking and established organised crime.
- Differences in socio-economic situation (level of economic development, stable/transitional). Bulgaria for instance is among the poorest Member States, while Sweden is among the wealthiest.
- Differences in drug policy. The United Kingdom has a harm reduction orientation, but also has heavy penalties for convicted drug offenders; Portugal recently officially decriminalized possession for personal use of any psychoactive substance; in the Czech Republic policy has been subject to rapid changes; Sweden is beginning to accept some types of harm reduction, etc.
- Geographical coverage.
- Pragmatic considerations (e.g., availability of data). The selected Member States are all nations where either there is a relatively well developed research community (e.g. the Netherlands and the United Kingdom) and/or at least one strong research group in the field of drugs (e.g. the Czech Republic and Bulgaria).

The table below provides the sample Member States and the selection criteria we used.

**Table:** List of countries for individual study

Member State	Specific aspects of interest
Bulgaria	Transshipment (heroin to the west, ecstasy to the east), drug policy changes
Czech Republic	Production (methamphetamine, cannabis), substantial policy changes
Italy	Link between trafficking and organised crime, substantial policy variations
The Netherlands	Production (cannabis, ecstasy), transshipment (cocaine), coffee shops for cannabis retail sale, highly articulated harm reduction
Portugal	Transshipment (cocaine), recent drug policy changes: decriminalisation of use
Sweden	New policy development, relatively limited consumption
England and Wales	Consumption, emerging cannabis production, tough sentencing, large cocaine market

We used the sample Member States for many of the research tasks in this project, as we expected this to contribute to a consistent picture of all parts of the research, to deepen the understanding of factors shaping the policy and to facilitate the work (and the project management), because we could work with one partner organisation in each sample Member State in order to collect available data and – where appropriate – do some additional research.

## 2.2 Focus on four drugs

Our research focused on the following four drugs: cannabis, cocaine, heroin and Amphetamine Type Stimulants (ATS). In some Member States other drugs might be important, but they either contribute little to the total EU market for illicit drugs or they are not the subject of a lot of explicit policy making.

## 2.3 Combining research tasks

There are various links between the different research tasks in this study, highlighting a number of aspects of the drugs market, showing interactions between the demand and supply side and interactions between drug policy and the market. We looked for possibilities to combine the actual research work for these different tasks. Besides combining desk research it was particularly important to find efficient ways of utilising our primary data collection because of the ambitious character of this study. As already mentioned, we used our user surveys not only as input for the research in Part I on user types and availability and consumption estimates but also for some other research tasks. To be able to assess the impact of OST on the heroin market we added some additional questions to the questionnaires for heroin users. We also added some questions to the Dutch and Portuguese version of our web-based survey to assess the respondents' view on the impact of drug policy developments on the drugs market in part III.

## 3 Structure of the study

Taking into account these links between the different research tasks we chose for a report structure which followed a 'bottom-up' order: starting with analysing the market at the user level (Part I of this study), followed by more general aspects of the drugs market (Part II) and ending with drug policy issues (Part III).

### 3.1 Part I

Point of departure of the study is to assess the drugs market from the demand side. A deeper understanding of the functioning of the drugs market is expected to help inform the policy making process in the EU. It is meant to allow for developing policies geared to the current characteristics of the drugs market. In Part I we therefore investigate different drugs market features at the users' end, analysing in more detail characteristics of the buying and using behaviour, distinguishing between different user types based on the frequency of use and use the findings from this analysis to estimate annual consumption in the seven sample Member States. For this part of our study the available data were useful, but far too limited to allow for a thorough analysis. Therefore we did some rather extensive primary data collection, using two types of surveys in the seven sample Member States. On the one hand we made use of a web-based survey to reach all types of cannabis users (from infrequent to frequent) and in particular infrequent and occasional users of amphetamines, ecstasy and cocaine. On the other hand we used face-to-face interviews to reach frequent (problem) users of cocaine, heroin and amphetamines who are unlikely to be captured in a web survey (see Introduction, Part I). We present the analysis of this data collection in three reports. The first report focuses on cannabis. Our web-based survey in all seven selected Member States yielded samples of respondents big enough to present a rather detailed analysis of different types of users. Here we could distinguish between four types of users: infrequent, occasional, regular and intensive users. The analysis in this first report provided us with rich information about the differences between these user groups e.g. regarding the quantities used per use occasion. Some of these differences seem to be more or less 'universal' for all the seven sample Member States. However, we also found sometimes notable differences between these countries.

In the second report we focus on amphetamine, ecstasy and cocaine use. In addition to information from other research sources and data from our web-based survey, we also used data from our face-to-face interviews. The data we collected here were less rich than the data collected for cannabis, which allowed for a more limited analysis of user types. We confined ourselves to three user types (infrequent, occasional and frequent users), but not all Member State samples consisted of sufficient respondents to allow this differentiation for all three substances. This more limited detail of course also resulted in less detailed consumption estimates (see report 1 in part I).

In the third report on heroin we decided to combine three research parts focussing on different issues around heroin use. In the first part of this third report we explore some aspects of heroin consumption, using the data we collected through the face-to-face interviews besides data from other research sources (see report 3.1 in Part I). These data were insufficient to say anything meaningful about consumption estimates. In the second part we therefore included an analysis on the size of the heroin markets in Czech Republic and England, which was originally intended as a separate research (see report 3.2 in Part I). The calculations of this report are based on data about PHUs and estimates of weekly heroin expenditures in the two countries. Finally, we also included in this third report the analysis of the impact of OST on the European heroin market. For this assessment we used a combination of existing data sources and data from our face-to-face interviews. The analysis concentrates on methadone maintenance treatment in four EU Member States (the Czech Republic, England, Italy and the Netherlands). This choice was for an important part based on pragmatic considerations, i.e. the availability of data and methadone being the most widely used substitution medication (see report 3.3 in Part I).

Finally, we decided to include in Part I also a study on estimating the size of the EU cannabis market, which builds on the detailed analysis and calculations of the cannabis report (report 1 and report 2, part I). In particular the data on typical quantities consumed by the different types of users enabled us to produce more sophisticated calculations, taking into account the differences between consumption quantities on a 'typical use day' of the different user types. This has resulted in new, more solid estimates of the size of the market.

## 3.2 Part II

Part II of the study should be taken as a bundle of selected issues of drugs market research. It consists of four reports, focusing on different research questions relevant for better understanding the organisation of the drugs market in the EU. Again, the focus is on knowledge relevant for policy making.

The first report looks into the complex relationship between drug demand and supply factors by comparing the impact of increased provision of OST on opioid use in two Nordic EU countries, Finland and Sweden. The report shows that due to complex interfering factors choosing different options of OST programmes in similar countries can result in very different outcomes. One interesting finding is that Finland seems to have reduced heroin use through increased availability of buprenorphine treatment but is at the same time facing a substantial buprenorphine abuse problem (see report 1, part II).

The second report focuses on one element of the rules of the game used in illicit drugs business, such as the way potential conflicts are managed in illegal markets. It does so by a case study of cocaine smuggling in the Netherlands. An analysis of 33 incidents involving failure of cocaine smuggling related transactions of smugglers residing in the Netherlands shows that the ways potential conflicts are managed in an illegal market are not so different from the way disagreements are settled in the legal market. In most of the analysed cases the disputes were settled through negotiations. Only when attempts to negotiate the issue failed, threats and violence were used (see report 2, part II).

In the third report we investigate the relationships between different areas of illicit business and adaptations of criminal networks to changes in the field in which they operate. From the available information we can take that criminal organisations operate as 'polymorphous criminal networks', responding to changes in their markets by looking for alternative – licit and illicit – ways to secure their position and income. A review of existing literature sheds light on the combinations of licit and illicit activities undertaken by criminal networks. The report also presents a proposal for a new framework for a better understanding of the relationships between the diverse activities undertaken by internationally operating criminal networks in particular those involved in illicit drug trafficking (see report 3, part II).

The last issue covered in part II is the cost of producing and distributing cannabis in the EU. The fourth report demonstrates how cannabis prices increase across the supply chain in the EU as distributors take additional mark-ups to compensate themselves not only for shipping costs but also for the risks they assume. Based on interviews with producers of medicinal cannabis and other data sources it documents the costs involved in producing cannabis in different legal environments. On the basis of this information the report provides a discussion of the possible implications of alternative control regimes (see report 4, part II).

## 3.3 Part III

In the last part of this study we focus on the policy level. We addressed two issues considered relevant for improving drug policy making: the effects of policy measures on the market and an exploration of experts' views on future developments of the drugs market and drug policy. In the first two reports we analyse two examples how policy changes impact the market, what effects they have on the users. Report 1 looks into the impact of decriminalisation of possession of small quantities for personal use in Portugal. The qualitative study is based on a literature review, data from our web-based survey and expert interviews. The results suggest that what can be seen as a major change of the legal framework is not correctly understood by the users (see report 1, Part III). The second report focuses on the impact of recent changes in the Dutch cannabis coffee shop policy on cannabis users. Until recently these changes involved a step by step tightening of the rules regulating coffee shops based on modifications of the municipal regulations (reducing the number of coffee shops, limiting access to coffee shops, etc.). The latest changes seem to go again in a less restrictive direction. Again we triangulate insights using a literature review, data from our web-based survey and expert interviews. The findings underline that the mix of ongoing changes and unresolved issues result in confusion of the users and in concerns about unintended negative consequences of the policy implemented (see report 2, part III).

Besides knowledge on effects and effectiveness of implemented drug policy measures and understanding of relevant developments of the drug problem drug policy making needs to anticipate what is coming, how the drug problem might develop in the coming years. Drug policy is expected to be proactive. The third report is therefore an attempt to explore expert views on how key trends of the illicit drugs market and policy responses in the EU will develop in the near future. Based on a four

stage expert consultation using an adapted version of the Delphi method, a mix of web-based and e-mail questionnaires, we discuss a number of key trends. The findings are among others in line with the conclusions of report 2 in part II, that the illicit drugs market is for an important part guided by the same laws and mechanisms as licit markets. We use these findings to formulate some recommendations for a more pro-active policy response to these trends (see report 3, part III).

## 4 References

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Reuter, P. and Trautmann, F., editors (2009). A report on global illicit drugs markets 1998-2007: full report. European Commission, Brussels.



# Highlights

- Our estimates for the EU cannabis market suggest a range of approximately €7 billion to €10 billion for 2010. These estimates are likely low as they do not account for the “consumption gap” (see below) that is created when data from general population surveys are used to measure substance use. Prior estimates of the EU cannabis market ranged from €15-35 billion.
- This difference arises from two key findings of this study:
  - o Cannabis users who use more frequently also smoke more each time they use. This is true across the seven countries studied.
  - o Occasional users are more likely to share than are frequent users; that still further reduces the amount they consume at each session.
  - o This picture also seems to apply to amphetamine, ecstasy and cocaine use.
- Prior estimates multiplied the number of users by the average number of sessions per user and the average amount per session; this will lead to overestimates of the quantity consumed because, for example infrequent users are the vast majority of all users and they use much less per session as the result of sharing.
- Our study also shows that intensive users are a small to modest fraction of cannabis users (between 5% and 25%), but are responsible for the bulk (between 55% and 77%) of the total amount of cannabis annually consumed in all countries. Infrequent users of cannabis, using less than once per month, form the largest group of past year cannabis users but account for 2 per cent or less of the quantity consumed.
- Another important finding is that users stating that they used in the past month and specifying the quantity used in the past month do not consume (the same amounts) each month. Multiplying their consumption by twelve to obtain an annual estimate may result in an overestimation. There are also other factors which might have led to earlier overestimations of cannabis consumption. One might be overstating the share of ‘high consumption users’ among past year. Finally, earlier studies have used higher estimates of amounts of cannabis used per unit compared to those we found in our study.
- Substantial prior research finds that opioid substitution treatment (OST) such as methadone maintenance treatment (MMT) contributes substantially to a reduction of drug use related harm and to better health. Research shows that OST reduces the frequency and intensity of illicit heroin use among treatment clients. Drawing from a wider lower and upper bound range, the study calculates that the amount of pure illicit heroin consumption averted per PHU retained in MMT each month ranges from a conservative estimate of 1.26 grams to a high estimate of 3.09 grams. This compares with estimates for the amount of pure heroin consumed when not engaged in MMT, which ranged from 1.79 to 4.5 grams. At an individual level, changes on this scale are equivalent to a 70 per cent reduction in the amount of pure heroin consumed while retained in MMT.
- Extrapolating these estimates across the four case study Member States considered, we conclude that retention in MMT may reduce total pure heroin consumption by around 30 per cent. Assuming 221,452 PHUs from a wider population of 505,173 were in receipt of MMT across these four Member States, total monthly consumption of pure heroin is estimated to have reduced by between 0.28 and 0.69 metric tons, from an estimated total of between 0.9 and 2.3 metric tons consumed.
- Enforcing laws against the production and distribution of cannabis dramatically inflate their costs. The increase is largely driven by producers and traffickers requiring compensation for their risk of arrest, incarceration, seizure, and violent injury as well as by the inefficiencies associated with having to operate covertly.
- Drug markets to some extent follow the same laws of economics of licit markets, as attested by our Delphi survey of European drug experts about key trends of the illicit drugs market and policy responses in the EU. The majority of experts stress the analogy of the illicit drugs market with other (licit) markets. For example, it is important to maintain working relations with suppliers and employees. A study of 33 failed transactions in the Dutch cocaine smuggling trade found that the smuggler mostly tried to understand what went wrong and work out a reasonable way of arranging compensation. However about 40% did involve either violence or its threat; how that affects behaviour within the market remains to be worked out.



# Key findings and summaries

This chapter provides key findings and summaries of the reports in this analysis of characteristics and operations of the EU's illicit drugs market

## 1 Surveys on user types, availability and consumption estimates

Margriet van Laar, Tom Frijns, Franz Trautmann and Linda Lombi

With contributions of Beau Kilmer, Vendula Belackova, Carla Rossi, Bengt Svensson, Fernanda Feijão and Momtchil Vassilev

### 1.1 Key findings

- This study clearly shows that the more frequently cannabis is used, the higher the number of units consumed per typical use day and the bigger the amount of cannabis consumed per unit. This pattern was consistently found across all seven EU Member States participating in the web survey. Similar patterns were found in the total samples and selected Member State samples for amphetamine (Czech Republic, Netherlands and Sweden), ecstasy (Netherlands) and cocaine powder (Netherlands).
- Infrequent users of cannabis ('chippers'), who take cannabis less than once per month, form the largest group of past year cannabis users. This is also true for users of amphetamine, ecstasy and cocaine. Also among past month cannabis users, who are usually considered to be regular users, infrequent use is common.
- Last month users do not consume (the same amounts) each month. Multiplying their consumption by twelve to obtain an annual estimate will result in an overestimation.
- The average amount of cannabis consumed annually by intensive users tends to be lowest in Portugal (184 gram) and highest in Sweden and England and Wales (363 and 374 gram, respectively). However, confidence intervals are fairly wide.
- At country level, our estimates for the amounts of cannabis consumed range from about 4 tons in Bulgaria up to 384 tons in Italy.
- In all countries (except for Portugal), intensive users form the smallest group of cannabis users (between 5% and 25%), but they are responsible for the largest part (between 55% and 77%) of the total amount of cannabis annually consumed. The same picture can be found for the total amounts of amphetamine, ecstasy and cocaine annually consumed in the selected Member States.
- Some prior estimates on cannabis consumption tended to be too high, probably because the assumed share of 'high consumption users' among past year users was too high, and the assumed amounts of cannabis used per unit were higher compared to those assessed in our study.
- The proportion of users who indicate that other drugs are available at the location where they usually buy their cannabis varies from 14% to 52%, suggesting that – in spite of differences between countries – the cannabis market at retail level seems to be specialized to a great extent across EU Member States.
- Further research is needed to improve the data on the frequency of use of the less common drugs (amphetamine, ecstasy and cocaine). Moreover, feasible self report methods for assessing amounts of cannabis consumed per unit should be validated and improved, and the impact of sharing of cannabis on consumption estimates should be studied in more detail. Finally, estimates of under coverage or underreporting of drug use should be better supported by empirical data.

## 1.2 Summary

The main aims of this study were three-fold: to describe characteristics of users and consumption patterns among different types of users of cannabis, ecstasy, amphetamines, cocaine and heroin; secondly, to describe the availability of drugs to the different types of users; and thirdly, to make estimates of the amount of drugs consumed - by user type and in total - in the seven sample EU Member States: Bulgaria, the Czech Republic, Italy, the Netherlands, Portugal, Sweden and England & Wales. In Spring 2012 a web survey was carried out in the seven countries to collect data on these topics for the four drugs under study. For the Czech Republic, amphetamine in this report refers to methamphetamine.

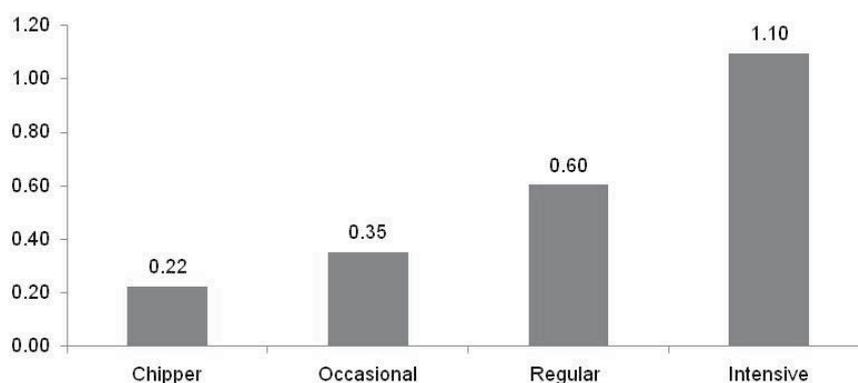
The most detailed data we gathered from our survey are those on cannabis use. Our sample of cannabis users was big enough to differentiate between four types of users. The final sample consisted of 4,126 persons who had consumed cannabis at least once in the past year. They were classified on the basis of their number of use days in the past 12 months into four groups: infrequent users or chippers (<11 days), occasional users (11-50 days), regular users (51-250 days) and intensive users (>250 days). The numbers of users of amphetamine, ecstasy or cocaine use (especially the more regular users) were too small to allow a detailed assessment of user types for these drugs in all countries. Analyses on consumption patterns and estimates were therefore limited to three user types (infrequent, occasional and frequent users), with country-specific data being available only for amphetamine in the Czech Republic, Sweden and the Netherlands, and for cocaine and ecstasy for the Netherlands. Additional data on consumption patterns among problem users of amphetamine and (crack) cocaine were used from the face-to-face interviews. For heroin use we have drawn upon our face-to-face interviews with PHUs and data from other research and monitoring sources. We focus on Italy, the Netherlands and England, the three sample Member States where we have data on heroin use from a sufficiently large sample of heroin users from our face-to-face interviews. Occasional, non-dependent heroin use proves to be rather rare. We therefore do not differentiate between user types but focus only on regular or PHUs. The qualitative approach we used here, working with a limited sample size and using in-depth interviews of purposively sampled respondents, makes that we neither can draw clear conclusions regarding consumption nor estimate heroin consumption. Sizing the market for heroin is done in a separate research chapter (Part I report 3). We were looking for information helping us to better understand some aspects of the demand side of the heroin market, the drugs used, frequency of use, route of administration, sources of supply, search time, buying scenarios, etc. The findings should be taken as lending colour to the picture of what is actually happening on the user level.

### ***Characteristics of cannabis users and consumption patterns***

The results reveal many differences between user groups, which seem to be more or less 'universal', but there are sometimes also notable differences between countries. Overall, intensive users differ most strongly from other user groups – in particular from the chippers and occasional users in that they have a relatively early onset of first cannabis use, were more often male and were older (except for Bulgaria and the Czech Republic), compared to the less frequent user groups.

Moreover, the more frequently cannabis was used in the past year, the higher the number of units (mainly joints) is used on a typical use day and the more cannabis is put in a unit. For the total sample the average number of units per typical use day varies from 1.4 among chippers to 4.1 among intensive users (excluding possible sharing). The average amount of cannabis per unit varies from 0.15 gram to 0.25 gram. The total amount (gram) of cannabis per typical use day for the total sample increases from 0.2 gram for chippers to 1.1 gram for intensive users.

### **Amount (gram) of cannabis consumed on a typical use day by user group**



*Despite these overall main differences between user groups, there are quite a number of specific differences between countries:*

*Age of first use*

The average age of first cannabis use is overall higher in Sweden compared to all other countries. This difference is difficult to explain on the basis of these data. This finding may be associated with the long-standing relatively restrictive Swedish drug policy aimed at a drug-free society. Nonetheless, once cannabis is used, the annual amounts consumed by Swedish cannabis users are similar or sometimes higher compared to those in other countries.

*Type of unit*

While the majority of the cannabis users consume their cannabis by smoking a joint, up to 45% of the intensive users in the Czech Republic prefer smoking cannabis by dry pipes/chillums. Health concerns related to tobacco smoking, and better options to titrate the cannabis dose, have been put forward as possible explanations for the popularity of this consumption method in the Czech Republic.

*Mixing cannabis*

Although the majority of cannabis users mix their cannabis with tobacco, there are clear differences between countries. Proportions of users who consume cannabis 'pure' varied from 9% or less in Italy, the Netherlands and Portugal up to 28% in the Czech Republic and 33% in Bulgaria. As mentioned before, in the Czech Republic, this relatively high proportion may be associated with the popularity of smoking cannabis by dry pipes/chillums.

*Preference for hash or marihuana*

The proportion of users with a preference for marihuana is highest in Bulgaria and the Czech Republic (96%), followed by the England & Wales (83%). Preference for marihuana is lowest in Portugal (38%), where hash tends to be more popular (overall 43%), especially among intensive users (69%). This is preference for hash is associated with its proximity to Morocco, which is the world's largest producer and supplier of hash.

*Amount of cannabis consumed*

The average amount of cannabis consumed annually by intensive users tends to be lowest in Portugal (184 gram) and highest in Sweden and the England and Wales (363 and 374 gram, respectively). However, confidence intervals are fairly wide.

*Sharing on the last occasion*

Although sharing is common among all types of users, especially among the less frequent users, there are notable differences between countries. The proportions of intensive users reporting sharing their cannabis on the last occasion, varies from 50% in England & Wales to 91% in Bulgaria.

*Availability of cannabis*

Differences between user groups are also found with regard to availability indicators, although differences between countries featured here more prominently. The proportion of users who usually buy their cannabis, instead of employing other modes to acquire the drug, is highest among regular and intensive users and was lowest among chippers, who most often get cannabis from others (including sharing). Growing cannabis is mentioned between 15% to over 21% of the intensive users in five countries, but hardly plays a role as primary way to obtain cannabis among less frequent users. Of those users who usually buy their cannabis, the amount of cannabis bought per purchase increases from chippers to intensive users, as does the frequency of buying and amount of money spent on cannabis purchases in the past month. Intensive users also more commonly buy cannabis for others, and more often indicate that it is very easy to obtain the drug, compared to less frequent users.

In addition to these common trends across user groups, there are many more remarkable differences between countries on availability indicators.

*Growing cannabis*

The proportion of intensive users reporting growing their own cannabis as dominant way of obtaining cannabis is lowest in the Netherlands (5%) and England & Wales (9%) and highest in the Czech Republic (21%), Italy (19%) and Sweden (18%). Yet, only in the Czech Republic growing seems to play a role in all user groups (10%), suggesting that it is more widespread than elsewhere.

*Locations of purchase*

Coffee shops are mentioned as the main location of buying cannabis for the vast majority of users in the Netherlands (87%), while buying on the street or in a park is mentioned by more than 50% of the users in Bulgaria (58%), and by between 20% to 34% in Italy, Sweden, Portugal and England & Wales. Buying at a seller's home is a relevant source especially in the Czech Republic (45%) and between 21% and 36% in the other countries, except for Bulgaria (10%) and the Netherlands (3%).

#### *Availability of other drugs*

Excluding the Netherlands, between 26% (Czech Republic) and 52% (Sweden) of the cannabis users indicate that other drugs are available at the location where they usually buy cannabis. The relatively low proportion in the Netherlands (14% overall, 9% for those who buy in coffee shops), is likely to reflect the policy of separation of the cannabis and hard drugs markets, but the data also suggest that cannabis markets at retail level seem to be specialized in other countries as well, albeit to different degrees.

#### *Amount of cannabis bought and prices*

Among intensive users, the amounts of cannabis bought per purchase is lowest in Bulgaria and highest in Italy, Portugal, Sweden and England & Wales, and prices paid are lowest in Bulgaria and highest in Sweden.

#### *Time and ease to obtain cannabis*

The proportion of cannabis users estimating that they would be able to buy their usual amount of cannabis within half an hour is highest in the Netherlands (71%) and varies between 22% (Sweden) and 44% (Czech Republic) in the other countries. In all countries, the majority of the users indicate that it is easy or very easy to obtain cannabis, but in the Netherlands the qualification 'very easy' is the highest (82%), against about 32% (Italy and Portugal) up to 57% (Czech Republic) in other countries.

#### *Unable to buy*

The proportion of users who are sometimes unable to buy cannabis in the past 12 months varies from 18% in the Netherlands up to 78% in Italy. The lack of available sellers or sellers who did not have cannabis for sale is the most frequently cited explanation.

Most of the findings on availability indicators with regard to the Netherlands are consistent with the Dutch policy pursuing a separation of the cannabis and hard drug markets, and allowing the small sale scale of cannabis for personal use under strict conditions in the so-called coffee shops.

### ***Characteristics of users, consumption patterns and availability of amphetamine, ecstasy and cocaine***

As mentioned in the introduction of this summary the data concerning amphetamine, ecstasy and cocaine use allowed for less detailed analyses than those for cannabis because of smaller (sub)sample sizes. For most Member States and indicators, data are reported for the total Member State sample. Differences between user types could only be analyzed for a selection of sample Member States (Czech Republic, Netherlands and Sweden for amphetamine; Netherlands for ecstasy and cocaine).

Similar to findings for cannabis, the more frequently amphetamine, ecstasy and cocaine were used in the past year, the higher the daily dose (in grams or pills) that was consumed on a typical use day.

The total amount of amphetamine per typical use day in the Czech Republic increases from 0.31 gram for infrequent users to 0.66 gram for frequent users. Daily doses in the Czech Republic are about half of those in the Netherlands and Sweden in all user groups, with amount increasing from 0.50 to 1.49 gram in the Netherlands and 0.59 to 1.24 gram in Sweden. This difference can probably be explained by the consumption of high potency methamphetamine in the Czech Republic, against 'normal' amphetamine in the other countries.

The total amount of ecstasy per typical use day for the Netherlands increases from 1.95 pills for infrequent users to 2.43 pills for occasional users and to 3.56 pills for frequent users. These numbers are lower in the combined other sample Member States, where consumption on a typical use day increases from 1.51 pills to 1.93 pills to 2.93 pills.

The total amount (gram) of cocaine per typical use day for the Netherlands increases from 0.52 gram for infrequent users to 0.80 for occasional users to 1.28 gram for frequent users. These numbers are somewhat lower in the combined other sample Member States, where consumption on a typical use day increases from 0.43 gram to 0.88 gram to 0.94 gram.

The proportion of users who usually buy their amphetamine, ecstasy or cocaine, instead of employing other modes to acquire the drug, tends to be highest among frequent users and lowest among infrequent users, with occasional users in between. Of those users who usually buy their drugs, the amount bought per purchase increases from infrequent to frequent users, as does the frequency of buying and the amount of money spent on drug purchases in the past month, although these patterns are less consistent than those for cannabis. In addition to these trends across user groups, there are also differences between Member States on availability indicators.

*Locations of purchase*

The seller's home is the most frequently mentioned location of buying amphetamine in the Czech Republic, the Netherlands and Sweden, while their own or someone else's home are most frequently mentioned in England & Wales. On the street or in a park is most frequently mentioned in Bulgaria, and Italian respondents mention a place of entertainment most often. For ecstasy, the seller's home is mentioned most frequently in all Member States except for Bulgaria, where places of entertainment and private parties are most popular. For cocaine, similar to the findings for ecstasy and to a lesser extent those for amphetamine, the seller's home is mentioned most frequently in all Member States except for the Netherlands, where the street or a park are mentioned slightly more often. Interestingly, for all three drugs between 13% and 20% of Italian and Swedish users report to buy their drugs at school, college or university, while these locations are virtually not mentioned in the other sample Member States.

*Time to obtain drug*

Across Member States, the majority of users estimate that they would be able to buy their usual amount of amphetamine within either 'less than half an hour' or 'half an hour to an hour'. Nevertheless, user estimates vary across member States. Most notably, Swedish amphetamine users report longer times than users from the other sample Member States. Across Member States, obtaining ecstasy tends to take more time than obtaining amphetamine, but again estimates vary across Member States, with the biggest part (37%) of Swedish ecstasy users reporting more than 24 hours. Amphetamine and ecstasy thus seem to take longer to obtain in Sweden. For cocaine, a large part (26%) of Czech users indicate that it would take them more than 24 hours to obtain, while 40% of users from England & Wales indicate needing 1-2 hours.

*Unable to buy*

The proportion of users who were now and then unable to buy amphetamine in the past 12 months varies from 21% in the Netherlands up to 43% in the Czech Republic. For ecstasy, this proportion varies from 13% in the Netherlands up to 49% in Bulgaria, and for cocaine it varies from 20% in the Netherlands up to 52% for England and Wales. The proportion of users who were unable to buy is thus lowest in the Netherlands for all three drugs. The lack of available sellers or sellers who did not have availability of the drug of choice are the most frequently cited explanations for being unable to buy amphetamine, ecstasy and cocaine.

***Characteristics of users, consumption patterns and availability of heroin***

Due to the fact that occasional, non-dependent heroin use is quite uncommon we do not differentiate here between user types but focus only on regular users or PHUs.

*Age of first use*

The findings from our interviews as well as other survey data show that the average age of first heroin use is around 20 years in all three Member States we concentrated on.

*Route of administration*

Though the data from our interviews for Italy and England differ from the data from other sources the general picture is quite consistent. In Italy the majority of heroin users is reporting to inject heroin (77% in our sample and 67% according to data from the Italian Public Health Care Services) while in England and the Netherlands injecting is much less common. For England we found 31% injectors in our sample versus 18% in data of the National Treatment Agency for Substance Misuse. In the Netherlands our sample and data from the Netherlands Drug Monitor show 8% injectors. In these two countries smoking is the most common route of administration.

*Use of other substances*

The use of other substances besides heroin seems to be much rather uncommon in Italy compared to England and the Netherlands. In the Netherlands, all respondents reported to use crack cocaine next to heroin, in England this is true for 28 interviewees (78%). This is in line with other research findings. No crack cocaine use was reported by Italian respondents. Alcohol was the second most consumed substance overall in the Netherlands and England, and it was the substance most frequently used besides heroin in Italy. Cannabis was the next most commonly used substance.

*Buying behaviour/availability*

The overwhelming majority of respondents stated that they usually pay for their heroin (97%; only one person per country indicated usually not paying for heroin). Our survey also showed that most respondents bought their heroin 'on the street or in a park', though in England 'delivery service' seems to be a quite popular option, followed by 'on the street or in a park'.

In England and the Netherlands a substantial number of interviewees from our face-to-face interviews can buy crack cocaine at their heroin dealer. The availability of other drugs seems to be rather limited.

It was generally considered fairly or very easy to obtain heroin. The majority of heroin users across the three Member States indicate that it was 'very easy' for them to buy heroin. Approximately 58 percent of heroin users indicated that they could purchase their heroin in less than 30 minutes, while another 27 per cent state that it would take them less than an hour. However, we need to keep in mind that we interviewed heroin users in large cities. In smaller cities and in particular in rural areas, it might be more difficult to obtain heroin. Another issue to be taken into consideration is that all respondents were experienced heroin users.

Finally, a total of 47 respondents (42%) indicates that there had been occasions in the past 12 months that they were unable to buy heroin. Sellers being unavailable or not having any heroin were the two most frequently mentioned reasons. However, the reasons reported to us differed between countries. English respondents report more frequently sellers not having any heroin as a key reason for being unable to buy. By contrast, a quarter of the Dutch respondents reports police activity as an important reason for being unable to buy (whereas none of the English respondents mentions this).

### ***Estimates of cannabis consumption***

We estimated the amount of cannabis consumed by multiplying the number of users per user group by the annual amount consumed per year by user group in each of the seven sample countries. It should be noted, that although a detailed account was made of differences between user types and associated consumption patterns, there are still many sources of uncertainty and methodological differences between countries which affect the precision of the estimates.

In all countries the group of chippers forms the biggest group of the last year cannabis users with proportions ranging from 37% in Portugal up to 66% in Sweden. Intensive users form the smallest group in all countries, except for Portugal, with proportions ranging from 5% in Sweden up to 25% in Portugal. In Portugal the group of regular users and intensive users makes up half of all last year cannabis users. There is no explanation so far for these differences between countries.

### **Number of last year cannabis users by country and distribution over user groups\***

	BG	CZ	IT	NL	PT	SE	E&W
<b>Number of users</b>	138,809	1,128,957	8,105,720	781,233	255,520	171,174	2,800,073
<b>% Chippers</b>	64%	52%	41%	44%	37%	66%	54%
<b>% Occasional</b>	17%	20%	37%	15%	13%	15%	17%
<b>% Regular</b>	12%	22%	12%	25%	25%	14%	19%
<b>% Intensive</b>	7%	6%	10%	17%	25%	5%	9%

\* Based on general population surveys. For Italy, and adapted estimate of the number of users has been used, which is based on population surveys and indirect estimates (see § 1.5.2.3). Numbers are based on prevalence data from population surveys conducted between 2007 (Portugal) up to 2010/2011 (England and Wales), and data on the size of the population in 2011 from Eurostat.

The total amount of cannabis consumed per country varied widely, but in all countries, intensive users account for the biggest share of cannabis consumed, with proportions varying from 55% in the Czech Republic up to 77% in Bulgaria, the Netherlands and England & Wales. Chippers and occasional users account for less than 9% of the total amount of cannabis consumed. As far as data were available in other countries, the addition of (rough) estimates of cannabis consumed by (marginalised) populations of problem drug users increased the estimates from a low 3% in the Netherlands, up to 25% in England & Wales, and 35% in Sweden, which is a huge variation.

**Amount of cannabis (tons) consumed annually per country and user group (%)\***

	BG	CZ	IT	NL	PT	SE	E&W
Amount (tons) - lower	2.6	27.2	383.2	44.1	12.7	5.5	96.1
Amount (tons) - upper	<b>5.2</b>	<b>51.3</b>	<b>480.1</b>	<b>69.4</b>	<b>26.3</b>	<b>8.2</b>	<b>221.0</b>
Amount (tons) – average*	3.8	33.4	384.3	48.5	17.4	5.8	133.8
% Chippers	<b>2%</b>	<b>2%</b>	<b>1%</b>	<b>&lt;1%</b>	<b>1%</b>	<b>2%</b>	<b>1%</b>
% Occasional	<b>3%</b>	<b>6%</b>	<b>5%</b>	<b>1%</b>	<b>2%</b>	<b>4%</b>	<b>2%</b>
% Regular	<b>18%</b>	<b>37%</b>	<b>23%</b>	<b>21%</b>	<b>30%</b>	<b>37%</b>	<b>20%</b>
% Intensive	<b>77%</b>	<b>55%</b>	<b>71%</b>	<b>77%</b>	<b>68%</b>	<b>57%</b>	<b>77%</b>
Additional amount (tons) used by problem drug users***	<b>0.2-0.4</b>	<b>2.4</b>	<b>n.a.**</b>	<b>1.4</b>	<b>?</b>	<b>2.0</b>	<b>18-34</b>

Upper and lower values are based on the upper and lower values of the 95% confidence interval for the annual cannabis consumption on the basis of the web survey, multiplied by the number of users according to population surveys (except for Italy, see paragraph 1.5.2.3).

\*The average is based on the 5% trimmed mean of the 12 months cannabis consumption. \*\* For Italy, the adapted method to estimate the number of cannabis users is likely to take underreporting and undercoverage, including use among problem drug users, into account. \*\*\* Rough estimates of cannabis consumption by problem users of heroin, amphetamine, cocaine, based on indirect estimates of the number of problem users (Statistical Bulletin EMCDDA) and data on consumption patterns from the face-to-face interviews and other sources.

**Estimates of consumption for amphetamine, ecstasy and cocaine**

We estimated the annually consumed amounts of amphetamine, ecstasy and cocaine by multiplying the number of users per user group (estimated from external research combined with Eurostat data on population size) by the average annual amount consumed per user type (estimated from our data). As mentioned above, limitations in sample sizes made us restrict the consumption estimates for amphetamine to the Czech Republic, Sweden and the Netherlands, and for cocaine and ecstasy to only the Netherlands.

In all selected Member States for amphetamine and in the Netherlands for ecstasy and cocaine, infrequent users constitute the largest part of the last year users, while frequent users form the smallest group. However, because of their much higher annual consumption rates, frequent users contribute most to the total annual consumption, while occasional and infrequent users account for relatively small portions of total annual consumption.

**Amphetamine**

Total annual consumption of amphetamine in the Czech Republic is estimated at 4.55 metric tons with a range between 2.73 and 6.01 metric tons. Frequent users account for 96% of this amount while occasional and infrequent users accounted for respectively only 3% and 1%.

Estimates of the total annual consumption of amphetamine in the Netherlands ranges between 1.51 and 2.79 metric tons, with point estimates at 2.41 (user type numbers generated from general population survey) and 1.80 (user type numbers generated from targeted survey among visitors of clubs and parties) metric tons. Frequent users account for 89-93% of these amounts while occasional and infrequent users account for respectively 5-8% and 2%.

Because no Swedish studies were available from which to derive user type numbers, the figures from the Czech Republic and the Netherlands were used as a proxy. This resulted in estimates of the total annual consumption of amphetamine in Sweden that ranges between 1.24 and 4.59 metric tons, with point estimates at 3.40 (based on Czech user type figures), 2.53 and 1.91 metric tons (based on Dutch user type figures from a general population survey and targeted survey, respectively). Frequent users account for 87-94% of these amounts while occasional and infrequent users account for respectively only 4-9% and 2-4%.

**Ecstasy**

Estimates of the total annual consumption of ecstasy in the Netherlands range between 4.08 and 5.72 million pills, with point estimates at 5.22 (user type numbers generated from general population survey) and 4.48 (user type numbers generated from targeted survey among visitors of clubs and parties) million pills. Frequent users account for 39-49% of these amounts while occasional and infrequent users account for respectively 31-37% and 20-24%.

### *Cocaine*

Estimates of the total annual consumption of cocaine in the Netherlands ranged between 2.08 and 3.22 metric tons, with point estimates at 2.74 (user type numbers generated from general population survey) and 2.57 (user type numbers generated from targeted survey among visitors of clubs and parties) metric tons. Frequent users account for 73-75% of these amounts while occasional and infrequent users account for respectively only 18-20 and 7%.

### ***Final comments and recommendations***

Although this study is a further step forward in improving estimates on drug consumption by differentiating different user types, in terms of frequency of use, it also has limitations. These include, among others, the non-standardised way of recruiting respondents through various channels (but mainly through the web advertisements) and lack of a sampling frame. This may have resulted in a relatively high proportion of young (fairly highly educated) users, and, in the Netherlands, respondents who are associated with recreational (dance) settings (thus possibly inflating consumption estimates). Nonetheless, the reported 'universal' (consumption) patterns for cannabis, across countries with varied economic, social, and cultural norms, suggest that the findings for this drug may have a high degree of validity.

As estimates on the amounts of cannabis consumed per unit relied heavily on subjective reports of amounts based on (digital) photo cards, it will be important to build on research to further validate and improve methods to estimate amounts of cannabis consumed. Ideally, this should result in a feasible method to be implemented in (large scale) surveys in different countries.

Moreover, as this study shows that sharing cannabis among users is much more common than previously assumed, a more detailed analysis of the impact of sharing on the consumption estimated would be recommended.

For the less commonly used drugs (amphetamine, ecstasy, cocaine), numbers of past month users in general population surveys are often too low to provide reliable information on the frequency of use, which is necessary to allow consumption estimates at population level. This limitation is hard to solve, information might be obtained by aggregating samples from successive population surveys to yield a higher number of past year or past month users or by increasing sample sizes, which is not likely to occur. Studies among targeted samples of users could be useful, but at the expense of representativeness.

For all drugs, it is recommended that (population) surveys also collect data on frequency of use among past year users instead of last month users only, and, for cannabis specifically, it is recommended to add a few questions on numbers of units consumed per typical use day.

As this web survey was likely to capture mainly integrated drug users, it missed data on more marginalised populations of problem drug users. To some extent this bias could be reduced by adding data on the number of problem users and their consumption pattern, but not all groups will have been covered in this way (e.g. homeless in general, institutionalised people). Moreover, it can be assumed that not all drug users will have 'admitted' (or remembered correctly) the frequency or amounts of drugs consumed. While previous studies have assumed levels of underreporting ranging from for example 20% to 50%, the empirical support for these values and information on possible differences between countries is limited. It is recommended to improve insight on these issues, as they may be a main determinant of the final estimates of consumption.

## 2 Sizing national heroin markets in the EU: insights from self-reported expenditures in the Czech Republic and England/Wales<sup>1</sup>

Beau Kilmer, Jirka Taylor, Priscillia Hunt and Peter McGee

### 2.1 Key findings

- Estimates of retail heroin expenditure in the EU can range from €11 billion (Kilmer and Pacula, 2009) to €22 billion (UNODC 2005), suggesting there is a lot of money to be made in the market.
- Previous estimates from Paoli, Greenfield and Reuter (2009) suggest the typical PHU in Europe consumes 30 pure grams annually; roughly half the amount assumed by the UNODC (2005; 58 grams). Our calculations for the Czech Republic (12-21g) and England/Wales (32-47g) are consistent with a benchmark that is closer to 30 pure grams per year; however, there is likely variation in this value within countries, across countries, and over time.
- Using a range of 12-21g pure heroin consumed per user per year and multiplying it by the number of problem users in the country as of 2004 (9,700) suggests the total pure heroin consumption in the Czech Republic around 2004 was approximately 0.1t-0.2t.
- Multiplying the number of PHUs in England & Wales (255,044) by the estimated annual consumption of 32g and 47g yields estimates of 8t-12t of pure heroin consumed annually in England & Wales.
- This chapter focused on total expenditures by PHUs who account for the vast majority of retail transactions. Our estimate for the Czech Republic circa 2004 was slightly more than €50 million and is likely high since some users defined as PHUs were in fact abusing buprenorphine; however, we don't believe this was as much as issue in 2004 as it is today.
- Our heroin expenditure estimate for England/Wales was €2.5 billion circa 2005, and this is larger than the expenditure estimate generated by Pudney et al. (2006). This makes sense since our expenditure figure is based on a group that had recently entered treatment, and we expect their consumption to be near peak levels at intake. Thus, one should consider this figure to likely be a high estimate.

### 2.2 Summary

After alcohol, heroin consumption causes more social harm than any other intoxicating substance in Europe. In addition to the morbidity and mortality associated with heroin consumption, one of the negative consequences of the trade is the large amount of money it generates for criminal organizations. Estimates of retail heroin expenditure in the EU can range from €11 billion (Kilmer and Pacula 2009)<sup>2</sup> to €22 billion (UNODC 2005), suggesting there is a lot of money to be made in the market. This range also highlights the large amount of uncertainty there is about the actual size of the market in the EU.

One approach for sizing the market is to ask users what they spend in a given week or month, extrapolate this to an annual estimate, and then multiply by the number of users. Not all users spend the same amount, so this needs to be done separately for each type of user (occasional, regular, daily, etc.), but many studies suggest that most retail expenditures are made by the subset of users who consume regularly; those who use heroin only occasionally are not driving the market (Hay et al. 2006; Paoli et al 2009; Kilmer et al. forthcoming). Heroin is hardly unique in this respect; the distribution of consumption rates for alcohol and many other commodities are also skewed, with a long "right tail" (Cook 2007; Caulkins et al. 2012). In this regard, a clear advantage EU Member States have over the United States and other countries is the systematic collection of information about PHUs. The EMCDDA and its Focal Points deserve much credit for generating these estimates and improving them over time.

<sup>1</sup> We thank Vendula Belackova, Jon Caulkins, and Rosalie Pacula for insights on an earlier draft. The views here only reflect those of the authors.

<sup>2</sup> Assuming average retail heroin purity in Europe is equal to 25%; not reported in the text.

This chapter uses data about PHUs and estimates from field studies in the Czech Republic and England/Wales to calculate the size of the market for these two countries. Even though the field studies give us the building blocks needed for the estimates, the calculations still require a number of assumptions that will be made explicit. For a number of reasons we expect this approach to yield estimates that are likely to be high.

The chapter then goes a step further by using these expenditure estimates to calculate total pure grams consumed by PHUs. This not only provides a nice check about the reasonableness of our expenditure figures, it also contributes to the limited literature about the total number of pure grams consumed by a PHU.

Our estimate for the Czech Republic circa 2004 was slightly more than €50 million and is likely high since some users defined as PHUs were in fact abusing buprenorphine; however, we don't believe this was as much an issue in 2004 as it is today. Our estimate for England & Wales was €2.5 billion circa 2005, and this is larger than the expenditure estimate generated by Pudney et al. (2006). This makes sense since our expenditure figure is based on a group that had recently entered treatment, and we expect their consumption to be near peak levels at intake. Thus, one should consider this figure to likely be a high estimate.

Our expenditure approach also allows us to generate estimates of total pure grams of heroin consumed in these two countries. Our estimates for the Czech Republic and England were 12-21 and 32-47 pure grams, respectively, and the previous caveat about the English figure possibly being inflated since it is based on a treatment population is still applicable. Previous estimates from Paoli, Greenfield and Reuter (2009) suggest that the typical PHU in Europe consumes roughly 30 pure grams annually; nearly half the amount assumed by the UNODC (2005; 58 grams). Our calculations are consistent with a benchmark that is closer to the 30 pure grams per year.

In addition, this research exercise has revealed the importance of asking about weekly expenditures of PHUs. For instance, in the seminal study of problem drug users in the Czech Republic (Petros et al. 2005), which remains until today an authoritative source of data on consumption patterns, information on weekly expenditure did not always correspond to a simple multiplication of the volume of weekly consumption by average retail price. This discrepancy suggests that questions targeting weekly expenditures may help reveal other factors in play, such as the need to adjust for quantity discounts.

## 3 The impact of opioid substitution treatment (OST) on the European heroin market

Tim McSweeney and Oonagh Skrine

### 3.1 Key findings

- The evidence in support of opioid substitution treatment (OST) and methadone maintenance treatment (MMT) in particular, in contributing towards reducing the frequency and intensity of illicit heroin use among those retained in such treatment is both considerable and persuasive. Some controversy persists however about the extent to which forms of OST may contribute towards facilitating the attainment of 'recovery' orientated goals and extend opioid using 'careers'.
- Triangulating data from various sources we conservatively estimate the amount of pure illicit heroin consumed per year, per PHU (Problem Heroin User) not engaged in MMT as 21.5 grams. Our high estimate is 54.0 grams per year. These are broadly consistent with previous published estimates for annual consumption rates among European PHUs (30.0 - 58.0 pure grams).
- Drawing from a wider lower and upper bound range, we have calculated that the amount of pure illicit heroin consumption averted per PHU retained in MMT each month ranges from a conservative estimate of 1.26 grams to a high estimate of 3.09 grams.

- Avoided illicit heroin consumption on this scale across a population of 221,452 PHUs assumed to be accessing MMT throughout four case study Member States is equivalent to between 0.3 metric tons (conservative estimate) and 0.7 metric tons (high estimate) of pure heroin consumption avoided for each month retained in MMT, again drawing these estimates from a wider lower and upper bound range.
- PHUs not engaged in MMT and other forms of OST will account for a disproportionate amount of the illicit heroin being consumed in a given market. Significantly curtailing their involvement in it, via engagement with MMT and other evidence-based forms of OST, is likely to considerably undermine the market's viability and disrupt functionality by removing or displacing key participants from it.

## 3.2 Summary

### ***Evidence for the effectiveness of OST***

The evidence in support of opioid substitution treatment (OST), and in particular the maintenance prescribing of methadone or buprenorphine (and to a lesser extent heroin and a buprenorphine/naloxone combination.), is considerable and persuasive. This body of knowledge has accumulated using data and experience over a 40-year period, and from regions as geographically and culturally diverse as North America, Europe, Australia, Asia and the Middle East.

In aggregate, these findings point to the benefits of retention within OST, and in particular methadone maintenance treatment (MMT), in contributing towards reducing the frequency and intensity of illicit heroin use. Yet despite this body of evidence, controversy still persists about the extent to which forms of OST contribute towards facilitating the attainment of 'recovery' orientated goals, extend opioid using careers and impact upon drug-related mortality.

Using a combination of existing and primary data sources, we sought to estimate the impact of OST, in the form of MMT, in contributing towards avoided illicit heroin consumption across four European Union (EU) Member States - the Czech Republic, England, Italy and the Netherlands.

### ***Methods***

The information used to inform this work was derived from the following sources:

- Existing peer reviewed research
- Published and unpublished statistics and
- Supplemented with primary data gathered through interviews with heroin users in the relevant Member States.

### ***Assumptions***

In order to estimate the avoided heroin consumption attributable to MMT it was necessary to make a number of informed assumptions relating to the:

- Number of problem opioid users (POUs) within the four Member States being considered (N=505,153) and the proportion of this group thought to be accessing OST (52.6%, n=265,721) and MMT (43.8%, n=221,452)
- Nature and extent of their heroin consumption (frequency, amount and purity) when not accessing MMT and
- Nature and extent of any changes in this heroin consumption (frequency amount, purity) while exposed to and retained within MMT.

### ***Nature and extent of heroin consumption when not accessing MMT***

Triangulating data from various sources we conservatively estimate the amount of pure heroin consumed per year per PHU not engaged in MMT is 21.5 grams. Our high estimate is 54.0 grams.

**Conservative and high estimates of heroin consumption among PHUs not accessing OST**

Assumption	Conservative estimate	High estimate
Frequency (days) of use last month	21	24
Amount (grams) used per day	0.5	0.75
Purity	17%	25%
Pure grams of heroin consumed per month per PHU	1.79	4.5
Pure grams of heroin consumed per year per PHU	21.5	54.0

**Estimated impact of MMT on avoided illicit heroin consumption**

On the basis of a range of empirically informed assumptions we estimate that the amount of pure heroin consumption averted per PHU retained in MMT each month ranges from 0.45 grams to 4.21 grams, with a conservative estimate of 1.26 grams and a high estimate of 3.09 grams. Using these estimate ranges, a 95 per cent confidence interval for the amount of pure heroin consumption averted per PHU retained in MMT each month ranged from 0.75 to 2.63 grams, based on 400 random draws using a Monte Carlo simulation.

Avoided illicit heroin consumption on this scale across the 221,452 PHUs assumed to be accessing MMT throughout the four case study Member States is equivalent to between 0.1 and 0.9 metric tons of pure heroin consumption avoided for each month retained in OST, with a conservative estimate of 0.3 metric tons and a high estimate of 0.7 metric tons per month.

**Estimating averted monthly heroin consumption among PHUs retained within MMT**

Assumption	Conservative estimate			High estimate		
Frequency (days) of heroin use in the month pre-OST admission	21			24		
Frequency (days) of heroin use per month during OST (low, 'best' and high estimates of OST impact)	15.75	10.29	5.88	18.0	12.24	6.72
Amount (grams) used per day pre-OST	0.5			0.75		
Amount (grams) used per day during OST (low, 'best' and high estimates of OST impact)	0.5	0.305	0.115	0.75	0.46	0.17
Purity	17%			25%		
Pure grams of heroin consumed per month, per PHU not in OST	1.79			4.5		
Pure grams of heroin consumed per month, per PHU in OST (low, 'best' and high estimates of OST impact)	1.34	0.53	0.11	3.38	1.41	0.29
<b>Averted pure heroin consumption per PHU in OST, per month (grams)</b>	0.45	<b>1.26</b>	1.68	1.12	<b>3.09</b>	4.21

**Caveats**

Attempts to estimate the impact of MMT provision on avoided illicit heroin consumption in four Member States were constrained by a number of limitations, relating to our assumptions about using behaviour, the data sources themselves, the small number of interviews conducted in Member States, inconsistencies around definitional issues and difficulties extrapolating results from a small number of countries to other diverse contexts and settings. Our analysis is also insensitive to important variations in OST provision across different Member States in relation to issues such as rates of retention, unplanned exit and planned discharge from MMT, for example.

**Conclusions**

Using different sources we have developed and proposed a range of basic estimates for the amount of illicit heroin consumed by PHUs on an annual basis (21.5 - 54.0 pure grams). These in turn are broadly consistent with previous published estimates for annual consumption rates among European PHUs (30.0 - 58.0 pure grams).

Based upon a number of empirically informed assumptions about the impact of MMT on the nature and extent of illicit heroin use, and extrapolating to a PHU population of 221,452 assumed to be accessing MMT throughout four case study Member States, the magnitude of avoided (pure) heroin consumption attributable to retention in MMT for one month could, we conservatively estimate, be in the order of 0.3 metric tons (ranging from 0.1 to 0.9 tons).

Inevitably, given the level of uncertainty around many of our assumptions, the resulting estimates and their ranges are subject to considerable margins of error, and would thus require additional sensitivity analyses to further refine them. Nevertheless exercises of this sort can be particularly useful as the basis for informing further work, such as comparative assessments of different policy options e.g. averted pure heroin consumption attributable to OST as a share of pure heroin imported to EU markets, and/or seized by law enforcement agencies. Such work could have important policy and practice implications, against a backdrop of significant cuts to public sector budgets across the EU.

While undertaking comparative assessments of this sort was beyond the scope of the current paper, merely extrapolating our monthly estimates of averted heroin consumption over a 12-month period would inflate the impact of OST. This is due to the absence of reliable data with which to adjust for rates of retention, unplanned exit and planned discharge from OST over the longer term, both within and between countries, and the impact of these on illicit heroin consumption. Furthermore, with regards to estimating the share of pure heroin imported to EU markets, there remains considerable uncertainty about the amount of opium produced annually that is actually converted to heroin.

As noted in previous research, PHUs not engaged in MMT and other forms of OST will account for a disproportionate amount of the illicit heroin being consumed in a given market. Removing them, or significantly curtailing their involvement in it via engagement with MMT and other evidence-based forms of OST, is likely to considerably undermine the market's viability and disrupt functionality by removing or displacing key participants from it.

Traditionally, demand and supply reduction activities have tended to operate in isolation in this regard, but there is a growing recognition that complimentary demand and supply reduction efforts could disrupt functionality to a greater extent (but care also needs to be taken to avoid unintended negative consequences and harms).

Reductions in heroin consumption while exposed to OST will undoubtedly deliver benefits for the individual user. What is less clear is the wider impact, adverse or otherwise, this avoided heroin consumption will have on broader market dynamics (e.g. the price, purity and availability of heroin), and the implications of this for those still active as consumers within it.

## 4 Estimating the size of the EU cannabis market

Jonathan P. Caulkins and Beau Kilmer  
With contributions of Marlon Graf

### 4.1 Key findings

- Previous estimates of the size of the EU cannabis market vary widely, with figures ranging from €15 billion to €35 billion per year. An important source of uncertainty is the limited information available about typical quantities consumed by different types of users.
- Our estimates of the EU cannabis market suggest a range of approximately €7 billion to €10 billion annually circa 2010; however, these figures do not account for the "consumption gap" (see below) that is created when data from general population surveys are used to measure substance use. Thus, these estimates are likely low perhaps by as much as a factor of 2.
- Information about the type of cannabis consumed (herbal versus resin) across countries is scant. If the new estimates published by the EMDCCA (2012) are correct, then combining them with our figures suggests that roughly 50-65% of all cannabis consumed in the EU is resin.
- The analyses presented in this chapter make methodological contributions. Most importantly, we demonstrate that since consumption intensity (grams per day of use) is positively correlated with consumption frequency (days used per month), multiplying the average number of use days by the average number of grams consumed per use day generates consumption figures that are lower than what they should be. The better approach is to multiply each individual's days consumed and daily consumption figures and then average across individuals only after that multiplication. We hope this gets incorporated into future sizing exercises and motivates the collection of additional data about quantities consumed and expenditures.

## 4.2 Summary

There are several reasons why decision makers want to know how much cannabis is used in the EU and how much users spend on it. First, information about expenditures helps put the trade in context compared to legal (e.g. alcohol, tobacco) and other illegal industries. Second, it provides insight about the revenues being generated by criminal traffickers. This is not only of interest to law enforcement agencies, but also to those who seek to implement drug policy reforms that could reduce criminal proceeds. Third, knowing cannabis expenditures and amounts consumed is necessary, but not sufficient, information for projecting the consequences of alternative regulatory regimes (e.g. tax revenues that might be collected if cannabis were legalised and regulated).

Estimating the size of an illegal market is challenging. Since it is impossible to pull figures from official financial statements, one should be sceptical of those who claim they have precise estimates. However, understanding of the EU cannabis market has improved greatly in the past decade as we have learned more about who uses cannabis and how much they use (Leggett 2006; EMCDDA 2008; EMCDDA 2012). Indeed, we draw upon a web survey conducted in seven Member States and introduced elsewhere in this volume (Van Laar et al. 2013) that pushes the frontier of our knowledge about cannabis consumption in the EU, and arguably elsewhere.

Previous estimates of the size of the EU cannabis market vary widely, with figures ranging from approximately €15 billion to €35 billion per year. An important source of uncertainty is the limited information available about typical quantities consumed for different types of users. In addition, when surveying respondents about sensitive behaviours, under-reporting is a perennial concern. Thus, when estimating marijuana consumption from general population surveys, some researchers make adjustment to the estimates. Sometimes under-reporting is thought of only in terms of survey respondents' under-reporting of their activity, but we are interested in a more general concept: How much do respondents' self-reports under-estimate true consumption by the entire population? That under-estimate is what governs the size of the "multiplier" that should be applied to adjust survey-based estimates upward when estimating national consumption. Indeed, it is useful to distinguish four components of such a multiplier or adjustment (Kilmer et al. forthcoming):

- 1) Use by people outside the survey's sampling frame (e.g. homeless who are not in shelters)
- 2) Use by people who are in the sampling frame but nonetheless are not surveyed (e.g. because they were never home)
- 3) Under-reporting of past-month use by people who are successfully surveyed, and
- 4) Under-reporting of quantities consumed (e.g. days used in the past month) even if some use is acknowledged.

To keep the combined effect of these factors distinct from what is usually referred to as under-reporting (i.e., did the respondent admit use?), we refer here to the aggregate effect of these four phenomena as the "consumption gap."

Our paper initially estimates spending as consumption times price; however, a significant limitation of that approach is that users do not always pay the price as estimated and reported in official documents. There can be considerable variation in price across regions within a country (Caulkins 1995), and perhaps more importantly, large discounts for purchasing in quantity (Caulkins and Padman 1993). Hence, it is of equal interest to estimate national spending from individuals' reports of their own spending. This alternative approach has its own challenges, notably the possibility that some of what individuals purchase they then resell, either at cost (when they act as an "alpha buyer" purchasing for friends) or for profit (if they are a user-seller). So neither estimate is obviously superior a priori. For the latter method for estimating spending we sum over countries and user groups the amounts spent on cannabis herb and resin. Data from the sample Member States of our EU drugs market study are used to impute spending rates for the other countries.

These approaches suggest a range of €6.7 billion to €9.8 billion annually circa 2010, but this is before adjusting for the "consumption gap." This paper does not calculate or advocate for the use of a particular "consumption gap" adjustment; we think this is best done *ex post* in a judgmental way, not via some calculation that creates an artificial sense of precision. If one believes that these survey-based estimates only capture half of the market [an estimate that is not uncommon in the alcohol literature (see review in Gmel and Rehm 2004), but generally smaller than the figures typically used for cannabis], then the market would be €13.4 billion to €19.6 billion. Those comfortable with the more conventional adjustment of multiplying by 1.25 would estimate the range to be lower: €8.4 billion to €12.1 billion.

The main reason our estimates appear lower than previous estimates is because the web survey in our EU drugs market study suggests lower rates of consumption and spending than the rules of thumb from the past which often did not differentiate by type of users. However, this is just one survey. If our estimates are wrong, it will likely be because web-based surveys under-sample the really heavy dependent users, or because of the general "consumption gap" that also appears for alcohol and tobacco.

Finally, the analyses presented in this chapter make methodological contributions that should improve future attempts to size illegal drug markets. First, we find that if we place all past-month cannabis users into four frequency groups and then calculate the total amount of cannabis consumed by use group in each of our web survey countries, there are important similarities across a number of Member States. This has implications for imputing consumption for other Member States. Second, we show that consumption intensity (grams per day of use) is positively correlated with consumption frequency (days used per month). Hence, multiplying the average number of use-days by the average number of grams consumed per use day generates consumption figures that are lower than the correct approach of multiplying each individual's days consumed and daily consumption figures and then averaging. I.e., for each frequency group and country,  $E[\text{days}] * E[\text{grams per day}] < E[\text{days} * \text{grams per day}]$ , where  $E[\ ]$  stands for taking the average or expected value. The latter is preferred and can now be estimated using the web survey data; thus increasing what our estimates would have been if we used the other, more traditional method. We hope this observation gets incorporated into future sizing exercises and motivates the collection of additional data about quantities consumed and expenditures.

## 5 Opioid consumption and substitution treatment in Finland and Sweden: a similar path with different outcomes?

Andrés Villaveces, Jirka Taylor and Beau Kilmer

### 5.1 Key findings

- This case study looks at two Nordic countries that are quite similar on a number of measures, but have had different experiences with opioids over the past two decades: Finland and Sweden. Indicators from both countries suggest that heroin use has decreased since the late 1990s, but it is now extremely rare in Finland. By contrast, heroin is still the most common drug detected in deaths in Sweden.
- In Finland, buprenorphine abuse largely replaced heroin abuse and is now the main reason for individuals seeking treatment as well as the leading cause of drug-related death. This has not been the case in Sweden, where mortality figures attributable to buprenorphine are lower than in Finland, even though the extent to which buprenorphine is abused in Sweden could be somewhat underreported, as abusers of this drug do not usually qualify for OST programs.
- While there is no definitive answer to why buprenorphine abuse took off in Finland and not in Sweden, but there are a number of possible explanations for the difference in trends in heroin consumption in the 2000s between the two countries. These include availability of heroin in the country; drug prices; the time buprenorphine has been available in each country; prescribing practices and treatment settings; and different dosage or mechanism of administration of buprenorphine.
- These factors represent a list of possible explanations for the increase in illicit buprenorphine use in Finland and for its departure from hitherto shared patterns of heroin use with Sweden. Obviously, none of these is able to account for this phenomenon on its own; however, taken as a whole, they offer a contextual background that allows us to formulate plausible hypotheses as to what set Finland apart from its Nordic neighbour and, more generally, from other European countries. One important qualification to add here is that attribution of causation is problematic mostly because of lack of data.
- While the effects of increased buprenorphine use in the short run offer a somewhat mixed picture, especially given that the observed drop in deaths attributable to heroin post-2002 was offset by a sharp increase in buprenorphine-related deaths, it is conceivable that it will have more positive outcomes in the longer term. The increased use and abuse of buprenorphine have led the country to experiment with drugs that have similar therapeutic effects but less euphoric or addictive effects. In late 2004, a buprenorphine-naloxone combination drug (Suboxone®), considered to have several advantages over buprenorphine in that it allows for expanded access, take-home dosing, lower costs, and possible lower levels of abuse potential, became available in Finland, followed by Sweden two years later. As a result of these develop-

ments, it is envisaged that the health and social harm caused by the increase in buprenorphine use will be reduced in the coming years while the benefits gained from substantially reduced heroin use will be fully retained.

## 5.2 Summary

While heroin use appears to be decreasing in the European Union, the morbidity and mortality due to heroin continue to be a serious problem in a number of Member States. This case study looks at two Nordic countries that are quite similar on a number of measures, but have had different experiences with opioids over the past two decades: Finland and Sweden. Indicators from both countries suggest that heroin use has decreased since the late 1990s, but it is now extremely rare in Finland. By contrast, heroin is still the most common drug detected in deaths in Sweden. Both countries started prescribing buprenorphine to treat heroin dependence in the late-1990s<sup>3</sup>, but in Finland buprenorphine dependence is now the main reason why individuals seek treatment and is believed to be the leading cause of drug-related deaths in this country. This chapter seeks to generate plausible hypotheses, which if tested, would help account for these differences between the neighbours.

This chapter uses the following logic model as its basis. External conditions affecting opiate supply or opiate transit countries may modulate the internal socio-economic environment in receptor countries, specifically in regards to the availability of illegal opiates entering those countries. Internal conditions can affect the distribution of drugs, their consumption, and the way treatment for abuse is provided. These internal conditions (political and legal frameworks, and social norms) can also determine how widely and effectively legal opioid prescription is provided to the population but can also have an effect of abuse (even of legally prescribed substances). When abuse exists, these legal and political frameworks can allow for the development of opioid substitution therapies that are mainly aimed at reducing addiction as well as improving the conditions in which individuals expose themselves to opioids. Populations that are more vulnerable or that engage in high-risk behaviours are at especial risk. These high-risk behaviours, such as opiate abuse, may lead to changes in opiate-related morbidity and mortality. A variety of factors may influence the types of drugs people abuse and the method of abuse. These include changes in the supply of opiates (both legal and illegal), changes in internal and external conditions, and economic uncertainties. The latter can also modify the way in which countries approach opiate substitution therapies and how wide or restrictive programs can be which in turn can affect legal and illegal consumption.

Building on this logic model, the paper presents available data on heroin prevalence, treatment indicators, reported prices, drug seizures, and opioid-related harms for both studied countries. This is complemented by a discussion of their respective OST regimes in order to inform the formulation of hypotheses.

While there is no definitive answer to why buprenorphine abuse took off in Finland and not in Sweden, there are a number of possible explanations for the difference in trends in heroin consumption in the 2000s between the two countries. These include availability of heroin in the country; drug prices; the time buprenorphine has been available in each country; prescribing practices and treatment settings; and different dosage or mechanism of administration of buprenorphine.

The replacement of heroin abuse with buprenorphine abuse in Finland may have been associated with changes in heroin availability during the critical period of late 1990s and early 2000s. The peak in heroin consumption, registered in the late 1990s coincided with peak production of opium in Afghanistan, resulting in high availability of heroin in Finland. The situation is likely to have changed as a result of the 2000 ban on poppy cultivation by the Taliban, leading to significantly reduced availability of heroin. This scenario matches the picture offered by data on seizures of heroin, which indicate a notable decline in the aftermath of 2001. Poppy cultivation and heroin production nonetheless increased again a short term after yet it never increased in Finland but was replaced by buprenorphine. By contrast, Sweden, while also susceptible to the repercussions of the reduction in the production of heroin from Afghanistan, was in a position to mitigate its impact due to the existence of somewhat more diversified heroin supply routes.

Lower price is conceivably another factor that can possibly explain the increase in illicit use of buprenorphine and the related shift away from heroin, and is closely linked to the preceding one of heroin availability. While this argument is potentially applicable to both studied countries, the attractiveness of buprenorphine as a cheaper as well as a safer alternative to heroin is likely to have been more pronounced in Finland. Finnish retail heroin prices may have been considerably higher than those in Sweden in the 1990s. This gap seemed to narrow towards the end of the decade but persisted until the middle of the 2000s, spanning the period during which buprenorphine was introduced into the substitution treatment systems in both countries.

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<sup>3</sup> This is hard to say definitively without information about purity of heroin sold at the retail level in both countries.

One plausible explanation for the increased rate of buprenorphine abuse in Finland is its earlier introduction as a heroin substitute. Buprenorphine-based treatment was introduced in Finland in 1997, while use of buprenorphine in Sweden started two years later in 1999. Longer exposure to availability of buprenorphine and the possibility of its diversion for illicit use could explain partially the divergence between the two countries, even though it is very unlikely to account for the difference in its entirety.

Another potential reason for the rise in buprenorphine use in Finland could be local prescribing practices and availability of treatment options. In comparison to majority of other European countries, Finland has a restrictive system for the delivery of substitution treatment and relatively strict criteria for eligibility. As a consequence, the rigid control of drug treatment in Finland has likely contributed to individuals resorting to illicit buprenorphine. It should be noted, however, that an analysis of access to treatment is more useful for accounting for the rise of illicit buprenorphine use in Finland, rather than for explaining the difference between Finland and Sweden. The Swedish treatment system is rather similar to the Finnish one in terms of restrictiveness and eligibility and therefore the likelihood of a similar diversion of drug use would be expected to be comparable.

The use of opioids and their administration can be also a relevant factor. The mechanism of administration is important because different types of poly-drug users report different purposes of abuse, which is key for identifying the proportion of users who illegally obtain buprenorphine for treatment versus those who use it for recreational purposes. Data on administration patterns from Sweden and Finland confirm that drug users dose themselves with buprenorphine in different ways. In Sweden, sublingual administration of illicit buprenorphine was reported to be more common and more frequent among heroin users compared to amphetamine users. Also, illicit buprenorphine was reported to be mainly used among heroin users for withdrawal treatment or self-detoxification, rather than for euphoria seeking, in places where maintenance treatments are not available. In this instance, the preference for sublingual form may be reflective of the fact that it corresponds to how buprenorphine is generally prescribed in its legal form. By contrast, injected buprenorphine is more common in Finland.

These factors represent a list of possible explanations for the increase in illicit buprenorphine use in Finland and for its departure from hitherto shared patterns of heroin use with Sweden. Obviously, none of these is able to account for this phenomenon on its own; however, taken as a whole, they offer a contextual background that allows us to formulate plausible hypotheses as to what set Finland apart from its Nordic neighbour and, more generally, from other European countries. One important qualification to add here is that attribution of causation is problematic mostly because of lack of data.

Taking a longer-term perspective, Finland appears to be better off after the introduction of buprenorphine. While the effects of increased buprenorphine use in the short run offer a somewhat mixed picture, especially given that the observed drop in deaths attributable to heroin in the early 2000s was offset by a sharp increase in buprenorphine-related deaths, it is conceivable that it will lead to more positive outcomes in the longer term. The increased use and abuse of buprenorphine have led the country to experiment with drugs that have similar therapeutic effects but less euphoric or addictive effects. In late 2004, a buprenorphine-naloxone combination drug (Suboxone<sup>®</sup>), considered to have several advantages over buprenorphine in that it allows for expanded access, take-home dosing, lower costs, and possible lower levels of abuse potential, became available in Finland, followed by Sweden two years later. As a result of these developments, it is envisaged that the health and social harm caused by the increase in buprenorphine use will be reduced in the coming years while the benefits gained from substantially reduced heroin use will be fully retained.

Several unanswered questions remain and deserve serious study including better understanding of the motivations for diversions and sources of drugs and therapeutic uses of diverted drugs. This is relevant for studying buprenorphine as well as buprenorphine/naloxone combinations. For the latter, there is even less evidence about diversion practices. The mode of consumption, the local and international availability of drugs, behaviour of individuals in societies, the implementation of OST programs, enforcement, illicit trafficking, and the health sector's capacity to respond and adapt to changes modulate opioid abuse. Understanding these interactions as well as the benefits and secondary effects of different drugs can contribute to the implementation of a better-informed drug abuse prevention program that combines harm reduction with proper enforcement activities.

# 6 Managing potential conflict in illegal markets: an exploratory study of cocaine smuggling in the Netherlands

Melvin Soudijn and Peter Reuter

## 6.1 Key findings

- Cocaine smugglers frequently face potential disputes with others in the same business as the result of shipments being seized, disagreements about money or drugs or failure of agents or customers/suppliers to perform. They may use violence to resolve these, as is often assumed. We developed an “incident data base” from 31 large files on Dutch-domiciled cocaine smugglers. Analysis of this data-base showed that many disputes were resolved without either violence or its threat; the parties might agree that no one was at fault or that compensation could be provided in a later transaction.
- The disputes that were most likely to result in violent resolution were those involving participants of different ethnic origins or participants in different organizations. However the incident data-base, with only 33 observations, is too small to make these findings more than indicative.
- This study was restricted to a specific drug (cocaine), level (smuggling) time (2005-2010) and place (the Netherlands). However, methodologically the study suggests that it is possible to use rich investigative data to examine what drives violence in the drug trades.

## 6.2 Summary

Illegal enterprises operate in settings of risk and uncertainty very different from those in legal businesses. Not only do the state and competitors threaten their transactions and assets but they cannot make use of written contracts, settle disputes through the civil courts or obtain information as readily as their legal counterparts. Thus disputes are likely to be more common. Moreover those entering illegal markets include many whose skill is intimidation. It is widely assumed that illegal entrepreneurs, such as drug dealers and human smugglers, make routine use of violence to settle disagreements or punish failures. Studies of drug retailing, mostly in the U.S., show a variety of non-violent dispute resolution methods but there is no study of high level traffickers, whose risk-reward calculations may differ.

The data for this research were extracted from 31 case files on cocaine smuggling enterprises involving Dutch-resident ringleaders. The cases included all the major investigations of cocaine smuggling from 2005-2010. Each enterprise had been involved in smuggling of shipments of multiple kilos, typically tens of kilos, in a single shipment, worth hundreds of thousands of Euros. Since the Dutch police make extensive use of wiretaps and other electronic surveillance the case files are relatively rich in their description of interactions among participants.

We used data on 33 incidents involving failure of cocaine smuggling related transactions of smugglers to examine the use of violence and threats. We focused on incidents that could potentially, or did actually, derail the trafficking of cocaine. Many involved transactions between Dutch-domiciled dealers and exporters from South America. We defined incident in a broad sense keeping it open to include all kinds of possible failures. These could range from accidentally faxing the details of an operation to the wrong fax number, forgetting to extract all the cocaine out of a shipment of fruit to even stealing shipments of cocaine. These incidents often led dealers, otherwise cautious in their phone conversations, to be more open in their communication in order to deal with a crisis expeditiously. We focused our analysis on the principal in the operation, hereafter called the ringleader.

Most ringleaders are also involved in the smuggling and production of other drugs including, Ecstasy, precursors, hashish, Dutch cannabis, or heroin. They do not seem to have much involvement in illegal markets other than drugs; one is involved in cigarette smuggling and another in owns a brothel.

The data show that in most instances the ringleader follows routines perhaps not very different from those in legitimate organizations, investigating whether the balance of evidence favours an interpretation of bad luck or underlying incompetence as opposed to an effort to defraud. As shown in the table, 60 per cent of the incidents were resolved without threat or actual violence. Participants were often willing to negotiate a compromise. For example, in one incident a seller says that the buyer did not hand over as much money as promised following a cocaine delivery; they agree that this will be dealt with in their next transaction. These kinds of agreements point to the confidence of the participants that their transactional partners have a high probability of continuing to operate, suggesting that stable markets may be less violent.

However 40 per cent of incidents did involve the actual use of violence; this count includes two incidents in which the police stepped in to rescue the target. Looking not at incidents but at ringleaders (i.e. taking into account that there are multiple observations on some individuals) we still find seven out of 18 who are involved in at least one incident resolved with violence. It appears that it is not just a few “bad apples” that feel the need to use violence.

#### Characteristics of incidents

Incident type	
Money dispute	9
Loss of drugs	7
Problems offloading	5
Police confiscation	5
Unexpectedly low quality of drugs	3
Delay	1
Quitting	1
Stealing cocaine	1
Exposing operation	1
	33
Resolution	
Violence	11
Barter	8
Leave it	5
Physical proof	5
Find more capable party	2
Rerouting	2
	33

With only 33 incidents in the database, analyses of sub-groups can only be descriptive and indicative. We hypothesized that incidents involving participants from the same ethnic group would be less likely to require violence for resolution and similarly that incidents within a group rather than between groups would also be less likely to generate violence. The data are consistent with both these hypotheses.

It is perhaps surprising that such a high percentage of these incidents involves the use of violence. In some cases the culpable party had acted in an egregious fashion, which is not to justify morally the violence but to suggest that it was not arbitrary and capricious. Cocaine smuggling attracts many individuals who indeed cannot be trusted; their behaviour may reasonably provoke forceful responses, shading into violence.

This is the first systematic study of violence in the higher levels of the drug trade. This sample is limited in scope; Dutch-resident dealers, cocaine, 2005-2010. While it adds to the literature by providing data on high-level transactions, it cannot be generalized to other drugs, places and times. For example, the Netherlands is a country characterized by low levels of violence, which may discourage violence in the drug trades. The results here are preliminary and further analysis of the data-base is expected.

# 7 'Polymorphous criminal networks': considering criminal groups' engagement across markets

Jennifer Rubin, Mafalda Pardal, Peter McGee and Deirdre Culley

## 7.1 Key findings

- The study highlights that transnational criminal networks are polymorphous – that is, they are flexible and may shift activities and/or diversify the portfolios of goods and services in which they engage and from which they profit. Diversification includes trafficking of and trade in a range of illicit goods/services, as well as in the licit economy. The range of substances and activities that tend to co-occur, and diversification into and between illicit and licit markets, has not yet been systematically considered.
- Polymorphous criminal networks (PCNs) can change their focus and diversify in response to a range of pressures and motivations. The paper provides a typology of factors associated with diversification, including market forces, the legislative and regulatory environment, regime change and political events, human capital, knowledge and networks, and cultural factors.
- Illicit and licit markets are interconnected as are processes and activities in ecosystems. Because PCNs are driven by profit, law enforcement and other interventions that put pressure on one market are likely to impact on others, as PCNs seek to replace their income and/or expand and diversify to improve resilience. Without a better picture of where, how and why this happens, and with what combinations of goods and services, it is difficult to build policy and operations best tailored to tackle these polymorphous criminal networks in an informed manner that will effectively reduce harms to communities. Without this broader picture policy and operations risk addressing one problem to watch it re-emerge in a different shape or elsewhere.
- While this paper begins to build a picture from available data on co-occurrence and diversification within PCNs, we are aware of and highlight limitations of existing data which can only provide a partial picture that may say more about a particular jurisdiction's reporting practices or strategic priorities and resource focus than about the scale or range of different illicit activities in that area. Furthermore, the licit services and activities engaged in by PCNs are beyond the scope of law enforcement action and are therefore in any case unlikely to be captured within criminal justice datasets.
- The study proposes a new approach to the analysis of polymorphous criminal network activity - a 'big data' approach that would address some of these challenges, complementing and building from existing data. This approach would do so by seeking out information about the range of illicit activities linked to PCNs in different datasets within the criminal justice system, for example those gathered by units focusing on drugs, prostitution, firearms, and other potentially related crimes. However, this approach proposes going beyond law enforcement datasets to include and indeed focus on drawing from data on health, housing, expenditure and other service provision that may be associated with the range of PCNs' activities. This would provide a more comprehensive and systematic picture of the movements and relationships between markets.

## 7.2 Summary

At a time when drug policy and law enforcement regimes for tackling illicit markets are in a state of flux, it is important to understand how changes in the treatment of one type of illicit activity or substance may impact others. Some criminal networks are unlikely to allow profits and trade in one area to disappear without seeking to replace that income in other ways. On the contrary, many criminal groups and networks have shown themselves to be adaptive to changing when under pressure. We call these 'polymorphous criminal networks' (PCNs) because of their ability to change. However, relatively little is known about the relationship between most illicit trades, for example between one illicit drug and another or between drugs and human trafficking, or about the relationship between those and many of the licit activities in which criminal networks also engage. Indeed, there are very few sources of information, datasets or even frameworks for thinking about such relationships. And the data that are available largely depend on law enforcement reporting, driven by seizures and arrests, which is often a better measure of the allocation of police resources than of actual levels of activity by criminal groups. Yet without better information about how

criminal networks' activities shift and change, it is difficult to develop evidence-based policy and operations to tackle them. This chapter begins to address this gap and indicate a means of building the evidence base by providing an illustrative collation of the licit and illicit activities undertaken by criminal networks as identified in a targeted review of the literature. The paper also captures, where possible, reasons for market diversification and movement between licit and illicit goods. Finally, we propose a new framework building from textured micro-level case study and investigative information, to develop an understanding of wider, non-criminal justice datasets that may be available to develop more robust understanding of the relationships between the range of activities undertaken by transnational criminal networks, especially those who traffic in drugs.

## **Background to the study of co-occurrence and diversification**

### ***Polymorphous criminal networks in the context of transnational and organised crime***

There is growing recognition that many criminal groups can be better understood as networks, attending to their flexibility of structure and range or portfolio of activities. These transnational criminal networks are likely to be involved in more than one illicit market or activity. These groups may link with each other, adapt supply chains and adjust their activities in response to law enforcement interventions and market opportunities. In this context, we introduce the concept of polymorphous criminal networks (PCNs) to refer to those groups or networks, at local, national, regional, or international levels, able to profit from activities relating to multiple illicit goods and/or services.

### ***Geographic mobility and diversification of drugs***

Organised crime groups are mobile and may extend their activities and reach to different locations. This mobility has been the focus of criminological research, attending to some of the drivers of and constraints on this geographic mobility. Other studies have addressed diversification within illicit drug markets, alluding to the flexibility and elasticity of illicit drug markets - what has been called the 'balloon effect'.

### ***Towards a focus on wider co-occurrence, diversification and its drivers***

While there has been some focus on diversification of routes and of movement between trafficking in different types of illicit drugs, there has been less attention to the multiplicity of goods and services that may be traded, provided and trafficked together. Yet a better understanding of what may be driving diversification and co-occurrence could valuably inform the development of more coherent strategic policy and law enforcement operations by providing indications of where and how PCNs' activities may be likely to shift.

### ***Challenges to the study of market diversification***

A significant challenge in attempting to identify co-occurrence and diversification from one market to another lies in the lack of readily accessible data. Police in many countries do not uniformly record the range of illicit goods and services traded and/or engaged in by criminal groups, instead collecting information only about their particular area(s) of focus. Further, because the licit goods or services engaged in and provided by those criminal groups are normally beyond the scope of law enforcement action and interest, these activities may be even less likely to be recorded. Even though a number of guidelines and rules have been established at national level in many countries, the degree of police discretion regarding the recording of crime varies across different criminal justice systems and jurisdictions. Furthermore, at every stage of the criminal justice system a significant number of cases are likely to 'fall out' of the system and therefore go unrecorded. Throughout this process some peripheral criminal activities may be filtered out as well, and therefore such data is not readily available from traditional criminal justice records which do not then capture the breadth of activities and services carried out by any one criminal group.

## **Co-occurrence**

### ***Approach to illustrate co-occurrence***

In order to highlight the potential for building a fuller picture of the range of activities and services in which PCNs may be engaged, we conducted a targeted review of empirical studies, extracting what those studies present as goods and activities in which different groups and networks are engaged. While this information is not comprehensive even for the groups discussed here, and is not representative of all groups, it nevertheless provides both an indication of the range of some PCNs' movements and activities. The 11 studies considered included a total of 27 organised crime groups from 12 different countries, and incorporated 54 different activities or commodities trafficked or traded, ranging from primarily illicit activities to those that are primarily licit.

### ***Beginning to build a picture of co-occurrence***

- Our targeted review showed the most diverse organised crime group in the studies included was engaged in at least 14 different activities across licit and illicit markets.
- The studies included identified 9 cases in which a group was engaged in both primarily licit and primarily illicit activities or trade in commodities. In three of those cases, an involvement in public works or in the food and catering sector was described as co-occurring with a range of different illicit activities. While emphasising that these studies provide only part of the picture, they nonetheless highlight that the number of activities described, even if partial, is extensive.
- About two-thirds of the criminals and organised crime groups (19/27) engaged in the production and/or trade of illicit substances. Drug trafficking did not co-occur with the production of drugs in 10 of the cases from these studies. What is more, the majority of these instances of trade-only involvement with drugs involved the trafficking of other substances or commodities, which given the reporting biases explained above, may be an underestimate of the actual frequency of co-occurrence.
- Cocaine and heroin were the substances most often described as co-occurring in instances of trafficking, both with other primarily illicit activities/commodities and with primarily licit activities/commodities. While again this could be subject to a reporting bias, it is nevertheless interesting to note the strong pattern of co-occurrence.

## **Market diversification**

### ***Review of market diversification***

While PCNs are involved in a range of different activities, there is little understanding of how and why they may diversify their portfolio of activities and services. An analysis of existing research and case reports has allowed us to gather multiple explanations for the diversification and mobility of some criminal groups. The table below provides an overview or taxonomy of some of the key factors identified in the literature as being associated with diversification.

#### **RAND taxonomy of influencers of PCN market diversification**

<b>Market forces</b>	Level of competition among existing firms Number and kind of potential entrants Bargaining power of buyers Bargaining power of suppliers Threat/opportunity of substitute product Supply and demand/changing fashions Threat from violent competitors Level of trust between buyers and sellers Access to customer base (open/closed markets) Access to commodity supply/production Financial risk/return
<b>Legislative and regulatory environment</b>	Level of competition in market place Risk of involvement Attractiveness of market Level of regulation enforcement/corruption Risk to proceeds/assets Incentivisation through avoidance of consumer protection regulations Incentivisation through high tax rates to deal in untaxed or counterfeit goods Displacement effects
<b>Regime change and political events</b>	New opportunities for individuals to tap into networks that can be used for organised crime Structural changes: no more borders Harsh economic conditions drive demand Rejection of Soviet equality and sexualisation of women associated with prostitution War and violence Ungoverned space State involvement
<b>Human capital, knowledge and networks</b>	Skills and knowledge to tap into Family and ethnic ties Access to logistical infrastructure (transport, storage, manufacturing facilities, financial expertise, forged documents, internet, etc.) Changes in technology Language

Culture	Culture Gender roles Manipulation of traditions Tap in to consumer resentment of high taxation rates Capture new markets/consumer demographic through interne
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## The need for new approaches to measurement

### ***A possible new approach to measuring illicit markets: using data from other areas to build an ecosystems approach***

In the sections above we have noted that different illicit and licit goods and services may interrelate and co-occur, as indicated in the literature, in the law enforcement case files and press releases. Policy and operations would thus benefit from a more systematic understanding of whether and how these co-occurrences take place, and whether and why criminal networks diversify their portfolios. We therefore conclude by proposing a conceptualisation for a new approach that would help provide this fuller picture, complementing and moving beyond existing data silos and partial reporting. Given the dynamic and inter-related nature of illicit markets, PCNs and the environments in which they operate, we have drawn on the analogy of an ecosystem. In practice this approach would require seeking out what we are calling the traces of illicit activity, often in data that currently exists, including and especially outside of criminal justice (e.g., health data, data on access to services, insurance and expenditure data). When the likely useful datasets are identified, it is then possible to develop indicators that would allow the analyst to observe changes in levels of activity to be observed in these data. Further, if several key indicators were to be gathered for each illicit market activity, these could then be assessed together, as a kind of dashboard for various illicit criminal markets in a particular area. If several of these indicators on the market dashboard then pulled in the same direction, this would increase confidence that these triangulated pieces of information were saying something robust about a given activity, trade, or when assessing several dashboards, about relationships between them. The establishment of 'Big Data Working Groups' to look across different datasets within the criminal justice system as well as across these other areas, with anonymised aggregated data, would allow for a better understanding of where illicit trade moves over time and across substances and markets. This would provide a clearer picture of the relationships between different illicit markets, and between illicit and licit markets and activities. This information could then be assessed against knowledge about law enforcement interventions and other changes in the environment both to better assess the impact of policy and operations, and to develop more strategic approaches to tackling associated activities together.

## Concluding recommendations

Given both the challenges described with respect to measurement of illicit markets and the need to better inform policy and operations by doing so, we recommend several possible areas for progress. First, it would be useful to expand the collation of evidence of co-occurrence through mining of case studies and existing research. Second, it would be beneficial to simultaneously build understanding of PCN's business models and reasons for diversification to inform policy and operations, through mining similar datasets, as well as through more targeted interviews and research.<sup>4</sup> Finally, we recommend the initiation of focused data assessment and data mining exercises specifically aimed at identifying, collating and analysing data from outside the criminal justice system to build a picture and more independent measures of illicit markets, the relationships between them, and between them and wider licit activities.

<sup>4</sup> ALICE RAP and others are building on Matrix study and developing this work further. And it will be important to build on both management literature about behaviour of firms and the growing knowledge base from behavioural economics to do so.

# 8 Insights about cannabis production and distribution costs in the EU

Beau Kilmer and James Burgdorf

## 8.1 Key findings

- Enforcing laws against the production and distribution of cannabis dramatically inflate their costs. The increase is largely driven by having to compensate producers and suppliers for their risk of arrest, incarceration, seizure, and violent injury as well as by the inefficiencies associated with having to operate covertly.
- In Morocco it costs approximately €90 – €180 to purchase the cannabis needed to produce 1kg of cannabis resin. The value of this 1kg increases as it moves along the supply chain (See Figure S1 below). After accounting for labour and distribution costs as well as risk compensation, that same 1kg generates approximately €8,000 in gross revenues in a Dutch coffee shop.
- The marginal cost of producing organic, high-potency, medical-grade herbal cannabis that has been professionally tested and packaged and produced in a Dutch facility with vegetation and flowering rooms that are both 56 square meters is about €1,000 per kilogram.
- Removing the prohibition on cannabis production and distribution could dramatically reduce the production and distribution costs; however, the size of the decrease will largely depend on the type of production that is allowed and how the market is regulated (e.g. will there be several private producers, a state monopoly, non-profit cooperatives, etc.). Further, the significance of the drop will also depend on the economic situation of the producing countries. We would expect to see larger drops in industrialized countries where there are significant risks associated with being arrested and sanctioned.

## 8.2 Summary

Policy makers interested in understanding the fiscal and public health implications of alternative cannabis regimes should not ignore the effect of these policy changes on cannabis production and distribution costs.<sup>5</sup> Indeed, if changes in production and distribution costs are large enough to influence the retail price, this could influence total consumption since consumers are sensitive to the price of cannabis (i.e., when price decreases, use increases; see reviews in Pacula 2010; Gallet 2013)<sup>6</sup>.

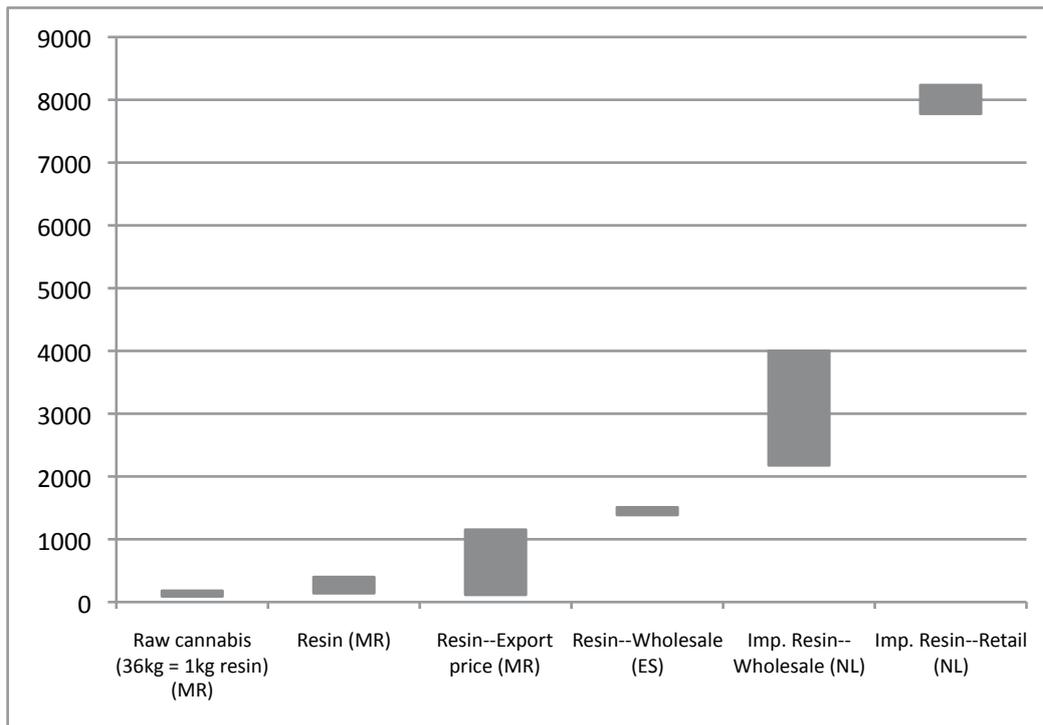
Enforcing laws against the production and distribution of cannabis dramatically inflate their costs. The increase is largely driven by having to compensate producers and suppliers for their risk of arrest, incarceration, seizure, and violent injury as well as by the inefficiencies associated with having to operate covertly. If cannabis were commercially farmed outdoors like any other agricultural good in developed countries, the production and distribution costs would plummet (see e.g. Gieringer 2009; Caulkins 2010; Caulkins et al. 2012). For example, Caulkins et al. (2012) estimate that the cost of producing a kilogram of high-potency cannabis could drop below €100 in developed countries if cannabis was allowed to be commercially farmed outdoors like other crops that need to be transplanted.

This chapter demonstrates how cannabis prices increase across the supply chain in the EU as distributors take additional mark-ups to compensate themselves not only for shipping costs but also for the risks they assume. Figure S1 displays how the value of 1kg of cannabis resin increases as it moves from Morocco to the EC. In Morocco it costs about €90 – €180 to purchase the 36kg of cannabis needed to produce 1kg of cannabis resin. After accounting for labour and distribution as well as risk compensation, that same 1kg generates about €8,000 in gross revenues in a Dutch coffee shop.

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<sup>5</sup> Please note that this paper does not take a position about whether cannabis prohibition, or even cannabis for that matter, is a good or bad thing.

<sup>6</sup> Of course, the overall effect will also depend on the tax rate and regulatory structure. In addition, policy changes may also have non-price effects on consumption (MacCoun 2010). For a more comprehensive discussion of the possible consequences of alternative cannabis production policies, see Kilmer et al. (2010) and Caulkins et al. (2012).

**Figure S1: Approximate value of 1 kilogram of cannabis resin along the supply chain**

**Sources:** in 2012 €. Created by Kilmer and Burgdorf and based on data from Bussink et al. 2007; UNODC 2006; UNODC 2007; Afsahi 2011; Gamella and Rodrigo 2008; and Niesink et al. 2010, as cited in van Laar et al. 2011. Imp. = imported, MR=Morocco, ES=Spain, NL=Netherlands.

To learn more about the costs of producing cannabis in a legal environment in an industrialized country, this chapter looked at the government-approved medical cannabis production program in the Netherlands. While cannabis production and distribution for commercial purposes is illegal in the Netherlands and laws against upper-market suppliers are enforced, an exception is made for medical cannabis. The Dutch Ministry of Health, Welfare, and Sport created the legal infrastructure for medical cannabis in the early 2000s and makes it available in pharmacies to patients with a valid prescription. There are now approximately 1,000 medical patients in the Netherlands, and all medical cannabis is currently provided by the Dutch company Bedrocan BV.

At Bedrocan, the clones from a mother plant are nurtured in a sterile and humid room (Figure S2) before they are moved to a separate room for vegetative growth (Figure S3). Figure S2 displays a picture of one "batch" (130 plants) in the vegetation room which is about 56 square meters. These plants are eventually moved to a similarly sized room next door for flowering. These 130 plants will yield 17kg of useable cannabis bud, a figure which is consistent across harvests. The average yield is approximately 123g per plant, depending on the strain.

**Figure S2: Room full of clones at Bedrocan BV**



**Figure S3: Room for vegetative growth at Bedrocan BV**



Bedrocan reports that its marginal cost for producing a kilogram of high-potency, medical grade, organic cannabis that has been professionally tested, packaged, and gamma irradiated is approximately €1,000. When thinking about how this figure could be used to inform estimates of the cost of producing legal cannabis for the non-medical market, one should keep in mind that 1) This is a heavily-regulated, high-quality product intended to be used as medicine by those who are sick; 2) the cannabis is produced in a relatively small indoor facility in a country with a high cost of living; and 3) there is no competition. As stated earlier, the cost of producing high-potency cannabis in large outdoor commercial farms could be much lower.

In a licit market, the wholesale price will be shaped by production costs, producer mark-ups<sup>7</sup>, distribution costs, and possibly fees and taxes. With the EMCDDA (2012) reporting that wholesale prices of herbal cannabis ranged between €800-€9000 per kilogram in the EU circa 2008<sup>8</sup>, alternative policies could lead to a large reduction in the wholesale price even after accounting for the mark-up and extra costs associated with producing in a licit market.

Removing the prohibition on cannabis production and distribution could dramatically reduce the production and distribution costs; however, the size of the decrease will largely depend on the type of production that is allowed and how the market is regulated (e.g. will there be several private producers, a state monopoly, non-profit cooperatives, etc.). Further, the significance of the drop will also depend on the economic situation of the producing countries. We would expect to see larger drops

<sup>7</sup> A mark-up of 25% is not unreasonable for agricultural producers (Caulkins 2010).

<sup>8</sup> Black market wholesalers currently charge €3,000 - €4,000 for a kilogram of high-potency domestically produced herbal cannabis in the Netherlands (Korf 2011); Spapens 2011; UNODC 2012).

in industrialized countries where there are significant risks associated with being arrested and sanctioned. Indeed, it is possible that a country which allows a commercial market for cannabis could depress retail prices not only for itself but also for other countries. However, this will depend largely on how governments decide to regulate their newly legal markets and how neighbouring countries react to these changes. Thus, when evaluating the strengths and weaknesses of alternative cannabis policies, the cost and price implications of each option should not be overlooked.

## 9 Impact of decriminalisation of personal possession offences in Portugal

Tiggey May and Oonagh Skrine

### 9.1 Key findings

- Respondents answering the web-based survey had a limited understanding of the difference between decriminalisation and legalisation: 60 per cent admitted not understanding the difference between the two, with a further 14 per cent unsure of the difference.
- Despite not understanding the legal subtleties of decriminalisation, the majority of respondents (61%) supported the policy. Supporters of decriminalisation commonly cited individual liberty and the need to treat drug use as a health issue rather than a criminal issue as reasons for their view.
- Fourteen per cent of respondents were opposed to the policy. The most commonly cited reason for opposition was that decriminalisation promotes illicit drug use.
- Portuguese drug policy experts agreed that public and political support for decriminalisation had grown since its implementation in 2001.
- Three of the four experts took a positive view of decriminalisation, saying that it had reduced problematic drug use and that treatment services had successfully been expanded.
- The work of the Commission for the Dissuasion of Drug Addiction (CDTs) needs to be monitored and revised - where appropriate - as the demographic profile and primary drug of individuals referred to the Commission changes.

### 9.2 Summary

In 2001 the Portuguese government decriminalised personal possession of all drugs in Portugal, drug possession became subject to administrative rather than criminal sanctions. Included in the drug policy reforms was an agreement to expand and improve access to treatment facilities. Since 2001, individuals found in possession of small amounts of illicit drugs are referred to the CDT. This panel assesses each individual and recommends an appropriate course of action. Most individuals are referred to a drug service to be assessed by health professionals. This small, qualitative case study aimed to assess the impact of decriminalisation of small quantities of illicit substances for personal use in Portugal in 2001 and capture the views of Portuguese drug users and experts<sup>9</sup>.

#### **Methods**

Information was drawn from the following sources:

- A review of English language literature from the last 20 years
- A web-based survey with 323 Portuguese respondents
- In-depth interviews with four Portuguese drugs policy experts.

#### ***The decriminalisation of drug possession***

Against the background of a worsening drug situation between the democratic revolution in Portugal in 1974 and 2000, a commission was convened to make recommendations for a national drug strategy. The commission recommended the

<sup>9</sup> The 1999 National Drug Strategy comprised a number of different strands, it is therefore extremely difficult to disentangle the impact of decriminalisation (alone) as all of the different elements that were introduced will have had an effect on the health of drug users, the take-up of treatment options, the decline in reported HIV cases and a reduction in the burden on the criminal justice system.

decriminalisation of possession and purchase of small quantities of drugs, alongside increased efforts in treatment, prevention and social reintegration. The recommendations were accepted and the Portuguese Drug Strategy was published in 1999, based on principles including humanism, pragmatism and prevention.

The current policy in Portugal is that, while the use and possession of drugs remains illegal, people found in possession of small quantities of drugs are referred to an administrative rather than criminal process. Drug users are required to attend a CDT, at which they are assessed by a panel consisting of a mixture of professionals, sometimes including psychologists, social workers and lawyers. The CDT generally suspends proceedings for non-problematic users and users who agree to enter treatment. Recreational and problematic drug users who commit other crimes, such as theft, are referred to the criminal system.

Although fears were initially voiced that the policy would attract drug tourists to Portugal, these fears proved unfounded and the policy is now widely accepted across the political spectrum. The opponents of decriminalisation have voiced their concern regarding the acceptance of long term substitution treatment, rather than the promotion of abstinence based therapies. The effects of decriminalisation are somewhat obscured by the fact that some aspects had been in practice before it became policy. It is generally agreed that decriminalisation reduced pressure on the criminal justice system, although before 2001 it was already unusual for drug users to be given prison sentences. Decriminalisation was accompanied by an expansion of treatment services, particularly substitution. Although diagnoses of HIV began to fall several years before decriminalisation, the decline continued after 2001. Intravenous drug use also declined, particularly among under 25 year olds and new drug users.

### ***The web-based survey***

Respondents' understanding of the meaning of decriminalisation was limited: 60 per cent admitted not understanding the difference between decriminalisation and legalisation, with a further 14 per cent unsure of the difference. Questions were included on changes in drug markets since decriminalisation. These results were not clear cut, with fairly even numbers thinking that the markets had decreased and increased for both cannabis and more serious drugs. A small number (n=18) had been referred to a CDT. Of the 16 who attended the meeting most (n = 14) reported that the quantity of drugs they used remained unchanged.

Despite being unclear on the meaning of decriminalisation, the majority of respondents supported the policy (61%), 25 per cent were unsure and 14 per cent opposed it. Of those who opposed decriminalisation the commonest reason for opposing decriminalisation was that it promotes drug use. Ten per cent of the respondents to this question were supportive of the decriminalisation of drugs such as cannabis but not substances such as heroin, cocaine or crack cocaine. Among those supporting decriminalisation, a common sentiment was that drug use is a matter of individual liberty, not concerning the wider public. That the health care system rather than the criminal system was more appropriate for drug users was also a frequent reason given for support of decriminalisation.

### ***Portuguese decriminalisation: expert's views***

There was agreement amongst the interviewees that support for decriminalisation had grown since 2001. Several of interviewees highlighted a shift in the work of the Drug Addiction Dissuasion Commissions (CDTs), from referrals originally predominantly involving heroin users to a greater number of cannabis users. The experts questioned the appropriateness of the CDT system for cannabis users, which has yet to develop a clear way of responding to the treatment needs of cannabis users.

Two of the four interviewees considered drug use and markets to have been generally unaffected by decriminalisation. Of the other two, one said that although cannabis use may have increased slightly, use of heroin and crack had declined and the other that there had been a rising number of all drug related problems. The three experts taking a positive view of decriminalisation cited successes as reducing problematic drug use, expanding treatment services and reducing the number of individuals criminalised for drug possession. Although some fine tuning of the system, particularly the work of the CDTs, there was general agreement that that the current policy would continue for the foreseeable future. One interviewee thought that Portugal urgently needed to back track and adopt a policy more similar to that of Sweden.

### ***In conclusion***

Decriminalisation in Portugal has become widely accepted in Portugal as a pragmatic and humane policy. Despite the widespread political support and a generally supportive public, the WBS suggested that decriminalisation is frequently misunderstood by the general public. The challenge posed in correctly informing the public of the legal technicalities of decriminalisation should not be underestimated and should remain on the agenda for Portugal and other countries considering such changes to their drug laws. A relatively new issue that Portugal should perhaps address is the relevance of CDTs. Changing drug use

patterns have meant that the proportion of problematic heroin users, for whom the system was designed, has declined and the number of cannabis users being referred has increased. If CDTs are to be used to assess cannabis users in addition to heroin users an advisory panel should perhaps provide guidance on how to achieve what is best for both (potentially very different) groups of users. Policy makers, from other countries, interested in adopting the Portuguese model need to be mindful that decriminalisation was part of a wider range of strategies, which included improving the prevention of drug use, streamlining referral mechanisms to treatment, putting in place appropriate treatment services and reducing the burden on the criminal justice system.

## 10 The impact of changes in the Netherlands coffee shop policies on local buyers and markets

Tiggey May and Oonagh Skrine

### 10.1 Key findings

- Of the 871 respondents to the web-based survey most (70%) reported that they were aware that the incoming government would implement a weed pass, half of the sample, however, didn't think their buying habits would change regardless of whether a weed pass was introduced or not.
- During 2012, few respondents (representing the 12 provinces) reported that they had noticed a change in the number of coffee shops in their local area. Over three-quarters reported that their attendance at coffee shops had remained the same over the previous 12 months despite the proposed changes having been implemented in a number of areas of the Netherlands. For instance, the so-called weed pass was only 'tested' in the three Southern provinces for some months in early 2012.
- A number of respondents were critical of the introduction of the weed pass, mainly because they considered the policy of condoning cannabis use and sale whilst it remained illegal nonsensical.
- Just over a fifth (22%) believed that the cannabis market should be regulated to ensure its separation from more serious drugs. The same number (22%) of respondents commented that they believed the introduction of weed passes would open the cannabis market to a more diverse range of criminals.
- Dutch drug policy experts tended to agree that the Netherlands had achieved an effective market separation; it is widely accepted that the cannabis markets operate separately from the heroin and cocaine markets. However, how cannabis is supplied to coffee shops is largely unregulated, un-policed and rarely monitored - leaving it open to infiltration from organised crime groups.
- The expert interviewees agreed that whilst the weed pass would undoubtedly alleviate some of the problems caused by drug tourism, none thought it would eradicate them.
- Regulating the supply of cannabis to coffee shops remains a challenge for the Dutch government.

### 10.2 Summary

Since the late 1960s cannabis use and the possession of cannabis for personal use has been condoned in the Netherlands. In an effort to separate the markets for hard (heroin and crack) and soft (cannabis) drugs, the Dutch Narcotics Act of 1976 officially decriminalised the possession of cannabis for personal use and the sale of small quantities, characterising it as a misdemeanour rather than an offence. From 1994 there has been a trend towards tightening the coffee shop regulations. By May 2012 the then government announced a new policy, restricting access to coffee shops through a membership pass for local residents (the weed pass). The aim of the pass was twofold: to keep coffee shops small, regulated and only for the use

of the local population, while at the same time rejecting access to drug tourists travelling to the Netherlands. The new rules were provisionally put in place in a few municipalities in the South of the country in 2012 and were due to be implemented nationwide in January 2013. A number of commentators, including coffee shop owners and patrons expressed concerns about the proposed new policies stating that street dealing would increase, the tax revenue from coffee shops would decrease and the market separation that had been the cornerstone of Dutch drug policy would be eroded. The aim of this small qualitative case study was to provide a snapshot (in time) of the views of members of the public and a small number of Dutch drug policy experts of the proposed coffee shop changes.

### **Methods**

The information used to inform this work was drawn from the following sources:

- An English language literature review of sources published in the last 20 years
- A web-based survey with 871 Dutch respondents (this survey was carried out prior to any changes being implemented)
- In-depth interviews with a small number of Dutch drug policy experts.

### **Dutch cannabis use and regulation**

Since the late 1960s cannabis use and possession for personal use has been condoned in the Netherlands as part of a consensus not to combine morality with criminal justice. In the 1970s it began to be argued that criminalising cannabis could lead users to further involvement with drugs considered more dangerous, such as heroin. In an effort to separate the markets of hard and soft drugs, the Dutch Narcotics Act of 1976 officially made a separation between soft and hard drugs and decriminalised the possession of cannabis for personal and the sale of small quantities, characterising it as a misdemeanour rather than an offence. The prevalence of cannabis use among young people remained much the same, despite the more relaxed legislation. Throughout the 1980s the coffee shop system emerged and, despite the sale of cannabis remaining illegal, toleration led to their proliferation.

In 1994 a new coalition took a tougher stance on cannabis regulations. With the aim of reducing public nuisance, drug tourism, cannabis cultivation and coffee shop related crime, a number of new restrictions were introduced. Limits were imposed on the quantity of cannabis a coffee shop could sell in any one day or house; minors were not permitted to make purchases; the number of plants allowed for home cultivation was limited; and mayors' powers to close coffee shops were bolstered. Between 2000 and 2009 the number of coffee shops nationally fell from 813 to 666.

In 2009 a review and evaluation (by leading Dutch drug policy experts) of Dutch drug policy was launched. One conclusion of the review was that the separation of the markets was reasonably successful. The expert committee recommended that coffee shops should move towards being 'closed clubs' thus limiting drug tourism. The committee also highlighted that ideally there should be a national policy on how coffee shops are managed but this policy should allow municipalities the flexibility to respond to local demands. Ideally local responses should involve the mayor, Public Prosecution Service, the police and preferably include an input from the municipal health service.

In conclusion the Committee stated that it: "would call for a more systematic approach, with further development of drugs policy in a more systematic and controlled manner than we have seen over the past few years ..... and with more guidance from central government..... National policy will have to be more actively shaped, and this will include the setting up and evaluation of experiments".

The government responded and issued a memo outlining their proposed new policy which was to make coffee shops quiet places for adult local residents, to restrict the number of coffee shops in any one area, and to increase efforts against organised criminals selling cannabis to coffee shops.

In May 2011, the government announced a policy to restrict access to coffee shops through a membership pass, which was to be open only to adults (although the requirement that buyers are adult is not new) resident in the Netherlands, with the stated aim of preventing foreign drug tourists from travelling to the Netherlands. The new rules were due to be implemented countrywide in January 2013. Coffee shop owners expressed concerns that customers would be unwilling to register with coffee shops and that street dealing would increase. The unwillingness to register was born out by surveys with consumers. After the 'weed pass' was implemented in the Southern provinces, such as Limburg, there were reports of increased street dealing. During the writing of this report the Dutch government changed and decided not to introduce the weed pass, instead suggesting that visitors should present their identity card proving that they are residents of the Netherlands. The implementation of this rule has been left at the discretion of individual municipalities, some of which have decided to continue to allow

non-Dutch residents to purchase cannabis.

### ***The impact of the weed pass on the general public***

Our survey was carried out in early 2012, prior to the weed pass plan being abandoned. The views of the respondents therefore have to be viewed from that perspective. Just over two-thirds (70%) of the web-based survey respondents were aware that the weed pass was due to be implemented in the Netherlands; just under half, however, believed that its introduction would have little or no effect on their purchasing habits. Prior to the weed pass becoming formal legislation a number of areas in the South of the country implemented some of the proposed changes; however, few respondents of the web-based survey reported noticing any changes occurring in the number of coffee shops in their local area. Although the majority of respondents did report that stricter policies were being imposed by the proprietors of their local coffee shops, for example: restrictions were being placed on the amount individuals could purchase and tighter control was being imposed on who was admitted to the premises. Despite the regulations changing, just under a quarter of the sample (across the country) reported that their attendance at coffee shops had remained the same over the previous 12 months.

### ***Dutch cannabis policies: the views of the web-based survey respondents***

It would appear that with the tightening of the regulations that govern Dutch coffee shops there has been a concurrent drop in public support for Dutch drug policy. Almost half of the survey respondents were critical of current Dutch cannabis policy stating that it was nonsensical. Although a third supported the new coffee shop policies. Just over a fifth (22%) believed that the cannabis market should be regulated to ensure it retains its separation from other more serious drug markets. Nearly a fifth (22%) of respondents believed that the introduction of weed passes would open the cannabis market up to a more diverse risk taking range of criminals.

### ***Dutch cannabis policies: the views of Dutch drug policy experts***

Dutch drug policy experts tended to agree that the Netherlands had achieved an effective market separation; they agreed that the cannabis market operates separately from the heroin and cocaine markets but were unsure whether the tighter coffee shop regulations would erode this previously successful policy of market separation. The experts voiced greater concern regarding the supply of cannabis to coffee shops, stating that how cannabis is supplied to coffee shops is largely unregulated, un-policed and rarely monitored - leaving it open to infiltration from Organised Crime Groups. The expert interviewees agreed that whilst the weed pass would undoubtedly alleviate some of the problems caused by drug tourism it was unlikely to eradicate them entirely and might even create other unforeseen problems.

### ***Conclusion***

The introduction of the weed pass has been a relatively contorted and confusing process, with its impact being purely dependent upon where you live. Although the Southern municipalities adopted the weed pass in 2012, with the aim that the weed pass would be implemented nationwide in January 2013 the new Government in November 2012 abandoned this plan. The new government instead implemented the less restrictive proof of residency requirement (see above). In essence, decisions on who to allow into coffee shops have now been left in the hands of the mayor of each municipality. Although complex and confusing for residents and visitors alike, the decision to devolve responsibility to local politicians seems a pragmatic one, especially in light of the range of challenges posed by the very different provinces. The more pressing, although less visible, challenge to Dutch drug policy, however, is how to control the illicit (street) drug market, which is likely to flourish as and when coffee shops close, if customers have to register and if drug tourists are unable to buy from coffee shops. Another equally pressing issue, is how to regulate the supply of cannabis to coffee shops – an issue that appears to have been left in the “too hot to handle basket” by successive Dutch governments. This particular issue, however, may now become far more pressing if the risk adverse small scale suppliers desist from supplying, and the risk taking organised criminal gangs take over.

# 11 Key trends of the illicit drugs market and drug policy in the EU: what do experts anticipate for the coming years?

Franz Trautmann

With contributions of Martine Themmen to the analysis of the drug policy trends

## 11.1 Key findings

- The study confirms the future importance of key trends we had identified in our earlier study on the global illicit drug markets (the increase of scale, growing globalisation and diversification of the drugs market and – in the field of drug policy – the decriminalisation of use and possession of small quantities for personal use, a tougher approach to illicit drugs supply, the wider acceptance of harm reduction and regulation instead of prohibition in drug control policies). Experts also emphasised the importance of the following trends for the coming years: the increasing importance of internet as means of drugs distribution, the impact of the economic crisis on the drugs market and on drug policy and the (further) increase of poly substance use.
- Experts underline that the development of the illicit drugs market is following the same general 'economic laws' as the different licit markets. The increase of scale, globalisation and diversification of the illicit drugs market is at the same time partly understood as unintended consequences of the current prohibitive drug control policy.
- Some of the examined drug policy trends (decriminalisation of use and possession of small quantities for personal use, wider acceptance of harm reduction and regulation instead of prohibition in drug control policies) are interpreted to be a response to dissatisfaction and/or disappointment with the results of current drug policy, to its unintended consequences (individual and public health risks and the contribution to illicit economies and organised crime), to inconsistencies of the policies towards licit and illicit drugs and to the unreasonableness of criminal proceedings in response to the use of illicit drugs.
- The economic crisis is expected to have a major impact both on the drugs market (e.g. increase of demand) and on drug policy (e.g. budget cuts). Experts also mention that these effects might be intensified by a rise of political conservatism in EU Member States, which might have an impact on social and health policies and support a tougher approach in drug policy. This could lead to divergence from the drug policy consensus reached in the EU in the past decade (e.g. decreased support of harm reduction in some Member States).

## 11.2 Summary

In this study we explored expert views on the future development of selected key trends of the illicit drugs market and policy responses in the EU. As a tool for consulting a number of selected experts we used a variant of the Delphi method, consisting of the following consecutive steps:

1. Consulting a selected group of EU drug experts about key trends of the illicit drugs market and policy responses in the EU and about their future development in three rounds. For the first two rounds we used a web-based application. For the last round we sent out questionnaires through e-mail.
2. Formulating a draft paper, summarising the EU experts' expectations about the development of these key trends.
3. A one round consultation of experts from the seven sample Member States on the conclusions in this draft paper, using questionnaires through e-mail.
4. Consulting international experts to discuss the findings and conclusions from this consultation and writing the report.

To take into account the diversity of viewpoints on trends of the illicit drugs market and policy responses we focused on experts representing different relevant viewpoints on both demand and supply issues, i.e. policy makers, researchers/drug policy analysts, representatives from demand reduction services, police / justice, user/'hands-on' expert and journalists. In

this study we present the major findings from this consultation exercise, followed by a discussion of a number of key trends and some recommendations for a more pro-active policy response to these trends.

Point of departure was a list of key trends we had identified in our earlier study of the global illicit drug markets (Reuter and Trautmann 2009). The selected market trends concentrated on different aspects of increasing drugs supply (increase of scale, growing globalisation and diversification), while the selected policy trends focused around convergence of drug policy in the EU (decriminalisation of use, a tougher approach to illicit drugs supply, wider acceptance of harm reduction and regulation instead of prohibition in drug control policies). The first two consultation rounds showed that the majority of consulted experts agreed with the future importance of these trends.

However, they also brought forward suggestions for other trends which might play an important role in the coming years. The responses we received show that there are three issues which are seen as particularly important by a significant number of respondents:

- The increasing importance of internet as means of drugs distribution
- The impact of the economic crisis on the drugs market and on drug policy
- The increase of poly substance use.

There is wide agreement among the consulted experts that general 'economic laws' ruling licit and illicit markets play an important role in the increase of drug supply. The increase of scale, globalisation and diversification of the illicit drugs market is at least partly understood as being unintended consequences of the current prohibitive drug control policy. The diversification of supply is seen as an element of broader socio-cultural developments driven by trends in youth culture. Advanced pharmaceutical and technological knowledge and search for new, cheaper substances support the increase in scale and globalisation of production. Experts also point at the process of integration of the EU and the development of an open European market as crucial elements. There is debate about the importance of internet as market place for licit and illicit drugs.

The majority of consulted experts expect the economic crisis to have a major impact on the illicit drugs market. It is seen as fuelling, in general, the use of illicit (and licit) substances – in particular poly substance use – and through this also boosting drugs supply. Moreover, different experts expect an increased involvement of young people in selling and producing drugs – especially home growing of cannabis – to make money.

Regarding drug policy the examined trends (decriminalisation of use and possession of small quantities for personal use, wider acceptance of harm reduction and regulation instead of prohibition in drug control policies) are interpreted as a response to dissatisfaction and/or disappointment with the results of current drug policy, with its unintended consequences (individual and public health risks and the contribution to illicit economies and organised crime), and with inconsistencies of the policies towards licit and illicit drugs and the unreasonableness of criminal proceedings as response to the use of illicit drugs.

The economic crisis is expected to have a major impact on drug policy and the drugs market. Experts assume that it will result in a lower ranking of drug policy on the political agenda and in budget cuts. However, there are differences of opinion which areas will be primarily affected by these envisaged cuts. The majority of consulted experts think that in particular the budgets for drug treatment and harm reduction will be reduced. Different experts also point out that these effects might be intensified by the rising political conservatism in EU Member States, which is expected to have a negative impact on social and health policies and to support a tougher approach in drug policy. This could lead to divergence from the drug policy consensus reached in the EU in the past decade. A substantial number of experts point in particular to signs that harm reduction is losing ground in the EU.

A Delphi exercise does not allow for making clear-cut policy recommendations as to which changes in EU drug policy will help to effectively address potential future challenges. Still, there are some conclusions which can be drawn from our study. One conclusion is that it would be worthwhile to explore alternatives for the current prohibitionist drug control approach, e.g. temporary control measures and regulation policies instead of prohibition. A second conclusion is that one should consider improving the knowledge basis of drug policy, particularly regarding (cost)effectiveness of policy measures, monitoring the drugs market, research of effects of new psychoactive substances and poly substance use and exploring the functioning and importance of internet as drugs market place.



# Part I: Drugs market: an assessment from the demand side

## Introduction

Margriet van Laar, Franz Trautmann and Tom Frijns

- 1 Cannabis market: user types, availability and consumption estimates**  
Margriet van Laar, Tom Frijns, Franz Trautmann and Linda Lombi
- 2 Amphetamine, ecstasy and cocaine: typology of users, availability and consumption estimates**  
Tom Frijns and Margriet van Laar
- 3 Heroin market: use characteristics, size of the market and impact of OST on the heroin market**

## Introduction

Franz Trautmann and Tim McSweeney

- 3.1 Exploring heroin consumption**  
Franz Trautmann and Tom Frijns
- 3.2 Sizing national heroin markets in the EU: insights from self-reported expenditures in the Czech Republic and England**  
Beau Kilmer, Jirka Taylor, Priscillia Hunt and Peter McGee
- 3.3 The impact of opioid substitution treatment (OST) on the European heroin market**  
Tim McSweeney and Oonagh Skrine
- 4 Estimating the size of the EU cannabis market**  
Jonathan P. Caulkins and Beau Kilmer (with Marlon Graf)



# Introduction

Margriet van Laar, Franz Trautmann and Tom Frijns

## 1 Scope of the survey

In the earlier study on the European drugs markets (Reuter and Trautmann 2009), demand-driven estimates were made on the consumption of some of the most common drugs (cannabis, cocaine, amphetamine-type stimulants, heroin). While an attempt was made to differentiate between 'heavy' and 'light users', data limitations did not allow for a detailed analysis of different user groups. Moreover, in the absence of appropriate national sources, data on use patterns in one country (including non-EU sources) were often extrapolated to (all) EU Member States. It was concluded that "surprisingly little is known about typical quantities consumed of illicit drugs, which makes generating demand-side estimates difficult" (Kilmer and Pacula 2009).

Distinguishing between user types is important because of the generally skewed nature of consumption levels found commonly among substance users (e.g. Wilkins et al. 2005). The majority of users consume moderate amounts, while a small proportion of users may consume large and almost implausible quantities. In this follow-up study, the main aim was to obtain a better insight into use patterns and characteristics of different types of users, which should allow more precise consumption estimates. While research into typologies of drug users is commonly driven from a public health perspective, it can also support policies aimed at reducing demand and supply of drugs, and support rational decisions about allocation of resources. Moreover, the current project aimed to enhance knowledge on the availability of the most prevalent drugs to these different user groups in different Member States. Data collection focused on seven countries, which were chosen because they represent different levels and types of illicit drug use and legal situations: Bulgaria, the Czech Republic, Italy, the Netherlands, Portugal, Sweden and the United Kingdom.

The specific objectives addressed in the reports 1 through 3 in Part I of our study, are as follows:

1. To provide a typology of different users groups and describe the typical consumption of the most prevalent drugs (cannabis, cocaine, amphetamine, ecstasy) by these different user groups<sup>1</sup>
2. To analyse the availability of these drugs to different user groups, taking the legal context and drug policies into account
3. To estimate the annual volume of consumption for cannabis, cocaine, amphetamine, ecstasy and heroin and the relative share per type of user of each of these drugs.

The first thing we did was to view existing information on the EU Member States in particular from the EMCDDA but also from other sources. For example there are good data held by some of the seven sample Member States on typical drug use patterns. In the UK, for example, there are useful data describing drug use patterns on problem drug users entering treatment, which could be used to derive estimates. There are also findings from the British Crime Survey which could be used to a similar end, relating to recreational users, though there are a number of limitations to these data. Moreover, in the Netherlands detailed data are available on patterns of cannabis use among a cohort of 600 heavy and dependent cannabis users (Van der Pol et al. 2011) as well as (convenience) samples of drug users in the nightlife scene, although these data may also have limitations. We explored the extent to which these types of data could be used for our research.

To address the objectives mentioned above, it was deemed necessary to generate new data, especially on drug use patterns. This information is generally not available from general population surveys due to the limited level of detail of questions on drug use and a lack of power related to insufficient numbers of users. Given these known weaknesses of current surveys with respect to frequent users and users of new drugs, we added targeted surveys in Member States that provided additional information on expenditures. Given the limits of the available data for most countries, we particularly focussed on seven Member States (Bulgaria, the Czech Republic, Italy, the Netherlands, Portugal, Sweden and the UK) for who we mounted additional primary data collection activities, surveys and expert interviews with respect to supply, consumption and other drug related activities.

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<sup>1</sup> Heroin use was also part of the study but it was assumed that most users belong to the population of problem users (although integrated, non problematic use has been described). Heroin user profiles will be addressed in part I, report 3.

Methods commonly employed in drug research to access targeted (non treatment) populations include snow-ball sampling or on-spot-recruitment at locations where drugs users are likely to gather, like nightlife settings. A more cost-efficient method involves web-based research, whereby respondents are recruited through the internet (and other modes) and complete on-line questionnaires (e.g. Miller 2011, 2010; Verster et al. 2010). While there are a number of limitations to this approach, for example reaching only those with access to the internet and therefore with a higher socio-economic background, we think that data produced by this approach will be valuable for this project. In spite of these limitations, a web survey was deemed a useful tool to reach sufficient numbers of drug users within the time and budgetary restraints of the current study. We also explored whether a web survey was the appropriate tool to use in Portugal and the Czech Republic. According to 2009 Eurostat figures internet access is high in the Netherlands, the UK, Sweden and Italy (respectively 90%, 86%, 77% and 73% of the population) but relatively low in Portugal (48%) and the Czech Republic (54%).

Based on experiences with web-based surveys we expected that through a web survey we would be able to reach all kinds of cannabis users, varying from incidental to more heavy daily users, and also 'recreational' users of amphetamine, ecstasy and cocaine (powder) at varying levels of use. However, it was expected that web surveys would largely miss the more marginalised and problematic populations of users of amphetamine and cocaine (powder and crack). Therefore in several countries, additional data on use patterns and availability were collected through face-to-face surveys in these populations of more problematic drug users. For the Netherlands and the UK we focussed on crack cocaine use and heroin use among samples of heroin/crack users, and for Italy, Bulgaria and Portugal on problem cocaine users in general. For Sweden and the Czech Republic data were collected on (meth)amphetamine.

We therefore worked with a combination of these two approaches: one involving a web-based self completion survey of mainly recreational/infrequent drug users; and the second one consisting of face-to-face interviews with a small purposive sample of regular/problem drug users. According to us this was the best approach given the time and budgetary limitations. While web-based surveys may include sufficient daily users (especially from cannabis), frequent/problematic users, especially marginalised user populations, will be more difficult to contact via the internet and they are less likely to complete an internet survey fully. Moreover, some of the types of questions we intended to ask them were best asked face to face on an individual level: for example questions about their involvement in drug dealing and drug distribution. The type and range of questions we wished to ask recreational and infrequent users was more limited and therefore more amenable to an internet based approach. This group was also more likely to be contactable via the internet.

Both the web-based questionnaire and the face-to-face interviews had common core items, including: use in the past week, 30 days and last year, types of drugs used, frequency of use, amount of drug used on a typical use day, route of administration, money spent on drugs, sources of supply, availability of other drugs at supply source, short screener of problem use (limited to those with regular/frequent use patterns); search time, buying scenarios. For reasons of comparability we used questionnaires that were as identical as possible in all seven sample Member States. However, we of course also had to take into account differences between the countries, e.g. specifics of cannabis use due to the coffee shop system in the Netherlands and specifics of methamphetamine use in the Czech Republic. It took quite some exploration and discussion to find a balance between the required standardization and the need for sensitiveness to national differences, resulting in slightly different questionnaires for the seven sample Member States.

In addition to data from the web surveys and face-to-face interviews, other sources were taken into account as well, for example the ESPAD survey, general population surveys, EMCDDA (e.g. Insight on cannabis markets, Annual Report), National Reports from the Focal Points, scientific publications and other (unpublished) data obtained from the contact persons of the participating countries. For a typology of users, sufficient cases per group are required. For cannabis, sufficient numbers of respondents were recruited to allow a differentiation into four user groups. Moreover, a separate group of problem users was identified on the basis of the Cannabis Abuse Screening Test (CAST) (see part I, report 1, chapter 3.7).

For the other substances (cocaine, amphetamine, ecstasy) responses to the web survey appeared to be more variable between countries. In most countries, infrequent or occasional users could be distinguished for these drugs, but the number of respondents was too low to profile the more regular and intensive user groups, except for some data provided by the face-to-face interviews on different populations of marginalised drug users. Overall, the usefulness of the collected data on these drugs was much more limited than the data we gathered on cannabis and we had to rely on additional data sources.

## 1.1 Typology of users

User profiles can be constructed in a number of ways, e.g. on the basis of cluster or latent class analysis of a set of variables, or by a priori choosing one or two variables as classifying factor. In selecting a classification we were bound by requirements following from the third objective of this study: to provide estimates of the annual consumption per user type. This objective presumes that we know the numbers of users per user type in each country. General population surveys are the most likely source of information to provide these figures, but the number of variables on drug use in these surveys is generally limited (see under Part I, report 1, chapter 5 'consumption estimates'). We have therefore simply classified users on the basis of the number of use days in the past 12 months. For cannabis, the number of respondents in most countries was sufficient to distinguish four user groups, which seemed to discriminate fairly well on a number of outcome variables, while retaining sufficient power to detect differences. Moreover, we will analyse some core variables regarding cannabis consumption for six user groups, although in countries with relatively small sample sizes the outcomes have to be interpreted with caution due to the low number of respondents per sub group. For the other substances (ecstasy, amphetamine, cocaine) a classification in two or three groups was the highest attainable level due to relatively small sample size in most countries. The user groups have been further profiled on the basis of socio-demographic characteristics, patterns of use, circumstances of use and, for cannabis, also problematic use.

## 1.2 Availability indicators

There is no shared definition of 'availability' (EMCDDA 2008). In a general sense this refers to the overall presence of a product in a given geographical area. Usually, the concept 'availability' is discussed from either the supply side (market indicators like seizures, prices) or the demand side (drug use itself, as an indirect indicator). A related concept is accessibility, which may refer to the amount of effort needed for an ordinary user who has the money to obtain the drug he or she wants.

Here we focused on a mixture of availability (and accessibility) indicators, but they all have in common that they focus on the consumer perspective or 'street level availability'. This section of our questionnaires included questions on purchasing or otherwise obtaining the drugs (where, from whom, ease and time needed to obtain) and on the availability of other drugs (separation of the markets).

## 1.3 Consumption estimates

Consumption of the drugs under study will be estimated per user group on the basis of the average number of use days in the past 12 months, multiplied by the amount of drug (units \* grams per unit for cannabis; grams for amphetamine and cocaine; pills and/or grams for ecstasy) and the number of users within each user group. The latter will be derived from general population survey data matched with the frequency categories in the web survey. This match is not perfect as measures in the web survey and EMCDDA model questionnaire, which was used in most countries, differ to some extent (see Part I, report 1, chapter 5). Data on the number of use days in the past month, as collected in most population surveys, had to be extrapolated to obtain annual frequencies. This is not simply a matter of multiplying the number of days used in the past month by twelve, as past month users appeared not to consume every month. As the web survey collected data on both past year and past month frequencies, it could guide us with this extrapolation exercise. We have carried out sensitivity analyses with regard to the estimates of the annual amounts of drugs consumed by taking into account differences in gender, age groups and type of unit as well as other uncertainties and variation, like underreporting and sharing for cannabis.

## 2 The web-based survey

The biggest share of the data for addressing the objectives of chapters 1 and 2 of part I of this study were gathered by means of web-based surveys among users of cannabis, cocaine, ecstasy and amphetamine in the seven sample Member States. In this section, we will provide an overview of the methodology of the survey.

### 2.1 Procedure

The questions and instruments for the survey were selected by a team of experts from the seven sample Member States. The specific questions and instruments will be presented in the corresponding sections, discussing their results. Once the content of the survey was determined, the basic web based survey was created in both English and Dutch, using SurveyMonkey ([www.surveymonkey.net](http://www.surveymonkey.net)). The structure of the web based survey will be outlined in the next paragraph. The web survey was then tested by a small panel including both experts and laymen for intelligibility, programming errors, completion time etc. and adjustments were made where necessary. The text of the resulting final survey was translated from English into each of the other Member States' languages by a native speaker. To ensure comparability, a sample of questions from each translation was translated back into English by a second translator, and this 'back' translation was checked against the original text by a third person. When these checks were completed, the translations were used to create each country's own version of the survey, resulting in a total of seven web surveys. These surveys each received their own web address (e.g., [www.surveymonkey.net/s/eudrugmarket\\_uk](http://www.surveymonkey.net/s/eudrugmarket_uk)), and a central webpage ([www.drugmarket.eu](http://www.drugmarket.eu)) containing links to the country surveys was created. The web surveys were launched in week 6 and closed in week 16 of 2012, and were thus open for participation for approximately 10 weeks.

### 2.2 Structure of the survey

The survey was designed in such a way that each respondent could only answer questions about one drug. There were two main reasons for this. Firstly, the considerable amount of information we wished to collect about each drug would lead to an unacceptably lengthy survey, if we were to ask respondents about each drug that they used. Secondly, we preferred to obtain independent samples for the four drugs. To this end, the survey was divided into four main tracks containing similar questions about the four drugs of interest (Fig. 1 shows the basic flowchart of the survey). The cannabis track was further split into three sub tracks for users of only hash, only marijuana, or both. Similarly, the cocaine track was split into three sub tracks for users of only cocaine powder, only crack cocaine, or both.

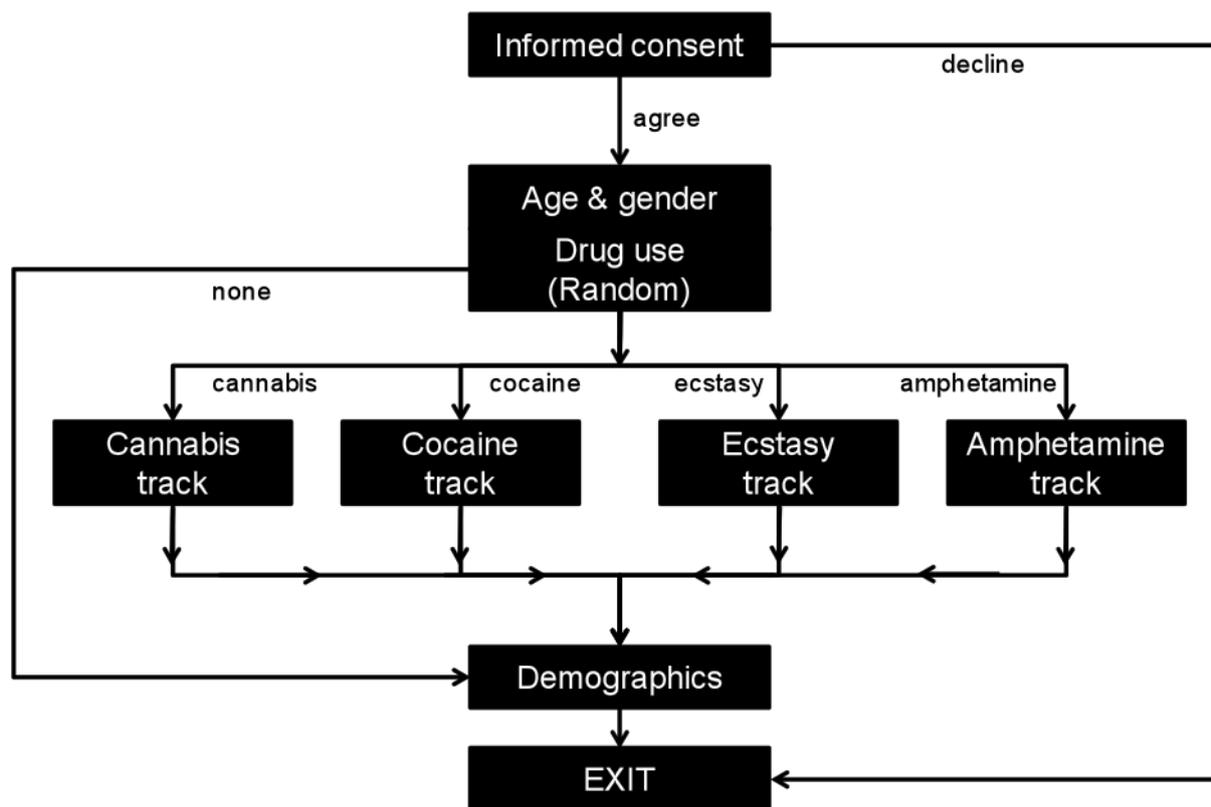
When (potential) respondents got to the introduction page, they were presented with a short introductory text, briefly outlining the survey. This was followed by an Informed Consent form explaining the study and underlining the voluntary nature of participation, the anonymity of participants and the possibility to discontinue participation at any time without consequences. At the bottom of this page a choice between agreeing or declining to participate could be made by clicking the corresponding button. If they agreed to participate, they were asked for gender and year of birth.

Next, respondents were asked about the last time they had used cannabis, cocaine, ecstasy or amphetamine, presenting these options to the respondent in random order. A fixed order of presenting these options, starting e.g. with cannabis use, would most probably have resulted in an overrepresentation of cannabis users in our sample. The first positive answer of a respondent indicating that he or she had used this substance within the last year, determined the main track he or she was sent to. If a respondent indicated not having used in the past 12 months any of the four drugs mentioned, he/she was presented with a number of demographic questions and then exited the survey. Thus, each respondent answered questions about only one drug that he/she had used.

We regularly monitored the growth of the four drug samples in each of the seven Member States. If the size of one drug sample reached approximately 800 respondents we removed the question about this drug from the randomization and presented it last in an attempt to increase response rates in the other three tracks. We used this strategy for cannabis in Italy and the Netherlands. In the Netherlands, this action was followed some days later by targeted advertising on Partyflock, a website and online community of party goers (see below), which led to over a thousand questionnaires on ecstasy and amphetamines over the course of a single weekend.

In the Dutch and Portuguese version of the web-based survey we included some additional questions to assess the respondents' view on the impact of drug policy developments on the drugs market (see part III, report 1 and 2).

Figure 1: Basic flowchart of the survey



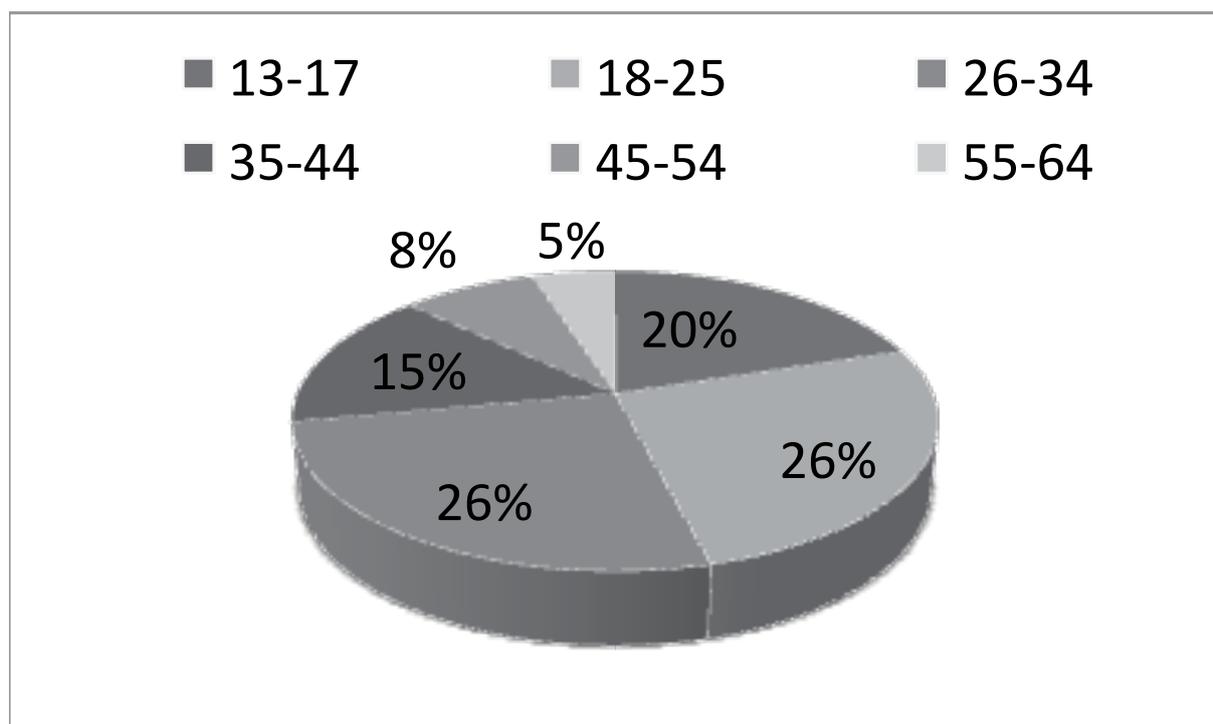
## 2.3 Recruitment and possible bias

Although recruitment strategies differed somewhat among the seven sample Member States, there were some general trends. As could be expected with a web-based survey, most countries used primarily online recruitment. It should be noted that our web-based approach of course excluded those without access to the internet. Although the internet penetration rate in the EU is quite high (at 71.5% of the population), internet penetration rates vary considerably among participating member states, ranging from 48.8% in Bulgaria to 92.9% in Sweden (CZ=70.9%, IT=58.7%, NL=89.5%, PT=50.7%, UK=84.1%; Internet World Stats 2011). The lower a country's internet penetration rate, the more selection bias may have occurred in its web survey.

Since drug users were our target population, recruitment in all countries included advertisements on drug information websites and other drug related websites, web fora and newsletters. Although such type of media seem ideal for the recruitment of drug users, they proved not very useful for reaching heavy and more problematic users, except for users of cannabis. Social media such as Facebook and Twitter were also employed for recruitment in all seven sample Member States. In most countries either a Facebook page for the survey or advertisements on already existing Facebook pages were used. As younger age groups are overrepresented on Facebook (Burbary 2011; see Figure 2), this recruitment strategy may have led to some selection bias towards these younger age groups. Table 1 shows the percentage of respondents that had been made aware of the study through various recruitment media (as reported by the respondents). It is evident that drug related websites and social media account for the majority of the respondents.

In the following we will briefly discuss the specific recruitment strategies per country and possible biases in the samples that may have occurred due to these strategies. In the report on the cannabis market (part I, report 1) we will go into more detail about the representativeness of the sample of cannabis users in terms of demographic characteristics.

Figure 2: Facebook users by age



Source: Burbary 2011.

Table 1: Percentage of respondents by recruitment medium per country

	BG	CZ	IT	NL	PT	SE	E&W
Drug info websites or fora	38%	17%	21%	15%	17%	56%	17%
Social media (e.g. Facebook)	30%	67%	41%	52%	25%	20%	42%
Drug help-lines	0%	0%	1%	0%	0%	0%	0%
Printed media (e.g. magazines)	1%	0%	0%	0%	0%	0%	0%
Advertising (cards, flyers)	4%	1%	1%	1%	10%	0%	0%
Friends	9%	9%	14%	2%	22%	5%	20%
Other	18%	6%	22%	3%	8%	7%	21%
PartyFlock (NL)	-	-	-	27%	-	-	-
University	-	-	-	-	19%	12% <sup>a</sup>	-
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

<sup>a</sup> Malmö University mailing.

### Bulgaria

**Recruitment strategies.** The main focus in Bulgaria was on online recruitment. Links to the survey were placed and advertised on a newly developed website/blog, focusing on new drug related information and trends. The introductory text and the link of the survey were placed in the best visible way possible. The survey was further promoted through social networks such as Facebook and internet fora for young people. It was also advertised and promoted through the website of the National Centre for Addictions, and websites of several of its partners (ministries, agencies, universities, local prevention centers etc.). Finally, the survey was promoted among clubbers on two of the most popular specialized websites for nightlife and leisure, Programata and Tillate.

**Possible bias.** The way of recruitment can be expected to have resulted in an overrepresentation of respondents who use the internet frequently and, of university students and/or clubbers and of people who are interested in participating in such type of surveys.

### **Czech Republic**

*Recruitment strategies.* In the Czech Republic a Facebook page was created for the survey ([www.facebook.com/drogy2012](http://www.facebook.com/drogy2012)). Facebook advertising was used, initially directed to the “general” population of age 15 – 39 (targeting over 1.5 million users). In the latter stages, advertising was shifted towards groups that prefer topics such as “marijuana”, “techno music”, “legalization” etc. In total, these more targeted advertisements were presented to 129,160 people. The page was updated several times, usually with drug policy related articles. The Facebook page was also promoted at Facebook sites related to ‘addictology’ (among others, on the site operated for students of addictology).

Moreover, an article was written, encouraging people to join the survey and foster drug policy comparison between different Member States. This article was sent to different webpages that focused on dance events, cannabis-related topics, and to a drug counselling site. The article was also published at [Adiktologie.cz](http://Adiktologie.cz), the website of the Department of Addictology of the General University Hospital in Prague. In addition, activities were focused on several drug related discussion boards where people were referred directly to the survey and to Facebook. Several sites provided promotional articles on their website, on their Facebook pages or in their newsletter. A few sites showed banners for the survey.

*Possible bias.* Through the chosen recruitment strategy – through dance oriented (and even paid) sites, and sites related to growing cannabis (the legislation towards this issue is very lenient, and therefore numerous physical as well as online grow shops exist, and growers use the sites to share their experiences with cannabis growing and the technical issues) – the survey is expected to be biased towards the party scene. One of the major sites emailed all its participants, which could have resulted in a selective population. Moreover, a bias can be associated with respect to the online nature of the web survey (targeting rather younger, student and higher paid population). Facebook advertising might cause this bias (towards the young) even more strongly.

### **Italy**

*Recruitment strategies.* Promotional emails were sent to the mailing list of subscribers to the site [www.illicitdrugmarket.net](http://www.illicitdrugmarket.net) (excluding those registered for business purposes), to mailing lists for various associations, and to all the students (about 30,000) of the University of Tor Vergata in Rome.

Accounts and pages were created on Facebook, twitter, and MySpace (Mercato della Droga), where information was provided and questions were answered. The new Facebook page was the focal point for the diffusion of the survey. Messages were sent from this Facebook page to individuals and groups on Facebook, inviting people to follow the survey, fill out the questionnaire and disseminate it. Similar actions were undertaken from the MySpace account. Also, an existing Facebook page offered contact with 141 individuals and associations and posts were written, asking for the completion of the questionnaire and for spreading the news through their own pages. Tweets were regularly sent from a twitter account.

The survey was promoted on various websites such as [www.illicitdrugmarket.net](http://www.illicitdrugmarket.net) and [www.idminstitute.org](http://www.idminstitute.org). Several blogs reported info on the survey. Announcements also appeared in a blog of the national RAI 3 TV page, and the websites of the newspaper “Il fatto quotidiano” and of “Radio Radicale”. Interviews with the principal researcher for Italy were broadcasted on Radio Radicale (political radio) and on the national TV.

Finally, leaflets/flyers were printed and distributed at a number of rave parties and social meetings, and near discos and stadium during soccer competitions for 4 weeks.

*Possible bias.* Due to the high response rate to Facebook and media announcements the sample is mainly representative of occasional and regular users more than poly or problematic users. Nonetheless, the proportion of intensive users among the respondents in the cannabis tracks was highest in Italy.

### **The Netherlands**

*Recruitment strategies.* Offline recruitment in the Netherlands focused on the network of drug testing facilities and addiction care centres linked to the national Drug Information Monitoring System (DIMS), coordinated by the Trimbos Institute. Flyers advertising the survey were delivered and handed out at test locations throughout the Netherlands. The peer educators network Unity offered on- and offline recruitment through their website and flyers. Online recruitment further included advertisement on various drug information websites, as well as in the digital newsletters, Facebook updates and tweets of these websites. By far the biggest response occurred after an advertisement programme was launched on Partyflock, a website and online community of party goers. A banner advertising the survey was placed on the Partyflock homepage

(www.partyflock.nl; presented 2 million times) and personal invitation messages were sent to the private webpage inbox of 50,000 Partyflock members. The banner and personal invitations promoted the survey with a chance to win a set of popular headphones (although all respondents could opt to partake in this draw, this incentive was primarily and explicitly advertised on Partyflock).

*Possible bias.* As mentioned in the general discussion of possible biases, the Dutch sample likely contains disproportionately large numbers of non-problematic drug users, young people, and frequent internet and social network users. Given the advertising on Partyflock, frequent party goers are likely overrepresented in our sample. Associated characteristics such as poly drug use may thus also be overrepresented. Data analyses seemed to confirm that different populations of cannabis users have been attracted, i.e. younger ones with relatively more experience with using other substances, and a population of older cannabis users. Moreover, as mentioned in § 4.1, two new criteria (residence criterion and closed club criterion) to which coffee shops have to adhere to, were implemented on the first of May 2012 in the South of the Netherlands - just after the web survey had been conducted. This may have caused a change in the buying behaviour and possibly the consumption behaviour of cannabis users. Therefore, it is not known to what extent the web survey data on cannabis uses, and especially availability, are representative for the situation after May 1, 2012.

### **Portugal**

*Recruitment strategies.* The web questionnaire was advertised through Internet to all workers of the Portuguese Institute on Drugs and Drug Addiction (IDT), to all IDT services throughout the country (IDT runs a national network of services in the different drug intervention areas), and all partner institutions (IDT finances a national network of NGO's). A banner was placed on the IDT webpage during the period of the questionnaire data collection, and the media/press IDT advisor published it in Facebook and Twitter.

The survey was further promoted through almost all university/college student's associations, University teachers or researchers that work in the drug field and journalists having covered recent news items in the drug field (written press, radio, TV). People involved in associations organising the "Global Marijuana March" were asked to promote the questionnaire.

*Possible bias.* The distribution of the respondents of this type of survey is expected to be different from that of a general population survey. In general, the respondents are younger, and in this case, they will likely include several types of drug users, but not the most heavily using groups.

### **Sweden**

*Recruitment strategies.* The main recruitment tool used was a text advertisement on Flashback.org, an "underground" forum where a very broad range of topics are discussed. Despite its underground status, this forum has a very high number of visitors per month. According to the person in charge of advertising at Flashback, the sub-forum where the advertisement was published has around 130,000 page views per 24 hours. The advert was placed in the sub-forum concerning drug policy as well as the general drug forum. The total number of views was over 2 million, which resulted in 2,350 clicks.

Advertising occurred through the Facebook and Twitter accounts of one of the researchers of the University of Malmö. A link was put up in a Facebook group called "Centre for narcotics science" (Centrum för Narkotikavetenskap - CFN), a group that wants to push issues of harm reduction policies to the political agenda and could be defined as "drug liberal" within the Swedish context. An event was created to which all the roughly 1,000 members of the group were invited. Overall the response was very positive and some group members invited everyone on their Facebook friend lists.

An email was sent out to all students with an email account at Malmö University. Also a reminder email was sent out after two weeks. Geographically speaking, this could mean that a large part of the respondents lived in Malmö or on commuting distance from the city.

*Possible bias.* Respondents from the Flashback and the university group are likely to be quite young, but this is well in line with the most frequent users in Sweden. The representativeness of the sample could be acceptable, considering the different strategies we used for recruitment. Without specific recruitment of students at Malmö University, the total sample would probably show a higher prevalence of drug use. People who are activists at the Centre for narcotic studies and those who take part in the underground oriented forum Flashback are mainly male. No data is available on the overall gender distribution of CFN or Flashback, but it has been estimated (expert opinion) that approximately 80% of the participants of the drugs forum are male. With regard to the university participants it is worth mentioning that about 40-45% of an age class will have been

studying at the university by the age of 25. The Swedish governmental goal is that 50% of each age class should go to university but this goal has not been achieved yet.

### **England & Wales**

*Recruitment strategies.* Recruitment of recreational users included setting-up a face book page for the survey, a writing of ICPR (Institute for Criminal Policy Research) on their own face book walls posting information about the survey, and setting-up a twitter account and tweeting the link to the survey with a short description of the project. Staff at ICPR sent an email to their personal and professional networks – asking them to complete the survey and to send the request to others. Moreover, various persons, with much larger groups of followers were asked to re-tweet for ICOR (Transform, Relate, various academics, activists, and policy makers). All of those who were asked did indeed re-tweet.

An email was sent to all law students at Birkbeck University, and to all criminology students at Kings College, Birkbeck, Leicester, Essex, Oxford, Sheffield and Leeds University. Flyers were handed out outside most of the central London student unions (three sessions were undertaken by two researchers) and at various tube/underground stations. Flyers were also posted through the letterboxes of various halls of residence for University of London students.

Finally, an advert was taken out on Gumtree – a buying and selling website. The advert remained on the front page of the website for a number of days.

*Possible bias.* The England & Wales web-based sample is expected to include a disproportionate number of students, have a higher level of educational achievement than the general population of cannabis users, and have a disproportionate number of 19-26 year olds and an under-representation of all other age groups. An analysis of the cannabis data shows nonetheless that the proportion of young people (15-24 years) among cannabis users in the general population surveys does not deviate much from that in the web survey (see part I, report 1, chapter 3).

## **2.4 Response and sample**

For our basic sample, we will use data from all participants between 15 and 65 years of age (denoted hereafter as 15-64 years) who have entered one of the 4 main tracks (see table 2). Note, however, that not all reported figures pertain to these numbers of respondents because of missing values (see also our notes on data preparation and analyses below). Results are based only on valid cases and the reported percentages thus always refer to the % of valid cases.

**Table 2: Basic sample: Number of respondents in each track per country**

	<b>Cannabis</b>	<b>Cocaine</b>	<b>Ecstasy</b>	<b>Amphetamine</b>	<b>Total</b>
<b>Bulgaria</b>	208	27	40	77	352
<b>Czech Republic</b>	522	70	137	150	879
<b>Italy</b>	1,044	132	69	64	1,309
<b>Netherlands</b>	1,128	731	1,814	913	4,586
<b>Portugal</b>	150	42	13	15	220
<b>Sweden</b>	791	122	151	202	1,266
<b>England &amp; Wales</b>	283	54	64	26	427
<b>Total</b>	<b>4,126</b>	<b>1,178</b>	<b>2,288</b>	<b>1,447</b>	<b>9,039</b>

Table 3 shows how we arrived at the basic sample. In total, 11,891 people visited the survey pages and of these, 11,444 people initially agreed to participate. Data from 2,302 respondents could not be used because they either dropped out before entering a main track (946) or had not used any of our target substances in the last 12 months (1,356). Additionally, selection on age led to a loss of 14 respondents who were below 15 years of age and 59 respondents who were 65 years of age or older. Finally, 30 multivariate outliers from the cannabis track were excluded (see below), leaving us with our final sample of 9,039 individuals.

**Table 3: Selection of final sample per country**

	Landed on site	Declined	No use in past year	Dropped out	Age below 15	Age above 64	Multivariate outlier	Final sample
<b>Bulgaria</b>	656	34	169	95	2	4	0	352
<b>Czech Republic</b>	1,163	56	91	120	3	12	2	879
<b>Italy</b>	1,980	90	417	139	1	8	16	1,309
<b>Netherlands</b>	5,309	147	218	330	4	20	4	4,586
<b>Portugal</b>	428	9	137	60	0	1	1	220
<b>Sweden</b>	1,762	84	246	146	4	9	7	1,266
<b>England &amp; Wales</b>	593	27	78	56	0	5	0	427
<b>Total</b>	<b>11,891</b>	<b>447</b>	<b>1,356</b>	<b>946</b>	<b>14</b>	<b>59</b>	<b>30</b>	<b>9,039</b>

## 2.5 Data preparation and analyses

### *Missing values*

The survey was set-up in such a way that, basically, respondents could not skip any questions. That is, unless they answered all questions on a page, they could not proceed to the next page. There were a few exceptions such as questions on demographics (e.g., living arrangements, income). Also, skip patterns (e.g. follow-up questions on sharing one's joint were only put to those who had indicated sharing in the first place) caused missing values, but since these are intentionally missing, we will not consider them as missing values here. Thus, values are not missing at random. Missing values are almost exclusively due to respondents dropping out of the survey, with the percentage of missing values increasing as questions near the end of the survey. We chose to handle missing values by pair wise deletion, thus maximizing the number of cases in each analysis (but also causing this number to vary across analyses).

### *Outliers*

We screened the data per country for out of range values (univariate outliers) on all quantitative variables, and for multivariate outliers on sets of key variables (e.g., frequency and amount of use variables) within each main track. Because classification of outliers is subjective and arbitrary, we were cautious in labelling persons/responses as outliers. Possible outliers were handled in one of three ways. Firstly, in many cases we simply accepted the extremes as part of a valid range. Secondly, in some cases, variables were capped to a certain maximum, and values above this maximum were treated as missing. Where capping was applied, this will be noted and explained when reporting results. Thirdly, there was one instance where (multivariate) outliers were removed from the sample. This was done for respondents in the cannabis track who indicated consuming more than 20 units (joints, pipes etc.) on an average use day ( $n=30$ ). All of these respondents were both univariate and multivariate outliers on all (sets of) key variables.

### *Data analyses*

All analyses were carried out using SPSS (version 19). Chi-square tests were used for examining differences in distributions of categorical variables across groups (e.g., member state, user type). Analysis of variance (ANOVA) was used to examine mean differences in continuous variables between groups. In case of significant main or interaction effects, post-hoc analyses were carried out (Tukey HSD) to test for pair wise differences. Because of the large size of the total sample, the significance level for statistical analyses has been set to  $\alpha = .01$ . Occasionally, however, we will elaborate on country specific findings that only meet a .05 significance level if we feel this is warranted by the country's sample size.

## 3 The face-to-face interviews

Another part of the data for addressing the objectives of chapters 1 and 2 of part I of this study were collected through face-to-face interviews among regular/problem users of heroin, (crack) cocaine and methamphetamine in the seven sample Member States. In each of the seven sample Member States we selected two of these substances. In this section, we will provide an overview of the methodology of that survey.

### 3.1 Procedure

The issues covered by the questionnaire for the face-to-face interviews were selected by a team of experts from the seven sample Member States. The specific questions and instruments will be presented in the corresponding sections and the results will be presented and discussed. After having defined the content of the survey we developed an English and a Dutch version of the questionnaire. We chose for a semi-structured questionnaire, using closed questions, where possible. These two versions were then tested by a small panel including both experts and laymen for intelligibility, completion time etc., resulting in a small number of adjustments. The final English version of the questionnaire was translated by a native speaker into the languages of the other Member States. The actual interviews were carried out in the seven sample Member States between 1st February and 30th June 2012.

### 3.2 Structure of the questionnaire

For drawing up the questionnaire for the face-to-face interviews we followed the same structure as used for the web-based questionnaire, using the same questions.

The questionnaire covered:

- Some general demographics (gender, age, etc.)
- Characteristics of use (age of first use, route of administration, location of use, use of other substances beside the primary drug used)
- Buying behaviour/availability (way of obtaining heroin, location of purchase, availability of other drugs at location of purchase, buying for someone else, ease of obtaining drugs and inability to buy).

In the questionnaire for heroin users we included some additional questions to assess the self-reported impact of OST in contributing towards avoided illicit heroin consumption (see part I, report 3.3).

### 3.3 Recruitment and possible bias

Our strategy was to interview minimum 45 users in each of the seven sample Member States. The partners were instructed to recruit the respondents in two different sites, if possible in one major city and in one smaller city in each Member State. Interviewees were paid €20 or received a voucher to participate in a ±45 minute interview.

The eligibility criteria included:

- Having used a minimum of three days a week in the last month
- In treatment and – if possible – not in treatment
- Respondents in treatment should have entered treatment in the last three months and have used three days a week in the month prior to treatment
- Resident of one of the sample Member States (BU, CZ, IT, NL, PT, SW, UK).

Groups included in the face-to-face interviews comprised:

- Regular users of heroin (regular: having used minimum 3 days a week in the last month)
- Regular users of crack/cocaine/amphetamine.

Where possible we attempted to also select on:

- Gender (match the gender ratio in the drug using population in the Member State)
- Two age groups: <29 and >29
- Ethnicity (match the ethnicity ratio in the drug using population in the Member State).

We used different recruitment strategies/tools to reduce the bias in our respondents' sample. We used the following strategies:

- Through substitution treatment services
- Through other drug treatment services
- Through harm reduction services (e.g. syringe exchange, user rooms, outreach work)
- Through chain sampling, e.g. starting with drug user in treatment as intermediary to get in contact with drug users not in treatment.

As agreed we selected for each of the seven sample Member States not more than two substances resulting in the following list:

- Bulgaria: heroin and cocaine
- Czech Republic: amphetamine and buprenorphine (black market)
- Italy: heroin and cocaine
- Netherlands: heroin and crack cocaine
- Portugal: heroin and cocaine
- Sweden: heroin and amphetamine
- UK: heroin and crack cocaine.

In **Bulgaria** we had a total number of 48 interviews, 25 of them with heroin users - 11 living in the capital Sofia, 14 - in two other cities (Blagoevgrad and Bourgas). Seventeen of these respondents were in treatment, 8 were not. The other 23 interviews were with Amphetamine abusers - 22 living in the capital Sofia and one in Bourgas. Fifteen of these respondents were in treatment, 8 were not in treatment.

In the **Czech Republic** respondents were recruited in Olomouc (a small, but important town in Moravia) and Prague through drop-in centres, substitution treatment and advertising about the study in a private online discussion board focused on addiction.

In **England** in total 45 respondents were recruited, all from two treatment services, 25 from a residential rapid detox centre where the use of illicit substances is not tolerated. Twenty were recruited from a structured day care service; most of the clients at this service are referred from criminal justice system. A certain amount of using illicit substances on top of substitute drugs is tolerated from clients at this service. Twenty-five respondents were from a large urban city, twenty from medium sized town. All had used in the three months prior to the interview, most the month before the interview.

In **Italy** all respondents were recruited in Rome (though not all of them were residents of Rome). They were recruited partly in low threshold services, partly in residential communities and in non-residential services, both types of drug-free treatment. Some of them have been in treatment or social assistance for many years.

In **the Netherlands** 27 respondents were recruited in Amsterdam (16 in a drug using facility, 4 in a drop-in centre and 7 on the street through personal network/snowballing). In Utrecht 20 respondents were recruited (10 in a 'social pension' for marginalised people, 5 in a drop-in centre and 5 on the street through snowballing).

In **Sweden** respondents were recruited in Malmö (in the Southwest of Sweden, 305,000 inhabitants) and in Norrköping (160 km south of Stockholm, 132,000 inhabitants). Respondents in Malmö were recruited at the local needle exchange programme and at a private opiate substitution treatment programme. In Norrköping the interviews were conducted by two men who were both Buprenorphine patients. The respondents were recruited through their personal network among active users. Respondents also came up with names of other users to be interviewed.

In **Portugal** all 53 respondents were recruited from treatment services.

We chose to work here with purposive samples of regular or problem users to gain insights into some aspects of the demand side of the drugs market. The limited sample sizes and the recruitment strategies used in the sample Member States caused a selection bias. A substantial number of respondents were identified through treatment and harm reduction services, meaning that some selection bias towards an older group of heroin users facing considerable health and social problems can be expected.

### 3.4 Response and sample

A total of 332 respondents were interviewed in the seven sample Member States. Table 4 gives an overview of the Member State samples.

Table 4: Drug questionnaires used in the face-to-face interviews

	Heroin & (crack) cocaine	Heroin	Crack cocaine	Cocaine	Amphetamine	Buprenorphine / Methamphetamine	Total
England & Wales	28	8	7	2	0	0	45
Italy	0	30	0	21	0	0	51
Netherlands	45	0	0	0	0	0	45
Portugal	0	46	0	7	0	0	53
Czech Republic	0	0	0	0	0	45	45
Bulgaria	0	25	0	0	23	0	48
Sweden	0	18	0	0	27	0	45
<b>Total</b>	<b>73</b>	<b>127</b>	<b>7</b>	<b>30</b>	<b>50</b>	<b>45</b>	<b>332</b>

### 3.5 Data preparation and analysis

To analyse these data ICPR set-up five SPSS databases for: heroin, crack, heroin and crack, cocaine, amphetamine/methamphetamine and emailed the relevant datasets to each Member State. The datasets received from the seven sample Member States were merged and cleaned and where necessary re-coded. This resulted in seven individual country SPSS datasets and one merged dataset which included all 315 interviews which have been conducted across the seven Member States.

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# Report 1

## Cannabis market: user types, availability and consumption estimates

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### Abstract

In this report we will start with a brief overview of recent developments relating to cannabis markets and policies in the seven countries participating in the project (chapter 1). Most of the information in this chapter is based on the National Reports of the EU Member States to the EMCDDA and can be found on the EMCDDA website ([www.emcdda.europa.eu](http://www.emcdda.europa.eu)). One document is of special interest in this regard: the recently published Insight of the EMCDDA making a detailed account of the cannabis markets (Carpentier et al. 2012), which is partly based on the Reitox National reports for 2009. For Portugal and The Netherlands specific case studies of drug policy and cannabis policy, respectively, are described in Part III, report 1 and 2. We will then summarize the latest figures on cannabis use and trends in cannabis use (chapter 2). In chapter 3 an introduction is given into ways to classify or typology cannabis users and how we have defined different user groups in the present study. The remainder of this chapter and the next chapter (chapter 4) describe the findings of the web survey conducted in the seven countries with regard to characteristics of cannabis users, especially their consumption patterns, and the availability of cannabis to different user groups. In the last chapter (chapter 5) an integration will be made of existing data on the prevalence of cannabis use and web survey data on consumption patterns in order to estimate per user group the total amount of cannabis consumed annually in each country.

## 1 Cannabis markets and policies: recent developments

After a global increase in the late nineties and early 2000s, cannabis use in Europe has remained generally stable in the past years and in some countries a decrease could be observed in the general population. Among pupils levels are overall higher compared to the mid-nineties and show both decreasing stable and increasing patterns in the past years (Carpentier et al. 2012; Hibell et al. 2012).

Although there are no precise figures on the size of the cannabis market, there are clear indications that cannabis cultivation nowadays is widespread in Europe. The increased production seems to have resulted in the increasing displacement of imported cannabis resin or hash by locally produced herbal cannabis or marihuana (Carpentier et al. 2012; EMCDDA 2012a). For 2009, it has been estimated that in some two-thirds of 30 reporting European countries (including Bulgaria, the Czech Republic, the Netherlands and the United Kingdom), marihuana is the most used type of cannabis, while in the remaining countries (including Portugal, Italy, and Sweden), hash is the predominant cannabis product.

In many countries a legal distinction is made between cannabis and other drugs, or when drug laws do not formally make a difference, provisions with regard to investigation and prosecution are made to distinguish between substances. However, in Bulgaria, Italy and Sweden, no distinction is made between cannabis and other substances. Moreover, a common trend can be seen across the Member States in the development of alternative measures to criminal prosecution for cases of use and possession of small quantities of drugs, or cannabis specifically, for personal use without aggravating circumstances (EMCDDA 2012; Reuter and Trautmann 2009).

### ***Developments per country***

Until 2011 controlled substances in **Bulgaria** were listed in annexes to the Drugs and Precursors Control Act. Because of the public significance of the problem and for the purpose of faster bringing new substances under control in 2011 the annexes with controlled substances have been transferred from the Art to sub-delegated legislation - a Regulation of the Council of Ministers. The amendment of the act and the change was ratified and promulgated in the SG, No. 61 of 09.08.2011. There are three Schedules. Cannabis is class A (high-risk) drug, together with heroin, cocaine, amphetamines and MDMA (ecstasy). In 2006, specific penalties were introduced for offences not related to distribution, namely one to six years' imprisonment for high-risk drugs (down from 10 to 15 years) and up to five years for risk drugs (down from three to six years); it also specified that minor offences could be punished with a fine. Between 2000 and 2004 the Bulgarian Penal Code stated that "punishment shall not be imposed on a person dependent on narcotic drugs or analogues thereof, provided the quantity such person acquires, stores, keeps or carries, is such that reveals intention of personal use

Cannabis use was very limited in Bulgaria until the mid-nineties. Until 2001-2002, the cannabis market was not considered as very profitable due to the unstable consumption and low prices. Small scale home growing and distribution within social networks was the main way for obtaining cannabis, facilitated by favourable climatic conditions. Thereafter, there were signs for a growing market for cannabis, with increasing involvement of criminal organizations. Supply was mainly realized through growing of marihuana in the South-western part of the country, occasionally in difficult-to-reach areas and by elderly people, for whom cannabis cultivation sometimes seemed to be a means of living. The dismantlement of large-scale plantations between 2000 and 2006 suggests substantial outdoor cultivation of cannabis in Bulgaria, although increased police efforts may also play a role. These efforts may also have reduced the ability of small-scale distributors to access and purchase cannabis on an occasional basis, thereby 'pushing' the market in the hands of commercial distributors. Moreover, changes to the Bulgarian Penal Code may have discouraged small-scale distributors from continuing to operate. In 2004, those caught in possession of a 'single dose' of cannabis were no longer exempt from criminal prosecution. This change in legislation and subsequent fear of prosecution may have led to a drop in the number of independent distributors operating within the market. The commercialisation or more organized market is suggested to have increased prices, while quality of cannabis remained the same.

A new Penal Code has been effective in the **Czech Republic** since 1 January 2010 (National report 2011). To a certain degree, the new legal regulation differentiates drugs according to their health and social risks, as it makes a distinction between cannabis and other drugs as regards the cultivation of cannabis for personal use and the possession for personal use. More specifically, the new Penal Code only distinguishes between the possession of cannabis and other drugs, when a quantity greater than small is concerned (lower maximum punishment for cannabis (one year in prison) than for other drugs (unchanged at two years) (see also table 1). A novelty to the previous legislation has been an introduction of government decree that now precisely states what the small amount is. Despite the fact that the "greater than small" concept was present in the criminal code since 1998, the threshold amounts were until 2010 subject to police and courts discretion. A small amount of drug is considered to be, for instance, up to 15 grams of cannabis, 2 grams of methamphetamine or 1 gram of heroin. In addition to the above-mentioned differentiation of drugs, the Penal Code newly provides for the offence of the unauthorised cultivation of a greater than small quantity of plants containing a narcotic or psychotropic substance. For cannabis, the cultivation in a quantity greater than small carries a sentence of imprisonment for a term of up to six months, while the grower of another psychoactive plant in a quantity greater than small may be punished by a prison term of up to one year. The threshold for small amounts of different types of psychoactive plants (cannabis, coca, psychedelic mushrooms et. al) is stated in the same government decree as mentioned above; for cannabis it is considered to be five plants, irrespective of their weight. The cultivation of plants on a significant scale is punishable by imprisonment for up to three years, and the same offence committed on a substantial scale carries a prison sentence ranging from six months to five years. Until 31 December 2009 cannabis growing was classified as an offence or attempted offence with the general punishment range of 1 to 5 years' imprisonment. The Department of Addictology, First Faculty of Medicine in Prague and General Teaching Hospital in Prague, in cooperation with the National Monitoring Centre for Drugs and Drug Addiction, are investigating whether these legal changes have had an impact on the cannabis markets.

**Italy** plays an important role in the (large-scale) international traffic of cannabis and other drugs, due to its geographical location, on the southern Balkan route at the centre of the Mediterranean Sea, and near the coast of North Africa. In recent years it has been reported that mafia organizations have begun to manufacture drugs themselves, producing roughly several tons of marijuana, since the direct cultivation offers higher earnings and lower risks during transport. There is also increasing involvement of foreign criminal groups, especially in areas with less control by the mafia (Serpelloni et al. 2011).

In 1993, in Italian law, cannabis belonged to a category of drugs that attracted punishments of less severity than other drugs; however, a law enacted in 2006 eliminated this difference on the assumption that all illicit drugs are dangerous. Apart from removing the sentencing distinctions between illicit drugs, the maximum duration of administrative sanctions was increased to one year for any illicit drug.

Data from seizures up to 2009 suggest that the Italian cannabis market is dominated by resin (accounting for some 65–75% of cannabis seizures). However, in recent years relatively large cannabis cultivation sites have been dismantled in Italy within the last decade, which may point to a higher use of herb (see also chapter 3.4.c).

**In the Netherlands**, cannabis use started to gain popularity in the sixties and seventies, and prevalence of use increased rapidly from the eighties until the mid nineties. The sale of small quantities for personal use was tolerated in the seventies first by so-called house dealers in youth centres, later in commercial outlets, the coffee shops (Van Laar and Van Ooyen-Houben 2009; Korf et al. 2002). Their numbers grew rapidly, and so did nuisance related to these coffee shops. Since the mid-nineties, policies aimed at a reduction of their number and stricter regulation. Moreover, cultivation of marihuana (currently also known as high potency 'Nederwiet'), which is nowadays the main type of cannabis consumed in the Netherlands, seemed to occur at an increasingly larger scale in the nineties, and there were indications for a growing role of the Netherlands in exporting cannabis.

Many other changes have occurred in the past decade in the field of cannabis policy and legislation (see Van Laar and Van Ooyen-Houben 2009; Van Laar et al. 2012), although the basic principle of a differentiation between drugs with unacceptable risks and other drugs (listed on schedule I and II, respectively) remained the cornerstone of the Dutch Opium Act. Since 1976, Public Prosecutor give low priority to the investigation of possession of small amounts of a drug for own use. With regards to cannabis (categorized as 'soft drug') small amounts are defined as no more than 5 grams and no more than 5 cannabis plants – under the condition that there is no professional or commercial cultivation of the plants. Apart from measures as of 2004 intensifying the combat of cannabis cultivation and organised crime associated with cannabis production and trafficking, many recent measures have been announced and (partly) implemented with the aim to (further) reduce public nuisance related to coffee shop tourism.

The sale of cannabis is allowed under strict conditions in coffee shops, which have to adhere to specific criteria (see Dutch National Reports). This provision intends to separate the cannabis and hard drugs markets. The Opium Act Directive was extended recently with two new criteria for coffee shops: the closed-club criterion, which allows access to coffee shops only for people who are registered member, and the residence criterion, stipulating that coffee shops are only accessible for adult Dutch residents. The criteria were enforced since May 2012 in the three southern provinces North Brabant, Zeeland, South Limburg). Enforcement in the other provinces was envisaged for January 2013. After the Coalition Agreement - in November 2012 - the minister of Security and Justice announced that the closed-club criterion will be cancelled, but that the resident criterion will be introduced nationwide by the 1st of January 2013. Enforcement will be implemented in consultation with the municipalities and, if necessary, in phases. Nonetheless, these measures may have affected the Dutch cannabis market after 1 May 2012<sup>1</sup>. A (quasi experimental) study is ongoing in which the (partial) implementation of the closed club criterion and the residence criterion are evaluated ([www.wodc.nl](http://www.wodc.nl)).

Moreover, in 2011, an advisory committee advised to classify cannabis with a THC concentration of 15% or more as a hard drug, and to place it on Schedule 1 of the Opium Act. Implementation is announced in the plans of the new Cabinet (Rutte II) of November 2012 and in a letter of the minister of Security and Justice. When enforced this change may also have an impact on the cannabis markets, but so far no specific date of implementation and enforcement has been mentioned.

**In Portugal**, sentences related to controlled substances depend on their classification on one of six lists of the main Drug Decree Law. List 1 is divided into opiates; coca derivatives; and cannabis and derivatives. List 2 is divided into hallucinogenic substances; amphetamines; barbiturates. List 3 contains preparations with controlled substances; list 4 contains tranquillisers and analgesics and lists 5 and 6 contain precursors. A change in the Decree Law in July 2001 decriminalised possession of all drugs for personal use. This reduced the maximum punishment for possession of small amounts of drugs from three months' imprisonment to an administrative fine given by the 'Commission for Dissuasion of Drug Dependence, which prioritised health solutions over punitive sanctions (Santos et al. 2011). Treatment is offered for situations involving problematic use/abuse of cannabis and administrative penalties for up to 10 daily doses, i.e. up to 25g of marijuana or 5 g of hashish may be applied.

<sup>1</sup> Since the web survey described in chapter 1.3 on patterns of cannabis use and retail markets was carried out before this date, it is possible that the data on the Dutch cannabis markets described in this report are not (fully) representative of today's situation.

Cultivation of any amount, even for personal use, remained a criminal offence. While lifetime use of cannabis increased between 2001 and 2007, last year and last month prevalence remained stable. A detailed account of changes in Portugal's drug policy is given in part III, report 1.

Cannabis resin dominates cannabis consumption in Portugal, which is associated with its proximity to the main trafficking route of Moroccan resin through the Iberian Peninsula. However, in 2009 it had been reported that a recent decline in the relative proportion of resin in cannabis seizures could point at an increasing consumption of herb. According to growers, a further increase could be expected by an increasing demand for cannabis, easier access to products (seeds, cultivation material), increased availability of information (especially Internet pages and forums) and by the financial crisis which has affected Portugal and Europe. The majority of cannabis cultivated in Portugal is not aimed to drug trafficking, but occurs at small scale for personal use and small networks of friends.

In **Sweden**, experiments in the 1960s involved decriminalising the use of cannabis and providing legal prescriptions for other narcotics, like amphetamines. During this time period the crime rate rose and problematic drug use increased. The lessons learned from this experience were a restrictive drugs policy, aiming at a drug free society, which is still pursued nowadays. No distinction is made between cannabis and other drugs, and drug enforcement agencies are empowered to arrest drug users in order to take blood or urine samples. If a person is found under the influence of illicit drugs, the penalty is a fine or imprisonment for up to six months.

Prevalence of illicit drug use, predominantly cannabis, is among the lowest in Europe for many years, although problem amphetamine use remains a point of concern. Factors mentioned to contribute to this (relative) 'success' include the geographical location of Sweden (not located along major drug trafficking routes); in addition, income inequalities, which often go hand in hand with criminal activities including drug trafficking, as well as unemployment rates (UNODC 2007). Nonetheless, problems with illicit drugs have increased in Sweden since the mid 1990s, partly due to greater mobility, access to information technology and more open borders in Europe (Bessö et al. 2009).

In 2009, it was estimated that approximately 75-80% of the Swedish cannabis market consisted of resin (mainly from Morocco) and about 20% - 25% consisted of marihuana. While approximately 20-25% of the marihuana was reported to be smuggled to Sweden from other countries, the detection of several sophisticated large-scale marihuana plantations suggested that Sweden is largely self-supporting with regard to marihuana supply. In the 2011 National Report it has been reported that professional, full-scale illegal indoor cultivation of marijuana, initially concentrated to the southern parts of Sweden, is now observed in other parts of the country as well.

Under the Misuse of Drugs Act in **the United Kingdom**, drugs are divided into three classes, A, B and C, which determine the maximum penalties for offences. Cannabis was reclassified from Class B to Class C in 2004, lowering maximum penalties for personal possession from five to two years' imprisonment, and national police guidelines were issued not to arrest but to give an informal warning, if there were no aggravating circumstances. The maximum penalties for supply and production remained the same. In January 2009, cannabis was reclassified from Class C to Class B, raising maximum penalties to five years' imprisonment once again. Revised national police guidelines continued to advise an informal warning for a first offence.

The cannabis market in the United Kingdom had been traditionally dominated by imported cannabis resin but since the early 1990s domestic cultivation has grown and large scale cultivation of cannabis has increased considerably since 2004. In 2009 it had been estimated that "skunk" accounted for between 38% and 81% of the domestic market, with large regional variations (Davies et al. 2009).

### ***Relationship legislation and cannabis prevalence***

There is no simple relationship between legal changes relating to cannabis possession (between 2001 and 2006) and the prevalence of cannabis use (EMCDDA 2011). Increases in penalties for possession may be associated both with increases or stable use, while decreases may be accompanied with both increases, decreases or stable use. Overall, temporary associations are weak. In Italy, an increase in penalties was paralleled with an increase in use, which started, however, before the legal change. In the United Kingdom, a decrease in penalties was associated with a subsequent strong decrease in prevalence, but in Bulgaria it was associated with a minor increase. In Portugal, last year prevalence remained at the same level between 2001 and 2007, following legislative changes in 2001.

Table 1: Legal status of cannabis when used or cultivated/possessed for personal use in the different countries

Country	Offences and penalties related to personal use	Legislation	Level of prosecution	Distinguished from other substances?	Notes
<b>Bulgaria</b>	As with all drugs there are no special texts related to the use of cannabis. It is stated in the Law that "Who without due permission acquire or hold drugs or their analogues, shall be punished: 1. for high-risk drugs or their analogues - with imprisonment of one to six years and a fine of two thousand to ten thousand BGN; 2. for risky drugs or their analogues - with imprisonment of up to five years and a fine of one thousand to five thousand BGN." ... In addition there is a text regarding practically to the use, including of cannabis: "In minor cases under ... the penalty is a fine up to one thousand BGN."	Law on Control of Narcotic Substances and Precursors (1999), art's 3, 7; Penal Code (1968), art's 354a-c	Despite there is no special text related to cannabis use in the Penal Code (the existing ones are oriented to those who produces, processes, acquires or holds) the users (without any other offence) are usually fined or even only warned.	No distinction	By 2000, the Bulgarian legislation included the term "disposable quantity." Then the following text was adopted in the Penal Code: Article 354, para. 3: "Person who is dependent on drugs must not be punished if the quantity that acquires, stores, keeps or carries, is in size, indicating that it is intended for single use." In 2004, the first subparagraph 3. was removed on a proposal of the party "New Time" to which the penalties for possession of drugs have been practically rehabilitated. In 2006, Art. 354a of the Criminal Code was changed again. Then the penalties were reduced and paragraph was added which allows to not apply penalties provided the offense is considered minor, without clearly defining this term.
<b>Czech Republic</b>	As with all drugs, administrative offence if quantity is small, subject to police fine or warning. Possession of a quantity "greater than small" of cannabis or other substances containing THC is punished with up to 1 year imprisonment (possession of other drugs punishable by up to 2 years).	Misdemeanour Act s.30(1) (j); Penal Code s.284(1), Government Decree No. 467/2009 Coll. of 14 December 2009	15 g of dry matter for marijuana and 5 g of hashish are considered a small amount according to Government Decree n. 467/2009 effective from January 2010.	Distinction by law for crimes of personal possession; specific paragraph on growing psychoactive drugs were cannabis is treated separately	Before January 2010, the old Penal Code made no distinction between cannabis and other substances, and it was unclear what was the great and the small amount that made a difference whether to prosecute drug possession criminally or administratively.
<b>Italy</b>	As with all drugs, cannabis-related offences (such as possession for personal use) are punishable by administrative sanctions from the second offence onwards.	DPR 309/90, Art. 75.	THC 1 g; DPR309/90 Art 72-75; Ministry of Health Decree of 11 April 2006<	No distinction.	Sale, production and possession of up to 30 g of cannabis are punishable by imprisonment for one month and/or a fine of €3 350; for more than 5 cannabis plants, the maximum penalties are 6 years' imprisonment.

<b>Netherlands</b>	Possession of any controlled drug is a criminal offence, with possession of up to 30g of cannabis legally punishable by imprisonment for one month and/or a fine of €3350.	Opium Act, Arts. 3C, 11(1); Opium Act Directive	The Directive states that investigation and prosecution of possession of cannabis for personal use (up to 5g) have the lowest judicial priority; the sale of up to 5g of cannabis per transaction in 'coffee shops' is generally not investigated (a transaction includes all sales and purchases made by a single coffee shop in the same day with the same buyer).	Distinction by law	Sale, production and possession of cannabis are punishable by imprisonment for one month and/or a fine of €3 350; for more than 5 cannabis plants, the maximum penalties are 6 years' imprisonment.
<b>Portugal</b>	As with all drugs, cannabis-related offences such as use, acquisition and detention may receive an administrative sanction.	Law 30/2000, Art.2, n.º 1	Cases are assessed and decided at a Commission for Dissuasion of Drug Dependence (Law 30/2000, Art. 5, n.º 1). Treatment is offered for situations involving problematic use/abuse of cannabis and administrative penalties for up to 10 daily doses, i.e. up to 25g of marijuana or 5 g of hashish may be applied (Law 30/2000, Art. 2, n.º2 and Governmental Decree 94/96)	Distinction by law – the administrative sanction varies according to the class of drug (Law 30/2000, Art. 15, n.º4 c) and Art.16)	
<b>Sweden</b>	As with all drugs, cannabis-related offences, such as use, are punishable by imprisonment for up to 3 years. If judged petty, according to the nature of the substance etc, up to six months or a fine.	Narcotic Drugs Punishments Act (1968:64), ss.1-2	Users are usually fined.	No distinction.	

<p><b>United Kingdom</b></p>	<p>Cannabis-related offences, such as possession, are punishable by up to five years' imprisonment. For adults, police may warn or issue a penalty notice for disorder instead of prosecuting, as part of a three-point escalation process for cannabis possession for personal use.</p>	<p>Misuse of Drugs Act 1971 s.5; ACPO Cannabis Enforcement Guidance</p>	<p>Whilst arrest is always the first presumption, an adult offender is likely to receive a cannabis warning for a first possession offence, and a penalty notice for disorder for a second offence. A third offence will result in arrest and consideration of likely further action including caution, conditional caution or prosecution. All subsequent offences are likely to result in arrest. If any aggravating factors are present the police will escalate the response accordingly. Ultimately, decisions as to the most appropriate disposal for an offender are made by the police and prosecution service.</p>	<p>Distinction by law (class of substance) and police guidance (specific to cannabis)</p>	<p>In January 2009 cannabis was reclassified to Class B.</p>
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Source: EMCDDA, Legal Topics Overview; Focal Point Bulgaria (<http://www.emcdda.europa.eu/html.cfm/index5036EN.html>)

## 2 Prevalence of cannabis use in the population

For Bulgaria, the Netherlands, Portugal, Sweden and England & Wales figures on the prevalence of cannabis use in this report are based on the most recent population surveys. For the Czech Republic, figures from the 2008 survey have been used instead of those from the more recent surveys in 2009 and 2010. The sample sizes of the latter surveys were much lower compared to 2008 (n=1,487 and 1,749 against 4,200) (Mravcik et al. 2011). Moreover, in contrast to the 2008 survey, the two most recent surveys did not assess (or report) data on frequency of use in the past month, which is important in the context of the current study for making consumption estimates per user group. In Italy, figures from the 2008 survey have been given for illustrative purposes, but the response rate was fairly low (33%), posing questions on the representativeness of the data. Therefore, for making annual consumption estimates, figures from indirect methods will be used to estimate the size of the Italian cannabis using population (see later). Also note that in England & Wales figures refer to age group 16-59 years. As the prevalence of cannabis use is generally lower among the very young and older age groups, these figures may be slightly higher compared to countries with a broader age range.

Tables 2.1 and 2.2 give the proportion last year and last month prevalence of cannabis use in each of the countries. Last year users have used cannabis at least once in the last year (or 12 months), while part of these users have also used cannabis at least once in the past month (or 30 days). Usually, those who have used in the last month are considered as more regular users. However, in the current study we will see that this is certainly not true for all of them.

Bulgaria and Sweden have with about 3% the lowest last year prevalence of cannabis use in the population of 15-64 years, followed at close distance by Portugal with almost 4%. Italy and the Czech Republic are on top of the list with 14% and 15%, respectively. The Netherlands and England & Wales are somewhere in the middle with around 7%. In all countries, cannabis use is about two to three times higher among the 15-24 year olds compared to the total population of 15-64 years.

The proportion of users in the past month is much lower in all countries. The ranking is more or less similar as described for the last year prevalence, except for the lower rates in the Italian population compared to those in the Czech Republic. Proportions of last month cannabis users peak in the Czech Republic, where amount one in five (22%) young people of 15-24 year reported the use of cannabis in the last month, while this was about ten times lower among the Swedish population in the same age group (2%).

Among the last year cannabis users, the proportion of young people of 15-24 years is lowest in Italy (22%), followed by the Netherlands and Czech Republic with 42%. The share of young cannabis users is highest (50% or more) in England & Wales, Bulgaria and Sweden. There are also fairly remarkable differences between countries with regard to the proportion of males among those who had used cannabis in the last year or month. In Bulgaria and Italy, about six in ten last year cannabis users is male, while in Portugal this almost nine in ten.

Proportions of young people among last month users do not differ much from those among last year users. Slightly higher proportions are reported in Bulgaria (+4.8%) and slightly lower in the Netherlands (-6.4%). The proportion of males is a fraction higher in most countries among past month users, which may reflect more regular and/or frequent use, with the previously mentioned reservations in mind.

**Table 2.1: Last year prevalence of cannabis use (%) by age and gender**

	Year	Age (years) <sup>I</sup>				Gender (15-64 years)		
		15-64	15-34	15-24	Proportion 15-24 <sup>II</sup>	Males	Females	Proportion males <sup>II</sup>
<b>Bulgaria</b>	2008	2.7%	6.0%	8.7%	55.9%	3.2%	2.2%	59.1%
<b>Czech Republic</b>	2008	15.3%	28.4%	37.4%	42.1%	20.1%	10.4%	66.4%
<b>Italy<sup>III</sup></b>	2008	14.3%	20.3%	22.3%	23.8%	17.3%	12.0%	58.9%
<b>Netherlands</b>	2009	7.0%	13.7%	16.1%	42.1%	9.8%	4.2%	70.3%
<b>Portugal</b>	2007	3.6%	6.7%	6.6%	30.0%	6.4%	0.9%	87.5%
<b>Sweden</b>	2010	2.8%	6.2%	7.3%	53.3%	3.7%	1.8%	68.0%
<b>England &amp; Wales<sup>IV</sup></b>	<b>2010/2011</b>	<b>6.8%</b>	<b>12.5%</b>	<b>17.1%</b>	<b>50.1%</b>	<b>9.3%</b>	<b>4.4%</b>	<b>67.9%</b>

I. Age limits in England & Wales 16 – 59 and in Sweden 16-64 years. II Proportions 15-24 year olds and proportions males among last year users have been recalculated by using Eurostat population data for 2011. III. Low response rate (33%); figures should be interpreted with caution. Indirect estimates on the number of cannabis users will be applied in calculations on annual consumption (see chapter 5)

IV. England and Wales.

Sources: EMCDDA 2012b; National Reports of Focal Points; contact persons of the sample countries; Eurostat.

**Table 2.2: Last month prevalence of cannabis use (%) by age and gender**

	Year	Age (years) <sup>I</sup>				Gender (15-64 years)		
		15-64	15-34	15-24	Proportion 15-24 <sup>II</sup>	Males	Females	Proportion males <sup>II</sup>
<b>Bulgaria</b>	2008	1.4%	3.1%	4.9%	60.7%	1,8%	1,0%	64.1%
<b>Czech Republic</b>	<b>2008</b>	8.6%	16.8%	22.4%	45.0%	12.4%	4.7%	73.0%
<b>Italy<sup>III</sup></b>	<b>2008</b>	6.9%	9.9%	11.0%	24.3%	9.6%	4.8%	66.5%
<b>Netherlands</b>	2009	4.2%	7.7%	8.2%	35.7%	6.3%	2.0%	76.2%
<b>Portugal</b>	2007	2.4%	4.5%	4.1%	28.0%	4.4%	0.5%	89.6%
<b>Sweden</b>	2010	1.0%	2.1%	2.2%	45.0%	1.4%	0.5%	74.3%
<b>England &amp; Wales<sup>IV</sup></b>	<b>2010/2011</b>	<b>3.8%</b>	<b>6.8%</b>	<b>9.0%</b>	<b>47.2%</b>	<b>5.6%</b>	<b>2.1%</b>	<b>72.7%</b>

I. Age limits in England & Wales 16 – 59 and in Sweden 16-64 years. II Proportions 15-24 year olds and proportions males among last year users have been recalculated by using Eurostat population data for 2011. III. Low response rate (33%); figures should be interpreted with caution. Indirect estimates on the number of cannabis users will be applied in calculations on annual consumption (see chapter 5).

IV. England and Wales.

Sources: EMCDDA 2012b; National Reports of Focal Points; contact persons of the sample countries; Eurostat.

### Methodological issues

A critical appraisal of methodological characteristics and differences between countries, which may affect prevalence figures and comparability, is beyond the objectives of this study (see EMCDDA, Statistical bulletin, for a brief overview). Nonetheless, it should be reminded that the reported prevalence figures may suffer from methodological drawbacks. Harmonizing age groups and core questions, as pursued by the EMCDDA, is already a major step forwards in enhancing comparability of figures between countries. However, there are other characteristics that may play a role, like non-response, the context of the survey, i.e. whether the survey is drug or substance use specific or whether questions are embedded in a general health questionnaire, and the survey mode. For example, in Bulgaria, the Netherlands, Portugal and England & Wales questions were asked in an 'interview', like a (computerized) face-to-face interview, which may include self-completed sections for the more sensitive questions, and in Italy and Sweden by mail (mailed questionnaire). The degree of privacy may influence the 'willingness' of respondents to admit drug use. Even in the Netherlands, where there is evidence that asking respondents about their drug use in interviewer completed face-to-face interviews may yield lower prevalence rates compared to online-questioning (Spijkerman et al. 2009). The precise extent of underreporting is hard to estimate. Moreover, undercoverage due to selecting, for example, only people who are included in population registries and are not institutionalized or homeless is another likely source of underestimating the true extent of cannabis use in population surveys.

### ***Trends in cannabis use***

In its 2012 report on the cannabis markets, the EMCDDA concluded that while cannabis use increased from the mid-nineties until the early 2000s in many European countries, the picture became more diverse in the period 2004-2010 (Carpentier et al. 2012).

Six countries, including Bulgaria and Sweden, were mentioned to always report low last year prevalence rates, although it remained unclear whether this also pertained to intensive patterns of use. In Sweden last year prevalence of cannabis use among men aged 16-64 varied between 2.6% and 3.0% in the period 2004-2008 and slightly increased to 4.3% in 2009. Among females, percentages showed minor fluctuations without a clear trend. In Bulgaria general population surveys have been conducted in 2005, 2007 and 2008, suggesting a slight increase in cannabis use from 2007 to 2008, but nonetheless levels remain relatively low.

Trend data from the British Crime Survey (as of 2012 renamed into the Crime Survey for England & Wales) showed a consistent decrease in the past year use of cannabis in the population of 16-59 years from 10.8% in 2003/2004 to 6.8% in 2010/2011 (Smith and Flatley 2011) .

In Portugal an increase in the lifetime prevalence of cannabis use was found in the general population (15-64 years) from 7.6% in 2001 to 11.7% in 2007. However, last year and last month prevalence remained fairly stable (last year: 3.3% and 3.6%; last month 2.4% in both years). In the most recent survey in 2012 a decrease in both last year and last month prevalence was reported among males.

In the Czech Republic, Netherlands and Italy, recent trends in cannabis use cannot be reliably established. As mentioned in the introduction of this chapter, (general population) surveys were conducted in the Czech Republic in 2008, 2009 and 2010. Prevalence rates were appreciably lower in the 2009 and 2010 surveys compared to 2008. For example, last year prevalence among 15-64 olds was 15.2% in 2008, 11.2% in 2009 and 10.4% in 2009. Last month prevalence rates were 8.5%, 4.1% and 4.2%, respectively. These differences could be interpreted as a decrease in cannabis use or rather reflect methodological differences between surveys.

In the Netherlands trends in cannabis use in the general population are monitored every four year since 1997. The surveys showed that cannabis use remained stable in the general population of 15-64 years between 1997 and 2005. Prevalence rates were overall higher in the 2009 survey. However, a change in data collection method in 2009 (shift from CAPI to CASI) precluded the determination of trends between 2005 and 2009.

In Italy, response rate was very low in the most recent survey in 2010 (13%). The 'reduction' in last year prevalence of cannabis use from 14.3% in 2008 to 5.2% in 2010 can therefore be questioned.

### ***Types of cannabis***

Population surveys rarely differentiate between types of cannabis (i.e. hash or marihuana). The Bulgarian general population survey of 2008 and the British Crime Survey of 2009/2010 are exceptions. Table 2.3 shows that marihuana is by far the most common cannabis type in Bulgaria, with a last year prevalence among 15-34 year olds being seven times higher compared to that for hash. Note that the especially figures on last year use of hash and marihuana do not sum exactly to the figure for 'cannabis', indicating that users of hash had consumed marihuana in this time period as well.

Also in the British Crime Survey of 2009/2010 questions were included on the use of cannabis types: marihuana, skunk, hash and hash oil (Hoare and Moon 2010). Skunk was described as a strong marihuana type with a two to three times higher THC content compared to traditionally imported marihuana. Overlapping terms are "sinsemilla" and "homegrown cannabis" but usually the term "skunk" is used in the England & Wales. This survey showed that 6.6% British people between 16 and 59 years had used cannabis in the past year. The majority of these users had used herbal cannabis (71%), 38% took hash, 6% hash oil and 6% did not know which type they had used. Twenty-nine percent of the last year users had consumed more than one type. About half of the cannabis users (or 3.2% in the general population) had used the stronger form of herbal cannabis (skunk).

Findings from an online poll conducted by the Czech National Focal Point in 2009 and the general population survey in 2008 suggest that approximately one third to a half of cannabis consumers use indoor marihuana, one third use outdoor marijuana, and the remaining one fifth to one third do not know the origin of the cannabis; hashish is used by an estimated 5-10% of cannabis users (Mravcik et al., 2012).

**Table 2.3: Last year and last month prevalence of use of hash and/or marihuana in the general population of Bulgaria in 2008**

	Last year prevalence (%)		Last month prevalence (%)	
	15-64 years	15-34 years	15-64 years	15-34 years
<b>Marihuana</b>	2.6%	5.8%	1.4%	2.8%
<b>Hashish</b>	0.4%	0.8%	0.1%	0.3%
<b>Cannabis (marihuana and/or hashish)</b>	2.6%	6.0%	1.5%	3.0%

Source: *Bulgarian National Focal Point*.

### Frequency of use

The EMCDDA model questionnaire for population surveys specifies frequency categories of last month substance use. Many countries have adopted these categories, structurally or in the framework of a field trial. Sometimes the exact numbers of use days have been used in the questionnaires and in other cases the ordinal approach (e.g. 'less than once a week'). Data are available for the Czech Republic, Italy, the Netherlands, England & Wales. For Italy data are available from an older survey (2005) and with the before mentioned reservations in mind. For Bulgaria data on the number of use days in the past month are available but use categories do not match. There are no frequency data for Sweden.

These data show fairly big differences in use frequency. The proportion of last month users who consumed cannabis less than weekly varied from 19% in Portugal to over 40% in the Czech Republic, England & Wales and Italy. Daily or almost daily use was with 9% lowest in the Czech Republic and with 44% highest in Portugal.

**Table 2.4: Frequency (number of use days) among past month users**

	Survey year	Age group	Last month prevalence	1-3 days/ less than once a week	4-9 days/ at least once a week	10-19 days/ several times a week	20 days or more/ daily or almost daily
<b>Bulgaria</b>	2008	15-64	2.2% <sup>I</sup>	54.5 (once)	22.7 (2-8 days)	13.7 (≥9 – not daily)	9.1 (daily)
<b>Czech Republic</b>	2008	15-64	8.6%	42.9	31.9	16.1	9.1
	2008	15-34	16.7%	43.1	31.1	16.8	9.6
<b>Italy</b>	2005	15-64	5.8%	47.6	24.5	10.2	17.6
<b>Netherlands</b>	2009	15-64	4.2%	23.8	21.0	24.8	30.5
	2009	15-34	7.7%	28.9	23.7	23.0	24.4
<b>Portugal</b>	2007	15-64	2.4%	18.5	14	23.4	44.1
<b>Sweden</b>	2010		n.a.	n.a.	n.a.	n.a.	n.a.
<b>England &amp; Wales<sup>II</sup></b>	2010/2011	16-59	3.8%	48.0	14.0	14.0	15.0

Figures should be interpreted with caution. For Italy, indirect estimates on the number of cannabis users will be applied in calculations on annual consumption (see chapter 5). I. Questions on frequency of last month use were differently phrased which might explain the difference between last month prevalence reported in table 2.2 and this table. II. Categories do not sum to 100 due to a weighing procedure (pers. comm. EMCDDA).

Sources: EMCDDA 2012b; National Reports of Focal Points; contact persons BG, CZ, IT.

### Cannabis use among pupils

Since the mid-nineties, the use of cannabis and other substances among pupils of 15 and 16 years is monitored every four years in many European countries. In the last survey of 2011, a total of 36 countries participated. Figures for the Netherlands will be made available in a supplement to the main report due to late data delivery. In the 2011 survey of England & Wales, the participation of the approached schools was very low (6%). Participating schools did not differ from those who did not in terms of school size, religious status and urbanization. Nonetheless, as a precautionary measure, the data from 2011 were not compared with those of previous years.

It is clear from table 2.5 that there was a great variation in the lifetime prevalence of cannabis use between the sample countries, with figures for 2011 ranging from 9% in Sweden to 42% in the Czech Republic. Last year prevalence was lower in most countries, although differences were sometimes very small, which may reflect the fact that many young people may have started cannabis use in the 12 months before the survey.

The proportion of pupils who had used cannabis in the last month prevalence was about two to three times lower compared to those who had ever tried the drug. Figures ranged from 3% in Sweden to 14% in the Netherlands and 15% in the Czech Republic. The proportion of pupils who had used cannabis 6 times or more in the last month varied from 0% in Sweden to 6% in Italy.

Compared with last year prevalence data from the general population, the ranking of countries shows similarities but also differences. Sweden scored lowest and the Czech Republic highest in both populations. However, in Bulgaria and Portugal prevalence rates in the general population were at about the same low level as in Sweden, but were clearly higher among pupils in the two former countries.

**Table 2.5: Cannabis use among pupils of 15 and 16 years in the sample countries in 1999, 2003, 2007 en 2011**

Country	Lifetime prevalence				Last year prevalence				Last month prevalence			
	1999	2003	2007	2011	1999	2003	2007	2011	1999	2003	2007	2011
<b>Bulgaria</b>	12%	21%	22%	24%	8%	17%	17%	18%	4%	8%	7%	10%
<b>Czech Republic</b>	35%	44%	45%	42%	27%	36%	35%	30%	16%	19%	18%	15%
<b>Netherlands</b>	28%	28%	28%	27%	23%	23%	25%	23%	14%	13%	15%	14%
<b>Italy</b>	25%	27%	23%	21%	20%	22%	19%	18%	14%	15%	13%	12%
<b>Portugal</b>	9%	15%	13%	16%	9%	13%	10%	16%	5%	8%	6%	9%
<b>Sweden</b>	8%	7%	7%	9%	6%	5%	5%	6%	2%	1%	2%	3%
<b>England &amp; Wales<sup>1</sup></b>	35%	38%	29%	25% <sup>1</sup>	29%	31%	22%	21% <sup>1</sup>	16%	20%	11%	13% <sup>1</sup>

*1. Low response of schools in 2011 (6%).*

Source: ESPAD

## 3 Cannabis use and classifications or typologies of cannabis users

### 3.1 Literature overview

In the (scientific) literature various classifications and more sophisticated typologies of cannabis users have been documented (Fischer et al. 2010; Hammersley and Leon 2006; Korf et al. 2007; Miller and Plant 2002; Senate Special Committee on Illegal Drugs (Senate) 2002; Temple et al. 2011; Van der Pol et al. 2013; Wittchen et al. 2009; Zeisser et al. 2012). The relevance of making classifications is mainly to understand associations between different user types and health or social outcomes, which could aid the identification of specific risk groups for prevention. Classifications are also employed in research on the drugs markets, e.g. to estimate consumption by different user groups (e.g. Hakkarainen et al. 2008; Observatoire Français des Drogues et des Toxicomanies (OFDT) 2002).

Cannabis users have been classified in many ways at widely varying levels of detail. User groups may be labelled as 'light and heavy users', 'occasional, regular, weekly, intensive/daily users', or 'current and past users', but there are no standard definitions underlying these concepts. On the one extreme cannabis users may be classified solely on the basis of their use ever (lifetime), in the past year ('recent use') or in the past month ('current use'), regardless of frequency. Other classifications employ various user characteristics, detailed cannabis use variables, indicators of problem use, or a combination of these.

Methods to profile subtypes of cannabis users include the a-priori classification on the basis of one or two characteristics (e.g. frequency of use in a certain time period, age of onset), which are commonly known as risk factors, or data driven methods

based on latent class or cluster analyses, which consider several variables in association (e.g. Fischer et al. 2010; Korf et al. 2007; Wittchen et al. 2009). Classes or categories may be formed on the basis of a fixed set of variables, and followed by a further characterization using other variables. Examples of studies employing different classifications or investigating typologies are summarized in table 3.1.

**Table 3.1: Examples of classifications and typologies of cannabis users**

Country (source)	Study population	Typology or classification
<b>Germany</b> (Wittchen et al. 2009)	Subjects of 14-24 years with repeated illegal substance use (5 times or more), assessed at baseline and over a 10-years follow-up period	Four classes of cannabis and other illicit drug users: 1. <i>Unproblematic cannabis users</i> (59%) 2. <i>Primary alcohol use disorders</i> (14%) 3. <i>Delinquent cannabis/alcohol DSM IV abuse</i> (18%) 4. <i>Cannabis use disorders with multiple problems</i> (9%) Variables in the latent class analyses included mental problems, somatic, interpersonal and occupational problems, mental disorders and antisocial behaviours. Cannabis use related problems were highest for class 3 and 4, while concomitant mental disorders were highest in class 2 and 4.
<b>Finland</b> (Hakkarainen et al. 2008)	Different sources (e.g. population surveys, field studies).	Five different cannabis user groups were distinguished on the basis of frequencies (number of use days in past year) and amount (gram per day): 1. <i>Experimenters</i> : 1-4 days x 0.2 gram 2. <i>Modest occasional users</i> : 5-12 days x 0.4 gram 3. <i>Frequent occasional users</i> : 13-51 days x 0.4 gram 4. <i>Weekly users</i> : 52-181 x 0.5 gram 5. <i>Daily users</i> : 182-365 x 1 gram
<b>France</b> (Observatoire Français des Drogues et des Toxicomanies (OFDT) 2002)	General population (18+, 1999-2000)	1. <i>Abstainer</i> : never smoked (78% of population) 2. <i>Experimental</i> : past consumption, but not in the last year (n.a.) 3. <i>Occasional</i> : between 1 and 9 times per year (6.5%) 4. <i>Repeated</i> : more than 9 times per year, less than 10 times per month (3.6%) 5. <i>Regular</i> : Between 10 and 19 times per month (1.4%) 6. <i>Excessive</i> : 20 times or more a month (n.a.)
<b>Italy</b> (Fabi et al. 2011)	National school population (15-19 years, N=34,000 in 2010)	Users were classified on the basis of frequency (use days) in the past 30 days: 1. <i>Occasional users</i> : use on 1-5 days in the past 30 days 2. <i>Regular users</i> : use on 6-19 days in the past 30 days 3. <i>Intensive users</i> : use on more than 19 days in the past 30 days
<b>Italy</b> (Cipolla and Martoni 2008)	Recreational setting attendees' in the Italian Romagna cost (N=5,233)	Classification of users based on use frequency: 1. <i>Non-users</i> : never use 2. <i>Occasional</i> : use from "at least once in the last year" to "2/3 times last month" 3. <i>Regular</i> : use from "at least once in the last week" to daily use 4. <i>Experimental</i> : once in the lifetime
<b>Netherlands</b> (Korf et al. 2007)	Regular cannabis smokers (at least once a month) recruited in 28 coffee shop located in 5 Dutch cities and through snowball sampling (N=388)	Three clusters of regular cannabis users, based on demographic, user, detailed cannabis consumption and environmental characteristics: 1. <i>Strongest high type</i> : was relatively young (average 23 yrs), consumed high average monthly dose (35 mg), inhaled higher potency cannabis more deeply, scored highest on dependence symptoms. 2. <i>The consistent high type</i> : was 28 yrs on average, preferred milder cannabis, consumed lowest average monthly dose (8.1 mg), compensated for stronger cannabis by inhaling less deeply and smoking less. 3. <i>The steady quantity type</i> : was oldest on average (38 yrs), were more likely to live and smoke alone, used an average monthly dose (19.5 gram) but did not tend to adjust their smoking behaviour in reaction to stronger cannabis.
<b>Netherlands</b> (Van der Pol et al. 2011)	Frequent cannabis users (18-30 years, who used cannabis at least 3 times a week during the past year; recruited in coffee shops of 5 Dutch cities and through snowball sampling (N=600)	Classification based on use frequency and dependence status: 1. <i>Frequent nondependent users</i> : use on at least 3 days a week during the past year and no 12 months diagnosis of cannabis dependence. 2. <i>Frequent dependent users</i> : use on at least 3 days a week in the past year and a 12 month diagnosis of dependence (DSM IV criteria). A wide range of variables (demographic, detailed consumption indicators, user characteristics, life events, childhood adversities, mental disorders) were entered into analyses to discriminate between dependent and non-dependent frequent users.

<p><b>Netherlands</b></p> <p>(Nabben et al. 2010)</p>	<p>Visitors of coffee shops in Amsterdam (N=266), of whom 94% had used cannabis in the past month, and 76% (almost) daily</p>	<p>Risky user: Daily cannabis use or consumption of more than one joint on several days or more per week. Of the past month users 82% could be defined as a risky user.</p>
<p><b>United Kingdom</b></p> <p>(Hammersley and Leon 2006)</p>	<p>People from 17 to 45 years old who have smoked cannabis at least once in a lifetime (N=176)</p>	<p>Cannabis users could classify themselves on the basis of descriptions of use patterns:</p> <ol style="list-style-type: none"> <li>1. <i>Ex-users</i>: have given up cannabis use</li> <li>2. <i>Casual users</i>: use cannabis less than a few times a year, might get it offered it and rarely buy it, only for special occasions.</li> <li>3. <i>Regular controlled users</i>: buy cannabis often or get it and use it a few days a month up to a couple of days a week.</li> <li>4. <i>Daily or near daily users</i>: often buy or get cannabis and smoke (almost) every day, at evenings up to the whole day</li> </ol>
<p><b>United Kingdom</b></p> <p>(Miller and Plant 2002)</p>	<p>School students aged 15-16 year (from ESPAD), N=2,641, including 201 heavy cannabis users (40 times in life)</p>	<p>Three clusters of heavy cannabis users were formed on the basis of gender, and a range of variables related to the quality of relationship with family and friends, leisure time, mood and attitudes, aggression and delinquency. They were labelled as:</p> <ol style="list-style-type: none"> <li>1. <i>Antisocial behaviour</i> type</li> <li>2. <i>Unhappy</i> type</li> <li>3. <i>Ordinary</i> type</li> </ol> <p>These types were further profiled on cannabis use variables, other substance use and social status.</p>
<p><b>Canada</b></p> <p>(Fischer et al. 2010)</p>	<p>Current cannabis users (use in past 3 months; N=1,303) from the Canadian household survey (N=13,909)</p>	<p>Four classes based on six cannabis-use related variables:</p> <ol style="list-style-type: none"> <li>1. Onset ≤ 21 years, occasional use (no use or on &lt;7 days/past month, used less than in past 12 months; used mainly for social reasons and not medically (32%)</li> <li>2. Onset ≤ 17 years, moderate/regular use (1-7 days in past month), used same or less than in past 12 months, used mainly for social reasons, not medically (20%)</li> <li>3. Onset ≤ 17 years, moderate-weekly use (1-14 days in past month), consumed same or less than in past 12 months; used mainly for social reasons and half for medical reasons (25%)</li> <li>4. Onset ≤ 15 years, near daily or daily use, used more than in past 12 months; used mainly for social reasons and half for medical reasons (23%)</li> </ol> <p>Class 4 was associated with the highest level of health and cannabis use problems.</p>
<p><b>Canada</b></p> <p>(Zeisser et al. 2012)</p>	<p>Regular (monthly) cannabis users aged 15–67 years from high risk population (club drug users, street youth, injecting drug users) (N=665).</p>	<p>Cannabis users were classified on the basis of frequency and quantity:</p> <ol style="list-style-type: none"> <li>1. <i>Frequency in the past 30 days</i>: 1–4 days, 5–11 days, 12–20 days, 21–29 days, and 30 or more days</li> <li>2. <i>Quantity (number of joints or equivalents per day)</i>: 0.1-0.8 joint; exactly 1 joint; 1.1 to 3 joints; 3.5 to 8 joints; 9 or more joints. It was assumed that one joint was equal to 0.5 gram cannabis, five bong or pipe hits or 10 puffs</li> </ol> <p>Frequency was the strongest predictor of cannabis use related problems.</p>
<p><b>Canada</b></p> <p>(Thomas et al. 2006)</p>	<p>General population of 15 years or older in 2004</p>	<p>Typology based on prevalence and frequency of use and scores on the Alcohol, Smoking and Substance Involved Screening Test (ASSIST):</p> <ol style="list-style-type: none"> <li>1. <i>Abstainer</i>: no use in lifetime (55.7% of population)</li> <li>2. <i>Past user</i>: used at least once in lifetime but not in last 12 months (30.4%)</li> <li>3. <i>Past recent user</i>: used in past year but not in last 3 months (2.9%)</li> <li>4. <i>Low-risk user</i>: less than monthly or monthly use in last 3 months and ASSIST score ≤3 (2.8%)</li> <li>5. <i>Moderate-risk user</i>: Daily or near-daily use in last 3 months AND/OR ASSIST score between 4 and 26</li> <li>6. <i>Dependent/high-risk user</i>: ASSIST score ≥27</li> </ol>
<p><b>US</b></p> <p>(Kandel and Chen 2000)</p>	<p>Ever users of cannabis (more than 10 times lifetime) followed from age 15-16 up to 34-35 years (N=708)</p>	<p>Four clusters of cannabis users, based on age of onset of cannabis use, extent of chronic use, persistence of use by age 34-35, labelled as:</p> <ol style="list-style-type: none"> <li>1. <i>Early-onset heavy use</i>: onset around 15 years, all were near daily (4 or more days a week) users, and half still used by age 34-35</li> <li>2. <i>Early onset-light use</i>: onset at around 15 years, half became near daily users and only 10% persisted in use at age 34-35</li> <li>3. <i>Mid onset-heavy use</i>: onset at around 16 years, two-thirds became near daily users and all still used at age 34-35</li> <li>4. <i>Late onset -light use</i>: onset at around 19.5 years, one fifth became a near daily user and less than 1% still used at age 34-35.</li> </ol> <p>These four user groups were further described on the basis of demographic, substance-use and problem use related variables, psychological problems and family and social context variables.</p>

The EMCDDA also collects data about the frequency of use during last month (1 to 3 days/30; 4 to 9 days/30; 10 to 19 days/30; 20+ days). People who use cannabis daily or almost daily (20 or more days in the past month) are considered as 'intensive user'. Work is in progress to find the most appropriate screening instrument to establish the prevalence of 'problem cannabis use' in the general population.

A categorization based on frequency (defined in varying ways) is most common in cannabis research aimed at establishing effects or outcomes of cannabis use. However, as noted by Temple et al. (2010) this leaves much room for variation in exposure as these studies usually do not take into account the number of consumption sessions or units per day and the amount consumed per unit or day, let alone cannabis potency, which may be relevant in investigating health risks. Moreover, according to these authors "there is a need for studies that examine a broader range of variables relating to overall patterns of cannabis use (e.g. context of use, method of administration, motives for use, subjective effects) to gain a greater understanding of differing patterns of use and how these use factors may be associated with use-related harms and problems experienced by cannabis users".

An example of a classification scheme incorporating some of these elements is proposed (not empirically tested) by the Canadian Senate Special Committee on illegal drugs (2002). They distinguish four groups of cannabis users based on context of use, quantity, frequency, period and intensity of use: experimental, regular, at risk, and excessive users (table 3.2). Smoking alone, in the morning and before work or school are considered to be risk factors. While this model is conceptually interesting from a public health perspective, it is less suitable for making markets estimates as groups are not exhaustive and do not provide sufficient detail on cannabis use patterns.

**Table 3.2: Classification of users by the Canadian Senate Special committee on illegal drugs (2002)**

Type of consumers	Context of use	Quantity	Frequency	Period and intensity of use
Experimental/ occasional	Curiosity	Variable	A few times over lifetime	None
Regular	Recreational, social Mainly in the evening Mainly in a group	A few joints Less than one gram a month	A few times a month	Spread over several years, but rarely intensive
At-risk	Recreational and occupational use (before work or school, for sport) Alone and in the morning Under 16 years of age	Between 0.1 and 1 gram a day	A few times a week, evenings, especially weekends	Spread over several years with high intensity periods
Excessive	Occupational and personal problems\ No-self regulation of use	Over 1 gram a day	More than once a day	Spread over several years with several months at a time of high intensity use

Several studies listed in table 3.1 are worth describing in more detail as they provide relevant information on cannabis use patterns from different perspectives (Hakkarainen et al. 2008; Korf et al. 2007; Zeisser et al. 2012).

In a Canadian study, individuals (15-67 years) recruited from three high risk populations (club drug users, street-involved youth and injecting drug users) were classified on the basis of both frequency and quantity of their cannabis use (Zeisser et al. 2012). Frequency was defined as the number of use days in the past month. Quantity was defined in terms of the number of joints, assuming that one joint was equal to 0.5 gram cannabis, five bong or pipe hits or 10 puffs. In their sample, cannabis use frequency was associated with the amount of use: the higher the number of use days, the higher the number of joints consumed per day (see table 3.3). Using items of the Alcohol Smoking and Substance Involvement Screening Test (ASSIST) to measure cannabis-related problems, it was determined that use frequency significantly predicted each of the cannabis-related problems, independent of cannabis quantity. Compared to those using cannabis on 1-4 days in the past 30 days, the odds of experiencing overall problems was increased in all other frequency groups in a dose-related fashion (OR 2.8 for 5-11 days, OR 4.2 for 12-20 days, OR 9.1 for 21-29 days and OR 11.6 for 30 days or more). Quantity was an independent (corrected for frequency) predictor of only one out of five problems (failure to do what expected) only for those smoking 3.5-8 joints per day. Nonetheless, other studies suggest that quantity, independent of frequency, is an important predictor of cannabis-related problems (Walden and Earleywine 2008).

**Table 3.3: Cannabis users classified by number of use days and number of units consumed per day (Zeisser et al. 2010)**

	Number of use days in the past month				
	1-4	5-11	12-20	21-29	30 or more
0.1-0.8	32%	18%	12%	7%	2%
1	42%	31%	34%	21%	9%
1.1-3	20%	39%	41%	43%	34%
3.5-8	5%	10%	11%	22%	41%
9 or more	2%	2%	2%	7%	14%
	100%	100%	100%	100%	100%

*Adapted from Zeisser et al. (2010).*

Note that Zeisser et al. (2010) assessed quantity as the number of joints, assuming that the amount of cannabis per joint was similar across users. This assumption is questionable, however. For example, in a Dutch study by Korf et al. (2007) a variety of personal and cannabis use variables were measured in a sample of relatively frequent cannabis users in order to construct user typologies to shed light on the relationship between cannabis potency, consumption patterns and harmful effects of cannabis. Consumption variables included: the monthly cannabis dose as calculated by the number of use days per month, the number of joints per typical cannabis day and the cannabis dose per joint. The latter was estimated in two ways: by asking users how many joints they usually would roll from 1 gram of cannabis and by using photo or prompt cards with four different amounts of hash or marijuana shown to the respondents, and asking them to rate which amount would be closest to the amount they normally consumed per joint. Overall, the first method resulted in an average dose of 250 mg and the second of 160 mg per joint. The photo card method was assumed to be most reliable and sensitive, although recent data from a validation study suggest it may give an underestimation of the true amount (Van der Pol et al., submitted). Nonetheless, table 3.4, which gives figures on a few variables measured in this study, suggests that users may not only differ in the number of use days and number of joints, but also in the amount of cannabis they consume per joint.

**Table 3.4: Cannabis user and use characteristics in a Dutch study among three clusters of current cannabis users (from Korf et al. 2007)**

	Cluster I (strongest high)	Cluster II (consistent high)	Cluster II (steady quantity)
% Males	86%	66%	91%
Mean age (years)	22.7	27.7	37.5
Dose per joint (mean)	35 gram	8 gram	19 gram
• Dose per joint (mean)	0.21 gram	0.11 gram	0.14 gram
• Joints per use day (mean)	5.7	3.1	5.1
• Use days per month (mean)	27.4	21.1	26.6

The third study by Hakkarainen and colleagues (2008) aimed to estimate the size of the cannabis markets in Finland, including the total amount consumed in 2004. The investigators used data from population surveys and registration data on problem users to estimate the annual number of cannabis users, while data from qualitative studies were used to estimate drug use patterns among different user groups. Their population survey only measured the prevalence in the past 12 months and last month use, and for the last month users also the frequency of use was measured (number of sessions in the last month). In order to classify users into 5 groups (see table 3.5), a number of assumptions had to be made about their frequency of use in the last 12 months, and their consumption pattern. For example, it was assumed that not all past month users consumed cannabis every month in the past 12 months. Moreover, based on the international literature, the phenomenon of 'sharing joints' was taken into account, which was assumed to play a role especially among experimenters and occasional users. For example, experimenters were assumed to take one joint, with an average dose of 0.4-0.5 gram of cannabis (based on American data), and share it in a 3-person company. Thus their daily dose (or more appropriately 'dose per session') would be between 0.13 and 0.15 gram. Occasional users were assumed to take several of these doses within one consumption session, resulting in an estimated 0.4 gram per session.

By classifying users into the different user groups and taking their assumed consumption per session into account, the investigators calculated the amount of cannabis consumed per user group. Moreover, numbers of cannabis users from population surveys were complemented with estimates of the number of problem drug users (amphetamine and opiates), of

whom 50% were assumed to be underrepresented in general population surveys. It was further assumed that two-thirds of this group used cannabis and that half of these users could be assigned to the group of frequent occasional users and half of them to the group of weekly users. Minimum and maximum estimates were based on the boundaries of the number of use sessions per year within each user group into account. The investigators concluded that, while the modest occasional users were the largest group, the smallest group of the daily users (6%) accounted for the majority (between 52% and 65%) of the total cannabis consumption. If all last years are taken together, the average consumption of a cannabis user would be between 16 and 40 gram per year.

While this study is highly interesting because it takes differences between types of users into account, the consumption pattern data have been drawn mainly from other studies, and assignment into user groups occurred mainly on the basis of assumptions on their frequency of use in the past year.

**Table 3.5: Estimated total consumption of cannabis by user group in the Finnish population in 2004 (from Hakkarainen et al., 2008)**

	Number of users		Amount of cannabis			
	N	%	Minimum		Maximum	
			Kg	%	Kg	%
<b>Experimenters</b> 1-4 sessions x 0.2 g per session	18,000	17%	4	0	14	0
<b>Modest occasional users</b> 5-12 sessions x 0.4 g per session	44,000	41%	88	5	211	5
<b>Frequent occasional users</b> 13-51 days x 0.4 g per day	23,100	22%	120	7	479	11
<b>Weekly users</b> 52-181 days x 0.5 g per day	15,100	14%	393	23	1,367	32
<b>Daily users</b> 182-365 days x 1 g per day	6,000	6%	1,092	65	2,190	52
<b>Total</b>	<b>106,200</b>	<b>100</b>	<b>1,697</b>	<b>100</b>	<b>4,261</b>	<b>100</b>

Finally, in its 2009 World Drug Report, the UNODC has differentiated four different types of users (casual, regular, daily, chronic) on the basis of an international literature review published in the Bulletin on Narcotics (2006) UNODC (2009). Table 3.6 shows 'global' consumption patterns per user group, without taking possible differences between countries into account. The weighted average of the amount of cannabis consumed per past year user was estimated at 172 gram, much higher than the amount in the study of Hakkarainen et al. (2008) (16-40 gram). Note, however, that the UNODC assumed a dose of 0.5 gram per joint, which may be fairly high for European countries.

So far, data on cannabis consumption patterns have not been empirically assessed in detail in one study in different countries and used for making consumption estimates differentiated by user groups.

**Table 3.6: Consumption patterns of different types of users**

User type	% of past year users	Use pattern (year)	Amount consumed per year
Casual users	45%	Sharing joints 1 -11 times (or 4 on average (0.15 gram per time) <sup>1</sup>	0.6 gram
Regular users	41%	100 times or days (0.15 gram per time or day)	15 gram
Daily users	9%	One to four joints on 320 days (on average one gram per day)	320 gram
Chronic users	4%	Ten joints daily (equaling 5 grams)	1,825 gram

*1. One joint of 0.5 gram cannabis may be shared with 3-4 people.*

**Source:** World Drug report UNODC (2009). Bulletin on narcotics (UNODC 2006).

## 3.2 Definition of user types

In the present study cannabis users were classified on the basis of the number of cannabis use days in the past 12 months (annual frequency) into four user groups. This classification is pragmatically chosen as the categories needed to correspond somehow with the data obtained in general population surveys on the prevalence and number of cannabis users. Most countries have data on the prevalence of use in the past year and the past month and within the group of last month users, on the number of use days. Data on the annual number of use days are rarely measured directly. Nonetheless, it was decided to classify users on the basis of annual frequency (use days) instead of extrapolating figures on the basis of frequencies in the past month, as annual frequency appeared to yield better discriminative properties with regard to a number of consumption variables. We will go into more detail about this match. After classifying users, they were further profiled in terms of demographic characteristics, consumption patterns, circumstances of use and problems associated with their cannabis use.

In the web survey, annual frequency was measured by two categorical variables. One variable included the following frequency categories: 1-5 days; 6-10 days; 11-20 days; 21-50 days; 51-80 days; 81-100 days; 101-150 days; 151-200 days; 201-250 days; 251-300 days; 301-350 days; >350 days. The other variable included the categories: 'daily', 'almost daily', 'not daily but more than once a week', 'once a week', 'less than once a week, but at least once a month' and 'less than once a month'. Correlations between both measures were high in all countries and within the total sample ( $r=.86$ ,  $P=.0001$ ). As numeric values could be assigned to the categories of the first frequency variable, it was deemed more suitable for quantitative analyses. Therefore, this measure was chosen for classification purposes.

The following four main groups of users have been distinguished, with two subtypes, and an additional group of problem users:

1. **Infrequent users or chippers**<sup>2</sup> = people using cannabis on less than 11 days in the past year ( $\approx$  'less than once a month').
2. **Occasional users** = people using cannabis on 11-50 days ( $\approx$  'less than once a week but at least once a month').
3. **Regular users** = people using cannabis on 51-250 days ( $\approx$  'once a week and 'more than once a week, but not daily or almost daily').
  - a. *Modest regular users* = people using cannabis on 51-150 days.
  - b. *Frequent regular users* = people using cannabis on 151-250 days.
4. **Intensive users** = people using cannabis on more than 250 days ( $\approx$  'daily or almost daily').
  - a. *Almost daily users* = people using cannabis on 251-350 days.
  - b. *Daily users* = people using cannabis on more than 350 days.
5. **Problem users** = use in the past 12 months and having a score of  $\geq 7$  (moderate dependence) or score  $\geq 12$  (severe dependence) according to the Cannabis Abuse Screening Test (CAST) (Cuenca Royo et al. 2012).

The category of problem users may overlap with other categories (especially category 4) and will be analysed separately (see chapter 3.7). The CAST was chosen because this instrument is one of the tools currently under investigation by the EMCDDA to be included in population surveys and it is one of the (optional) modules in the ESPAD survey.

The four group classification was chosen to have sufficient numbers of users per group in most countries. The number of use days is, however, not equally distributed over the different groups. Especially the frequency range for the category of regular users is quite wide (51-250 days) and may be heterogeneous, although conceptually this group can be seen as those who consume at least weekly but not (almost) daily. Splitting up this category into two groups (51-150 and 151-251) did indeed discriminate on a number of core consumption variables (such as number of units consumed on a typical day or amount of cannabis per unit) if the total data set combining respondents for all countries was analysed. Moreover, if we used a six-group classification by splitting up not only the group of regular users but also the group of daily/almost daily users - thus distinguishing six groups in total - an almost linear increase in number of units per day was found. We will show this in the respective chapters, especially for consumption related variables and when relevant differences are found, but focus on the four-group classification due to sample size limitations in several countries (Bulgaria, Portugal, UK), often not allowing a reliable classification into six user groups, especially for variables with multiple answer categories.

As described in 3.4.d, the cannabis questionnaire was split in three: one for respondents who only used hash in the past 12 months, one for those who only used marihuana, and one for respondents who used both (at least once of each cannabis type). Respondents in the last track who indicated that they used both hash and marihuana reported separately on their use

<sup>2</sup> Drawn from tobacco research, where the term 'chippers' is used to denote infrequent nondependent smokers (e.g. Shiffman 1994).

frequencies of hash and marihuana. We cannot be sure, however, to what extent these two use frequencies overlap. Analyses of patterns of answering and of different ways of combining the frequencies clearly suggest that (partially) summing the frequencies results in overestimation of the total number of use days, and that the highest reported frequency best reflects the total number of use days. For the purpose of classification into user type groups, respondents were thus assigned the highest of these two values as the number of days on which they had used cannabis in the past year.

Using the previously mentioned four category classification, 29% of the respondents in the total sample could be classified as chipper, 18% as occasional users, 28% as regular user and 24% as intensive users (figure 3.1). The average number of use days within these categories was 4.5, 26, 137 and 325, respectively. Table 3.7 shows that these proportions differed between countries, with Italy having the highest proportion of intensive users (34%) within their sample and Bulgaria having the lowest proportion (11%) of intensive users. Note, however, that these figures are more likely reflecting variations in recruitment strategies than prevalence of use. Moreover, it should be kept in mind that the totals of all user groups combined are for most variables not comparable between countries, because of the unequal weights caused by these different frequency distributions. Nonetheless, for ease of reporting, reference will be occasionally made to these totals

Figure 3.1: Number of respondents in the total sample per frequency category (= number of days used in the past 12 months)

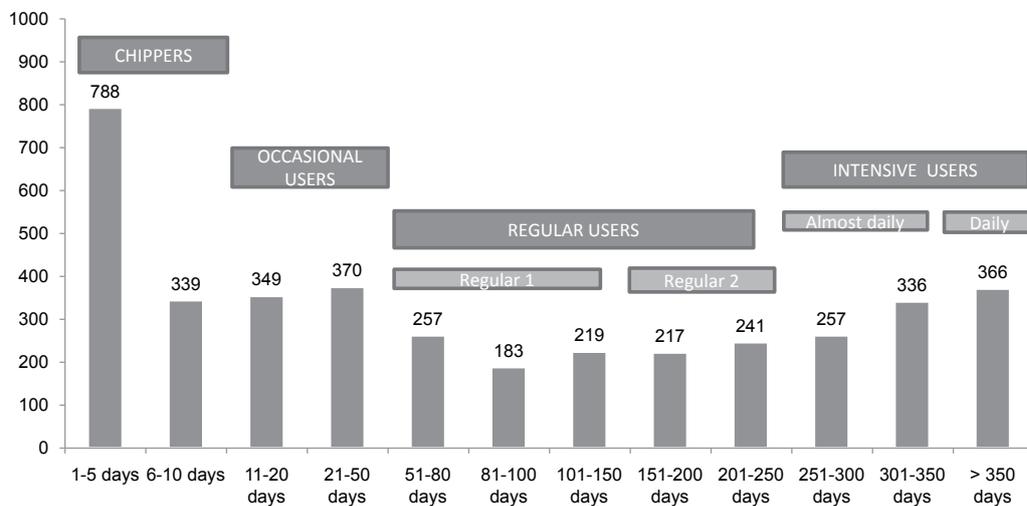


Table 3.7: Numbers and proportions of cannabis users by user group and country

		Chipper	Occasional	Regular	Intensive	Total
Bulgaria	Number	88	26	60	22	196
	%	45%	13%	31%	11%	100%
Czech Republic	Number	117	88	141	139	485
	%	24%	18%	29%	29%	100%
Italy	Number	191	141	332	340	1,004
	%	19%	14%	33%	34%	100%
Netherlands	Number	394	208	240	242	1,084
	%	36%	19%	22%	22%	100%
Portugal	Number	49	20	32	42	143
	%	34%	14%	22%	29%	100%
Sweden	Number	214	182	240	104	740
	%	29%	25%	32%	14%	100%
England & Wales	Number	74	54	72	70	270
	%	27%	20%	27%	26%	100%
All countries	Number	1,127	719	1,117	959	3,922
	%	29%	18%	28%	24%	100%

In the next sections, user characteristics, cannabis use patterns and circumstances of use will be described on the basis of these user types. We will look whether there are differences between user groups and whether these differences are consistent across countries. Note that data for all countries combined are not weighted, so that countries with relatively large samples (Italy, the Netherlands and Sweden) will contribute most to the overall averages.

### 3.3 Demographics

#### **Gender**

About three-quarters of all cannabis users were male, but proportions varied from 57% in Bulgaria to 88% in Sweden. There were significant gender differences between user groups. In all countries, the proportion of females was highest among chippers and lowest among regular and intensive users. Differences in the proportion males and females between user groups were largest in the Czech Republic and England & Wales, and smallest in the Netherlands and Sweden. Remarkably, in Bulgaria, the Czech Republic and England & Wales, the majority of the chippers were female.

**Table 3.8: Proportion of males among different cannabis user groups by country**

	Chipper	Occasional	Regular	Intensive	Total	P= .
<b>Bulgaria</b>	47%	58%	68%	68%	57%	.043
<b>Czech Republic</b>	47%	65%	74%	88%	70%	.000
<b>Italy</b>	57%	74%	83%	88%	78%	.000
<b>Netherlands</b>	63%	71%	74%	74%	69%	.009
<b>Portugal</b>	53%	70%	53%	83%	64%	.010
<b>Sweden</b>	79%	90%	92%	90%	88%	.000
<b>England &amp; Wales</b>	41%	67%	78%	89%	68%	.000

#### **Age**

Table 3.9 shows the average and median ages per user group and country. The majority of the respondents were in their early and mid twenties. Intensive users were on average two years older compared to the other user groups, but differences were only significant in Italy, the Netherlands, England & Wales, and Sweden. (F(user groups)=8.8; P=.000; F (countries)=18.8, P=.000); F (User group x Countries)=2.4; P=.001). The overall lower median ages suggests that the age distribution is skewed to the right.

The large majority of respondents fell in age group 15-34 years: 98% in Bulgaria, 94% in the Czech Republic, 87% in Italy, 88% in the Netherlands, 80% in Portugal, 90% in Sweden and 78% in the England & Wales. The low number of cases in age group 35-64 years will not allow further analyses of use patterns for different age groups (15-34 and 35-64 years).

Table 3.9 therefore gives the proportion of users in age group 15-24 and 25-64 years. Overall about six in ten respondents were between 15 and 24 years, while about four in ten respondents were aged between 25 and 64 years. Differences in the proportions of younger and older users between user groups were significant in the Netherlands, Italy and England & Wales.

The overall average age in age group 15-24 years was 20.7 years (median 21.0) and in age group 25-64 years it was 32.4 years (median 29.0).

Table 3.9: Age distribution by cannabis user group and country

	Chipper	Occasional	Regular	Intensive	Total	P= .
<b>Bulgaria</b>						
Age (yrs) – mean	23.6	24.7	23.2	22.5	23.5	.342
Age (yrs)- median	22.5	24.0	22.0	22.0	22.5	
% 15-24 years	67%	54%	67%	73%	66%	.532
% 25-64 years	33%	46%	33%	27%	34%	
<b>Czech Republic</b>						
Age – mean	22.9	23.4	22.9	23.0	23.1	.943
Age- median	22.0	22.0	21.0	21.0	22.0	
% 15-24 years	69%	68%	72%	73%	71%	.871
% 25-64 years	31%	32%	28%	27%	29%	
<b>Italy</b>						
Age – mean	25.1	24.5	25.6	27.3	25.6	.000
Age- median	24.0	23.0	23.0	25.0	24.0	
% 15-24 years	55%	62%	59%	48%	55%	.008
% 25-64 years	45%	38%	41%	52%	45%	
<b>Netherlands</b>						
Age – mean	25.0	23.8	24.8	27.9	25.4	.000
Age- median	23.0	22.0	22.0	25.0	23.0	
% 15-24 years	64%	71%	68%	50%	63%	.001
% 25-64 years	36%	29%	33%	50%	37%	
<b>Portugal</b>						
Age – mean	29.2	24.3	27.8	28.1	27.3	.159
Age- median	25.0	21.5	24.5	28.0	25.0	
% 15-24 years	49%	75%	50%	31%	48%	.013
% 25-64 years	51%	25%	50%	69%	52%	
<b>Sweden</b>						
Age – mean	25.1	25.0	25.1	27.9	25.8	.012
Age- median	24.0	24.0	22.0	25.0	23.0	
% 15-24 years	57%	55%	65%	48%	58%	.021
% 25-64 years	43%	45%	35%	52%	42%	
<b>England &amp; Wales</b>						
Age – mean	26.5	26.2	29.1	33.3	28.8	.000
Age- median	25.0	23.5	24.5	31.0	25.0	
% 15-24 years	42%	61%	50%	31%	45%	.008
% 25-64 years	58%	39%	50%	69%	55%	
<b>All countries</b>						
Age – mean	25.0	24.4	25.1	27.3	25.5	.000
Age- median	23.0	23.0	22.0	24.0	23.0	
% 15-24 years	60%	64%	63%	51%	59%	.000
% 25-64 years	40%	36%	37%	49%	41%	

**Work status**

Table 3.10 shows that a large proportion of the respondents was student (44%), with rates decreasing from chippers to intensive users. An analysis by age group shows that the overall proportion students was, as expected, higher among the younger user group, but differences between user groups were more pronounced in the older age group. Overall, one in ten cannabis users was unemployed, with slightly higher rates among intensive users. Employment rates were, as expected, higher among the older compared to the younger users, but showed overall little differences between user groups.

**Table 3.10: Employment status by user group and age group\***

		Chipper	Occasional	Regular	Intensive	Total
<b>15-24</b>	Employed full-time	12%	14%	13%	19%	14%
	Employed part-time	8%	8%	8%	6%	7%
	Self-employed full-time	1%	2%	3%	3%	2%
	Self-employed part-time		2%	2%	2%	1%
	Full time student	69%	65%	59%	56%	62%
	Unemployed	5%	8%	9%	11%	8%
	Other	4%	3%	6%	3%	4%
	<i>Number</i>	516	368	566	392	1,842
<b>25-64</b>	Employed full-time	44%	41%	42%	41%	42%
	Employed part-time	9%	6%	12%	10%	9%
	Self-employed full-time	9%	11%	8%	20%	12%
	Self-employed part-time	3%	2%	4%	2%	3%
	Full time student	25%	31%	19%	10%	20%
	Unemployed	7%	6%	11%	12%	9%
	Other	4%	4%	3%	5%	4%
	<i>Number</i>	377	234	347	410	1,368
<b>Total</b>	Employed full-time	26%	24%	24%	30%	26%
	Employed part-time	8%	7%	9%	8%	8%
	Self-employed full-time	4%	5%	5%	12%	7%
	Self-employed part-time	1%	2%	3%	2%	2%
	Full time student	51%	51%	44%	32%	44%
	Unemployed	6%	7%	10%	11%	9%
	Other	4%	3%	5%	4%	4%
	<i>Number</i>	893	602	913	802	3,210

\*Column totals sum to 100% within age group.

### **Comparing survey demographic data with population survey data**

Several countries have reported that younger people and students might have been overrepresented in the web survey. Table 3.11 shows the age and gender distribution as found in the web survey and in the population surveys as described in chapter 2. A direct comparison is nonetheless hampered because of the differences groups (i.e. user groups against last year and last month users). Nonetheless, the data suggest that males tend to be overrepresented in the web survey in Italy and Sweden, while females seem to be slightly overrepresented in the Netherlands and much more in Portugal (table 3.11). Moreover, younger users were clearly overrepresented in the web survey in the Czech Republic, Italy and the Netherlands.

We have no comparative data from general population surveys on work status, except for the Czech Republic (Běláčková et al. 2012). This comparison showed that the proportion of students among last year cannabis users in the web survey was about two times higher compared to that found in the general population survey of 2008. In contrast, employment rates as well as unemployment rates were about two times lower in the web survey compared to the general population survey. Also, the proportion of cannabis users with a university degree was higher. Note that these findings may be associated (to some extent) with the higher proportion of younger users in the web survey.

Table 3.11: Comparison of gender and age distribution among cannabis users in the web survey and the general population survey<sup>1</sup>

	Proportion males				Proportion 15-24 years			
	Web survey		Population survey		Web survey		Population survey	
	Range <sup>II</sup>	Total	Last year	Last month	Range <sup>II</sup>	Total	Last year	Last month
<b>Bulgaria</b>	47% - 68%	57%	59%	64%	54% - 73%	66%	56%	61%
<b>Czech Republic</b>	47% - 88%	70%	66%	73%	69% - 73%	71%	42%	45%
<b>Italy</b>	57% - 88%	78%	59%	67%	48%-62%	55%	24%	24%
<b>Netherlands</b>	63% - 74%	69%	70%	76%	50%-51%	63%	42%	35%
<b>Portugal</b>	53%-83%	64%	88%	90%	31%-75%	48%	30%	28%
<b>Sweden</b>	79%-92%	88%	68%	74%	48%-57%	58%	53%	45%
<b>England &amp; Wales</b>	41%-89%	68%	68%	73%	31%-61%	45%	50%	47%

I. For details about the web survey: see Introduction. II. Range refers to the lowest and highest value of the user groups.

### 3.4 Characteristics of cannabis use

In this chapter we will describe for each of the countries and user groups the following aspects of cannabis use:

- Age of first use
- Main type of unit
- Consumption of cannabis mixed or pure
- Cannabis type (hash or marihuana) and preference
- Number of units consumed on a typical day and estimated amount of cannabis per unit
- Estimate of daily dose and annual consumption

We will go into detail about point e (number of units per day, amount per unit) as these variables are of crucial importance for making annual consumption estimates at country level as described in chapter 5.

Respondents who indicated that they used both hash and marihuana reported separately on many use characteristics for hash and marihuana. Where we report separately for hash and marihuana, these respective figures were used. Where we report on cannabis with no distinction between hash and marihuana, we created single cannabis variables for these respondents. The majority of variables were created by assigning the value corresponding with respondents' preferred cannabis type (see chapter 3.4.d) or, for those who showed no preference, assigning the highest value. The main exception to this approach occurs for the purpose of estimating annual consumption. Here, single measures of the number of cannabis units consumed on a typical use day and the amount of cannabis put into a typical unit were computed as the weighted average of the corresponding figures for hash and marihuana based on the ratio of the number of past year use days of hash and marihuana. Thus, more weight is given to the figures reported for the type of cannabis that is used more frequently in determining the number of units of cannabis that are consumed on a typical use day and the amount of cannabis that goes into a typical unit.

#### **a. Age of first use**

An early age of onset of cannabis use has been associated with the development of substance use problems (not only cannabis) later in life, cognitive decline, mental disorders and problem behaviours, like criminality, reduced school completion rates and sexual risk behaviour (e.g. Horwood et al. 2010; Lynskey et al. 2012; Meier et al. 2012). There is no consensus, however, on the definition of 'early onset'. Usually first cannabis use before 16 or 17 years has been associated with greater risk, compared to those who start at a later age, but other research point at younger or higher age limits.

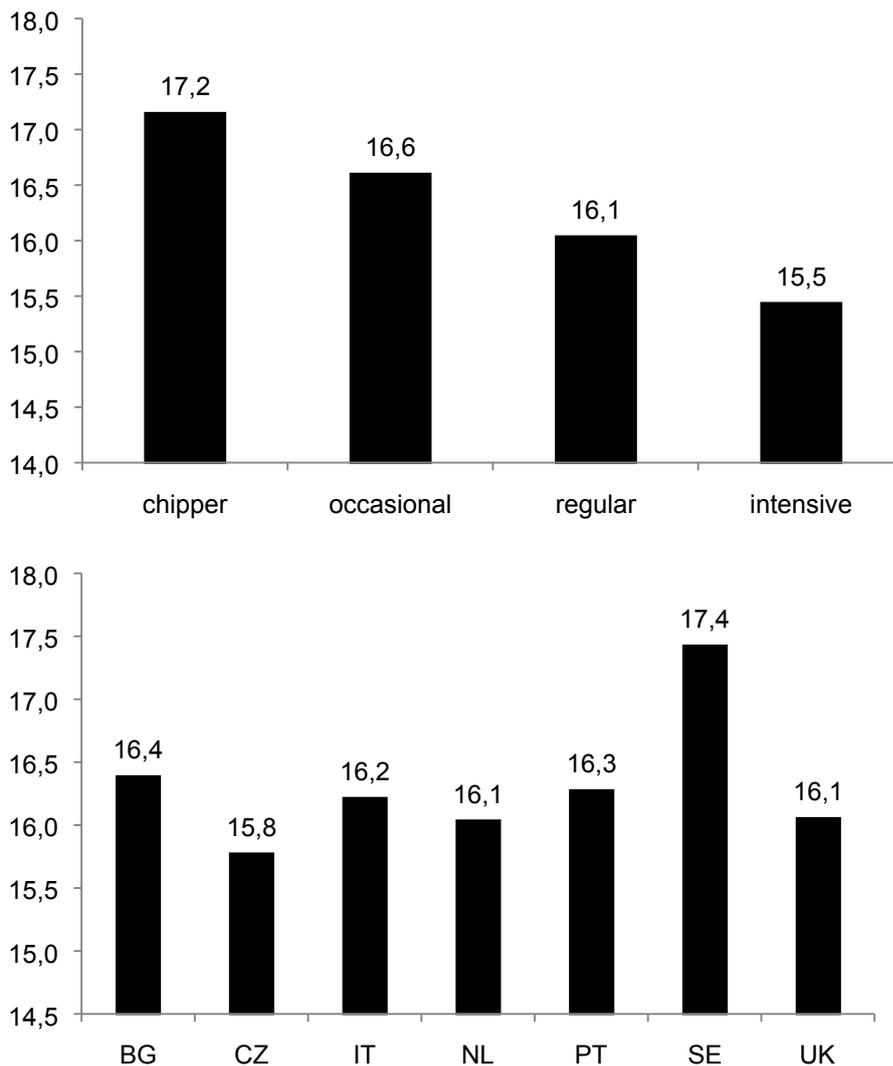
The average age of first use is highly dependent on the age distribution of the samples. As age of first use can never be higher than the actual age of the respondent, the inclusion of a relatively high proportion of young people will therefore 'reduce' the average age of first use. Stated in other words, those with a late onset of use will be underrepresented in relatively young samples.

We have therefore analyzed age of first use by in two ways. First by analyzing differences between user groups and countries by adjusting for age differences (i.e. age was evaluated as covariate in the model at a value of 25.5 years). Second, we have restricted the analyses to age group 25-64 years, which might seem more appropriate but reduces power due to low numbers

of respondents per user group in this age group. In addition, current age was included in the analyses as covariate, to further exclude the impact of differences in age distribution.

Figure 3.2 shows that the average age of first use in the total group and when adjusted for current age differences decreased from chippers to intensive users ( $F_{user\ groups}=34.3, p<.000$ ). Intensive users consumed their first cannabis when they were on average 1.7 younger than chippers. Moreover, there was a main effect of country ( $F=19.7, p<.000$ ). Post-hoc analyses showed that age of first use was overall higher in Sweden compared to all other countries. Differences between other countries were not significant. There was no significant interaction between country and user group ( $P=.057$ ).

**Figure 3.2: Average age of first use by user group (upper panel) or country (lower panel) (means adjusted for current age differences)\***



\* Estimated marginal means, with age included in the analyses as covariate at value 25.5 years

Since adjustment for age differences may have a fairly rigorous impact on the data, we have also analyzed age of first use by restricting the analyses to respondents aged 25 or older. It is assumed that first cannabis use will have occurred before this age by the majority of users and that the risk of under-inclusion of late onset users is minimal.

Table 3.12 shows the mean ages of first cannabis use in each country by user group among respondents older than 25 years. There were significant differences between user types ( $F=5.5, P=.001$ ) and countries ( $F=8.9, P=.000$ ). Taking all countries together, intensive users consumed cannabis for the first time when they were on average 16.6 years, which is younger compared to all other user groups. Chippers were on average oldest (18.3 years). All differences between user groups in the entire sample were significant, but in the individual countries user group differences reached significance only Italy. This might to some extent be related to the relatively small sample sizes per user group among 25-64 year olds only.

Moreover, post-hoc analyses showed that in Sweden the overall age of first cannabis use among respondents older than 25 years was higher (18.9 years) compared to all other countries (between 16.6 and 17.8 years). Moreover, age of first use was significantly higher in the Netherlands compared to Italy.

**Table 3.12: Mean age (years) of first cannabis use among respondents of 25-64 years**

	Chipper	Occasional	Regular	Intensive	Total	P=
<b>Bulgaria</b>	17.5	17.3	16.5	14.7	16.9	.178
<b>Czech Republic</b>	17.1	15.7	17.2	16.7	16.7	.204
<b>Italy</b>	17.5	16.8	16.4	16.2	16.6	.000
<b>Netherlands</b>	18.7	17.3	18.2	16.7	17.8	.058
<b>Portugal</b>	18.6	14.4	16.6	16.8	17.2	.118
<b>Sweden</b>	19.8	18.8	18.0	18.8	18.9	.106
<b>England &amp; Wales</b>	17.3	18.1	16.5	16.0	16.8	.161
<b>All countries</b>	18.3	17.5	17.2	16.6	17.4	.001

### ***b. Main type of unit***

Respondents were asked how they usually consumed their cannabis. There were five answer categories: joints, chillums or dry pipes, water pipes, in food or in beverages. Unfortunately, vaporizers were not included as an option, while comments of some respondents suggested that this method of use is preferred by an unknown part of the users, especially because of health concerns related to smoking. Some of these respondents indicated that they therefore chose 'chillum/dry pipe'.

Table 3.13 shows that overall the majority of the cannabis users - 85% of total sample – consumed their cannabis usually by smoking a joint, followed at quite some distance by a dry pipe or chillum (9%) and water pipe (4%). Ingesting cannabis in food (e.g. 'space cake') or beverages (e.g. tea) as main route of administration was rare. Only 1.3% and 0.3%, respectively, of the respondents mentioned these types of units. There were however, notable differences between countries, both in main type of units and whether there are differences between user groups.

In Bulgaria, Italy, the Netherlands and Portugal over 90% of all users consumed cannabis predominantly by smoking joints, while this proportion was much lower in the Czech Republic (63%), followed by England & Wales (75%) and Sweden (76%). In the Czech Republic, the second most common route of administration was smoking by a dry pipe or chillum, with proportions increasing from 11% among chippers to 45% among intensive users. The popularity of this method has been attributed partly to health concerns related to tobacco smoking, since pure cannabis without tobacco is more easily smoked through pipes than joints (person. communication, CZ contact person), and it seems also to be a more cost-efficient way of smoking. Indeed, a subsequent analysis showed that in the Czech Republic 58% of those who smoked cannabis by dry pipes usually took it pure rather than mixed with tobacco, against 15% of those who smoked joints. Moreover, it has been suggested that people who use cannabis for social, relaxation or self-medication reasons have better control over their dose when taking cannabis by pipes compared to joint. With the first method it is easier to interrupt and resume smoking – and thus titrate the dose depending on one's personal need and to avoid getting too stoned. Also cultural factors may play a role, in that in the region of Moravia (the capital Brno) and small villages, pipes are traditionally used instead of joints.

Also in England & Wales and Sweden, chillums or dry pipes were more relatively frequently employed routes of administration, but at much lower levels (13% and 14%, respectively) and with no or less pronounced differences between user groups. Nonetheless, smoking cannabis by joints is assumed to be by far the most common method to consume cannabis in the United Kingdom, and these findings seem to be rather atypical.

The overall proportion of cannabis users reporting water pipes as their main route of administering cannabis ranged from 1% in Bulgaria to 9% in England & Wales, with highest levels in the latter country found among intensive users (17%).

Differences between user groups in the way they usually consumed their cannabis were overall small, with the exception of the large significant differences found in the Czech Republic. In the Netherlands and Italy, differences between user groups were also significant but much smaller. In Italy intensive users tended to exhibit slightly more variation in the types of units, while in the Netherlands variation was more common among chippers. Nonetheless, in both countries, smoking a joint was by far the most likely consumption manner among all users. In England & Wales, chippers tended to more frequently use a joint, while the higher frequency groups seemed to show more variation in types of units.

Table 3.13: Main type of unit of cannabis by user group and country\*

<b>Bulgaria</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P= .040</b>
Joint	96.4%	88.5%	96.6%	90.9%	94.8%	
Chillum/dry pipe	3.6%	3.8%	0%	9.1%	3.1%	
Water pipe	0%	0%	3.4%	0%	1.0%	
Food	0%	3.8%	0%	0%	.5%	
Beverage	0%	3.8%	0%	0%	.5%	
<b>Czech Republic</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.000</b>
Joint	84.2%	68.2%	59.7%	45.3%	62.9%	
Chillum/dry pipe	10.5%	27.3%	34.5%	44.6%	30.4%	
Water pipe	1.8%	2.3%	4.3%	7.2%	4.2%	
Food	1.8%	0%	0%	0%	.4%	
Beverage	1.8%	2.3%	1.4%	2.9%	2.1%	
<b>Italy</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.000</b>
Joint	97.3%	98.6%	95.4%	87.3%	93.5%	
Chillum/dry pipe	1.6%	.7%	.9%	6.6%	3.0%	
Water pipe	0%	.7%	3.4%	5.7%	3.2%	
Food	1.1%	0%	.3%	.3%	.4%	
Beverage	0%	0%	0%	0%	0%	
<b>Netherlands</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=. 000</b>
Joint	88.4%	94.5%	95.8%	94.5%	92.6%	
Chillum/dry pipe	2.4%	2.5%	2.9%	2.9%	2.6%	
Water pipe	4.2%	2.0%	1.3%	2.5%	2.7%	
Food	5.0%	1.0%	0%	0%	2.0%	
Beverage	0%	0%	0%	0%	0%	
<b>Portugal</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.771</b>
Joint	91.7%	94.7%	100.0%	95.2%	95.0%	
Chillum/dry pipe	4.2%	0%	0%	2.4%	2.1%	
Water pipe	2.1%	5.3%	0%	2.4%	2.1%	
Food	2.1%	0%	0%	0%	.7%	
Beverage	0%	0%	0%	0%	0%	
<b>Sweden</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=. 306</b>
Joint	79.9%	70.9%	75.8%	80.4%	76.4%	
Chillum/dry pipe	12.7%	16.8%	14.4%	11.3%	14.1%	
Water pipe	4.4%	11.2%	7.6%	6.2%	7.4%	
Food	2.9%	1.1%	2.1%	2.1%	2.1%	
Beverage	0%	0%	0%	0%	0%	
<b>England &amp; Wales</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P= .012</b>
Joint	87.7%	77.4%	71.8%	62.3%	74.8%	
Chillum/dry pipe	6.8%	17.0%	14.1%	15.9%	13.2%	
Water pipe	1.4%	5.7%	12.7%	17.4%	9.4%	
Food	4.1%	0%	0%	4.3%	2.3%	
Beverage	0%	0%	1.4%	0%	.4%	
<b>All countries</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P= .000</b>
Joint	88.6%	84.6%	85.5%	80.8%	85.1%	
Chillum/dry pipe	5.5%	9.9%	9.3%	12.4%	9.1%	
Water pipe	2.7%	4.4%	4.4%	5.8%	4.3%	
Food	3.0%	.7%	.5%	.6%	1.3%	
Beverage	.2%	.4%	.3%	.4%	.3%	

\* Categories sum to 100% within user groups.

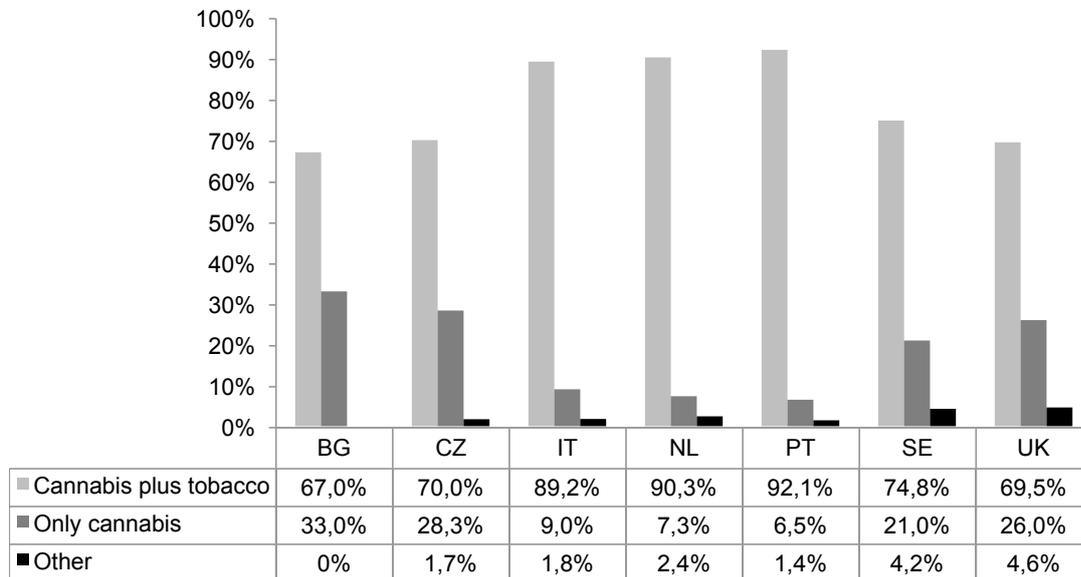
### c. Cannabis pure or mixed

Respondents were asked what they usually put in their joint, chillum, water pipe or other unit. Overall, 82% of the total sample indicated to mix hash or marihuana with tobacco, 15.5% used their cannabis pure, and 2.5% indicated to mix it with other substances. There were no differences between user groups.

The category 'other substances' contained a wide variety of mixtures of substances. Apart from respondents who indicate to mix 'marihuana with hash and tobacco', they reported to mix cannabis, for example, with other herbs (dragon, oregano, cinnamon, herbal tobacco), cacao, min tea, a bit of speed or synthetic drugs.

There were differences between countries, with Bulgaria, England & Wales, the Czech Republic and Sweden reporting the highest proportions (21% to 33%) of users who consume their hash or marihuana 'pure' (figure 3.3). In Italy, Portugal, and the Netherlands cannabis is almost always mixed with tobacco. Mixing with other substances is reported between In Sweden and England & Wales, 4% and 5% of the users, respectively, reported mixing use of other substances, while this did not occur in Bulgaria.

Figure 3.3: Proportion of users consuming cannabis pure or mixed with tobacco or other substances per country



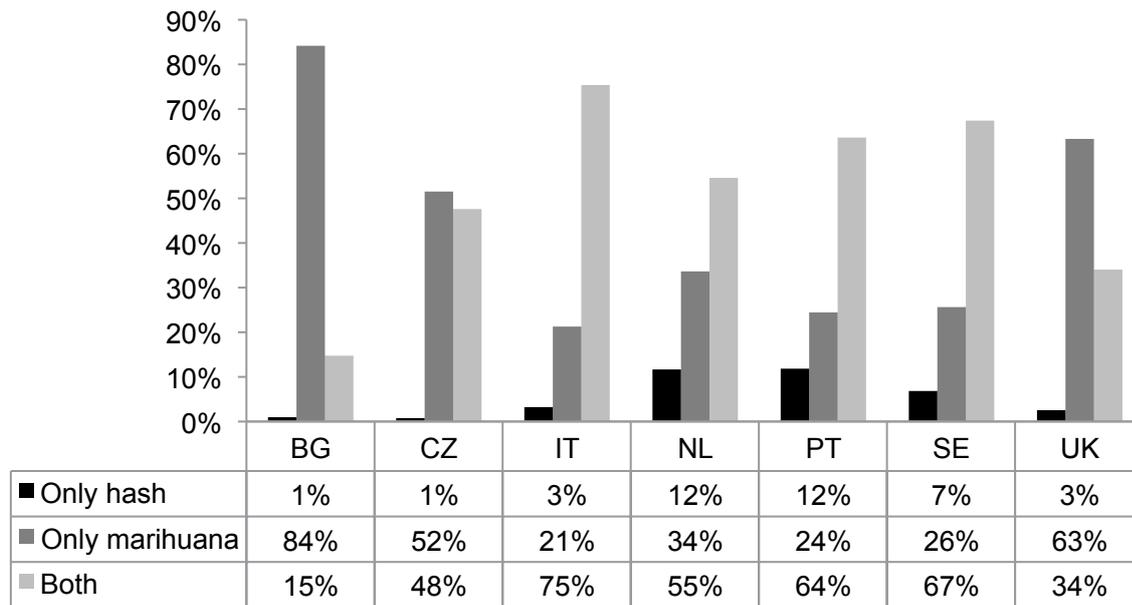
### d. Cannabis type (hash or marihuana) and preference

In Italy, the Netherlands, Portugal and Sweden, the majority of the respondents had used both hash and marihuana in the past 12 months, while in Bulgaria and England & Wales the majority of respondents had only consumed marihuana (figure 3.4). In the Czech Republic about as many respondents had used only hash as both hash and marihuana. A minority of the respondents indicated to have used only hash in the past twelve months, ranging from 1% in Bulgaria and the Czech Republic to 12% in the Netherlands and Portugal.

We have asked respondents also which type of hash or marihuana they usually consumed: locally/domestically produced or imported, and for marihuana also whether it was 'skunk/sinsemilla' or not. However, many respondents indicated that they did not know the answer, or consumed all hash or marihuana subtypes, or the answers were inconsistent with data from other sources. For example, in the Netherlands, locally produced hash ('Nederhash') is a rare product (Niesink and Rigter 2012) but it was nevertheless mentioned by 22% of the respondents who had used hash in the past year, while 21% indicated to use both imported and locally produced hash.

For illustration the data are summarized in annex 1, table A1 and A2, but we will not go into detail on these different subtypes.

**Figure 3.4: Proportion of respondents having used hash, marihuana/skunk or both in the past 12 months**



Having used both types of cannabis at least once in the past 12 months does not mean that both are used with equal intensity. We have defined a 'preference measure' on the basis of the frequency of use of hash and or marihuana in the past 12 months (definition of 'preference': see legend table 3.14). Most respondents showed a preference for one or either cannabis type.

In Bulgaria where hash is hardly used, marihuana is accordingly the most preferred type of cannabis (96%). Also in the Czech Republic marihuana is by far the most preferred (and consumed) type of cannabis – by 96% of the respondents - despite quite some users indicating use of hash in the past year. In the other countries preference for marihuana varied from 38% in Portugal to 83% in England & Wales. The proportion of respondents with a preference for hash varied from 1% in Bulgaria, 2% in the Czech Republic and 9% in England & Wales to 43% in Portugal. The proportion of cannabis users without a preference for hash or marihuana was highest in Sweden and Italy (28% and 26%, respectively).

Preference for hash or marihuana differed significantly between user groups in the Netherlands and Portugal, but in a reversed way. In the Netherlands preference for marihuana increased from 48% among chippers to 82% among intensive users, while in Portugal preference for hash increased with increasing frequency of use (24% among chippers up to 69% among intensive users).

Table 3.14: Preference for hash or marihuana\*

<b>Bulgaria</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P= .758</b>
Hash	2%	0%	0%	0%	1%	
Marihuana	95%	96%	97%	100%	96%	
No preference	2%	4%	3%	0%	3%	
<b>Czech Republic</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P= .130</b>
Hash	4%	0%	1%	1%	2%	
<b>Marihuana</b>	<b>93%</b>	<b>97%</b>	<b>97%</b>	<b>99%</b>	<b>96%</b>	
No preference	3%	3%	1%	1%	2%	
<b>Italy</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.606</b>
Hash	17%	21%	23%	22%	21%	
Marihuana	53%	51%	55%	53%	53%	
No preference	29%	28%	23%	25%	26%	
<b>Netherlands</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.000</b>
Hash	22%	25%	18%	9%	19%	
Marihuana	48%	52%	67%	82%	61%	
No preference	29%	23%	15%	9%	20%	
<b>Portugal</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.000</b>
Hash	24%	30%	44%	69%	43%	
<b>Marihuana</b>	<b>39%</b>	<b>55%</b>	<b>50%</b>	<b>21%</b>	<b>38%</b>	
No preference	37%	15%	6%	10%	19%	
<b>Sweden</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P=.014</b>
Hash	22%	25%	34%	33%	28%	
Marihuana	54%	54%	40%	41%	48%	
No preference	24%	21%	26%	26%	24%	
<b>England &amp; Wales</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>P= .679</b>
Hash	7%	9%	10%	10%	9%	
Marihuana	84%	78%	86%	82%	83%	
No preference	9%	13%	4%	7%	8%	
<b>All countries</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>Total</b>	<b>.000</b>
Hash	17%	19%	20%	18%	18%	
<b>Marihuana</b>	<b>61%</b>	<b>61%</b>	<b>64%</b>	<b>67%</b>	<b>63%</b>	
No preference	22%	19%	16%	15%	18%	

\* No preference refers to the use on a similar number of use days in the past month for hashish and marihuana, plus or minus one frequency category (see footnote 1). Those using only marihuana plus those using marihuana on more use days than hash (with a minimum difference of at least one frequency category) were assigned to the marihuana preference group; and vice versa for hash. Columns sum to 100 within user groups and country.

If we compare these findings with data reported by the EMCDDA on the market share of hash and marihuana, based on seizures, survey data and expert opinions (EMCDDA 2012), we can observe both similarities and differences. In order to make a comparison, it might be most appropriate to look at the figures for regular/intensive users as they are responsible for the largest part of the amount of cannabis consumed in a country (see also chapter.5). Moreover, we have assigned half of those grouped into category 'no preference' to the category 'hash' and half of them to the category 'marihuana'.

Table 3.15 shows that in Bulgaria and the Czech Republic, there is a perfect match between classifications. The predominance of herbal cannabis might be associated with the large geographical distance of these countries from the major trafficking routes for Moroccan hash and/or because traditionally hemp cultivation for industrial and other purposes was already present (EMCDDA 2012). For example, in the Czech Republic, also prior to 2005 when the large domestic production emerged, it was common to have outdoor cannabis distributed almost for free, and indoor cannabis shipped from the Netherlands for retail. For the Netherlands and the UK, there seems to be a match with the predominant type of cannabis, but the market share for marihuana was estimated to be higher in the current web survey. For Portugal, the predominance of hash seems to be confirmed, but data from the web survey also suggest a higher proportion for marihuana. Also, for Sweden and Italy, results

from the web survey suggest a higher estimate of the market for marihuana compared to the EMCDDA sources.

However, data from the EMCDDA is based on seizure data from 2000 up to 2009 and various other sources up to 2009. Possibly, the reported trend since the beginning of the millennium towards an increase in the consumption of domestically produced marihuana has continued in the past three years. For Italy, a recent strong increase in the amount of seized domestic cannabis has been reported in the past years (2008-2011), while the number of seizures (or operations by the police) remained at the same level (Direzione Centrale per i Servizi Antidroga (DCSA) 2012). These data could indeed point at increased herbal cannabis cultivation.

**Table 3.15: Market share of marihuana and hash in the sample countries in /2009 reported by the EMCDDA (2012) and based on the web survey in 2012 (between brackets)\***

	Mainly marihuana		Mainly hash	
	60% - 79%	>80%	55% - 79%	>80%
<b>Bulgaria</b>		X (99%-100%)		
<b>Czech Republic</b>		X (98%-100%)		
<b>Italy</b>			X (35%)	
<b>Netherlands</b>	X (75% - 88%)			
<b>Portugal</b>				X (47% - 74%)
<b>Sweden</b>			X (46%-47%)	
<b>England &amp; Wales</b>		X (86%-88%)		

\* Range between brackets based on values for the regular and intensive users, whereby the type of cannabis (hash or marihuana) selected is similar as indicated by the EMCDDA sources, complemented with half of the proportion of those who had no preference.

Source: Carpentier et al. 2012 and table 3.14.

### **Reasons to use hash or marihuana**

We have also asked respondents in the three sub tracks of the questionnaire what their main consideration is to consume only hash, only marihuana, or to choose between hash and marihuana for those who had used both in the past year. The number of respondents who had used only hash was too low to allow a detailed analysis by country and user group. Overall, 38% of the respondents indicated the type of effects as their main reason to consume only hash, for 26% availability was most important and for 19% taste. A minority indicated that potency (2%) or price (1%) was critical to use only hash, while 14% had other considerations.

Table 3.15 shows the main considerations to use only marihuana by those who had only consumed this cannabis type in the past 12 months. Overall, the type of effects, availability and taste were about equally often reported as the main reasons to choose only marihuana. There were, however, significant differences between countries (P=0001). In Bulgaria, the Czech Republic and to a lesser extent England & Wales, availability was appreciably more important as main reason compared to Italy, the Netherlands and Portugal. In the Netherlands, Portugal and Sweden the type of effects were the most common reasons to use only marihuana. Price and potency were relatively uncommon as main consideration to use marihuana in all countries. The highest proportion of users mentioning 'price' was found in Bulgaria (8%). Note that especially in Sweden and also Portugal 'other' considerations appeared to play a role.

In none of the countries, considerations differed between user groups, except for the Netherlands, where availability was more important among chippers and occasional users (28% and 23%, respectively) compared to regular and daily users (0% and 6%, respectively). It is not exactly clear what should be made by this finding. It suggests that the more infrequent users may be opportunistic users, and consume what is offered or available, rather than pointing at difficulties in obtaining a specific type of cannabis.

**Table 3.15b: Main consideration to use marihuana among respondents who only used marihuana (and not hash) in the past 12 months by country\***

	BG	CZ	IT	NL	PT	SE	E&W	All countries
<b>Total N</b>	147	237	200	346	33	181	162	1306
<b>Availability</b>	46%	43%	14%	18%	12%	24%	36%	28%
<b>Price</b>	8%	3%	2%	3%	0%	1%	3%	3%
<b>Potency</b>	4%	1%	1%	4%	3%	3%	6%	3%
<b>Taste</b>	5%	12%	49%	28%	21%	10%	17%	22%
<b>Type of effects</b>	22%	31%	19%	36%	39%	33%	21%	29%
<b>Other</b>	14%	9%	17%	12%	24%	29%	18%	16%

\* Column percentages sum to 100.

Similarly, among respondents who had consumed both types of cannabis, the type of effects, availability and taste featured as overall the most important considerations to choose between one or either type (table 3.16). However, there were again differences between countries. Availability played a key role in the Czech Republic, Sweden and England & Wales (around 40%) and to a lesser extent in Bulgaria and Italy, while it was hardly mentioned in the Netherlands and Portugal (9% and 7%, respectively). The type of effects is predominant in the Netherlands and Portugal, taste is most important in Italy, and also important in the Netherlands and the Czech Republic. In Bulgaria, price may also be important for some users, but note that the number of respondents in Bulgaria who consumed both hash and marihuana is very low. In other countries price does not seem to be very relevant. While potency is still not for many respondents the main reason to choose for either hash or marihuana, it is more commonly mentioned than among users of only marihuana, especially in Sweden (15%). According to the EMCDDA data on cannabis potency, the mean THC concentration in 2010 in herbal cannabis in Sweden was much lower compared to resin (2% against 9%), which might explain this finding.

Numbers of respondents in Bulgaria, Portugal and England & Wales were too low to conduct analyses per user group. There were significant differences between user groups in Italy ( $P=.006$ ) and the Netherlands ( $P=.001$ ). In Italy, 'other considerations' was more often mentioned among intensive users compared to chippers (19% against 3% for), and availability slightly more among chippers compared to intensive users (37% against 21%). In the Netherlands, availability was reported as main consideration by 17% of the chippers, decreasing to 4% among intensive users, and taste seemed to be more relevant to intensive users when choosing between hash and marihuana (40% against 21% for chippers).

**Table 3.16: Main consideration to choose marihuana or hash among respondents who consumed both types in the past 12 months by country\***

	BG	CZ	IT	NL	PT	SE	E&W	Total
<b>Total N</b>	29	217	728	543	87	470	84	2,158
<b>Availability</b>	28%	43%	26%	9%	7%	41%	40%	27%
<b>Price</b>	21%	5%	8%	4%	5%	5%	5%	6%
<b>Potency</b>	7%	2%	6%	9%	2%	15%	8%	8%
<b>Taste</b>	3%	26%	34%	30%	8%	5%	11%	23%
<b>Type of effects</b>	31%	17%	12%	38%	55%	19%	17%	23%
<b>Other</b>	10%	7%	14%	10%	23%	15%	19%	13%

\* Column percentages sum to 100.

#### **e. Number of units and amount of cannabis per unit**

We will go into more detail into these variables because they form the core data for making annual consumption estimates (chapter 5). We will first describe how these variables were assessed and analyzed.

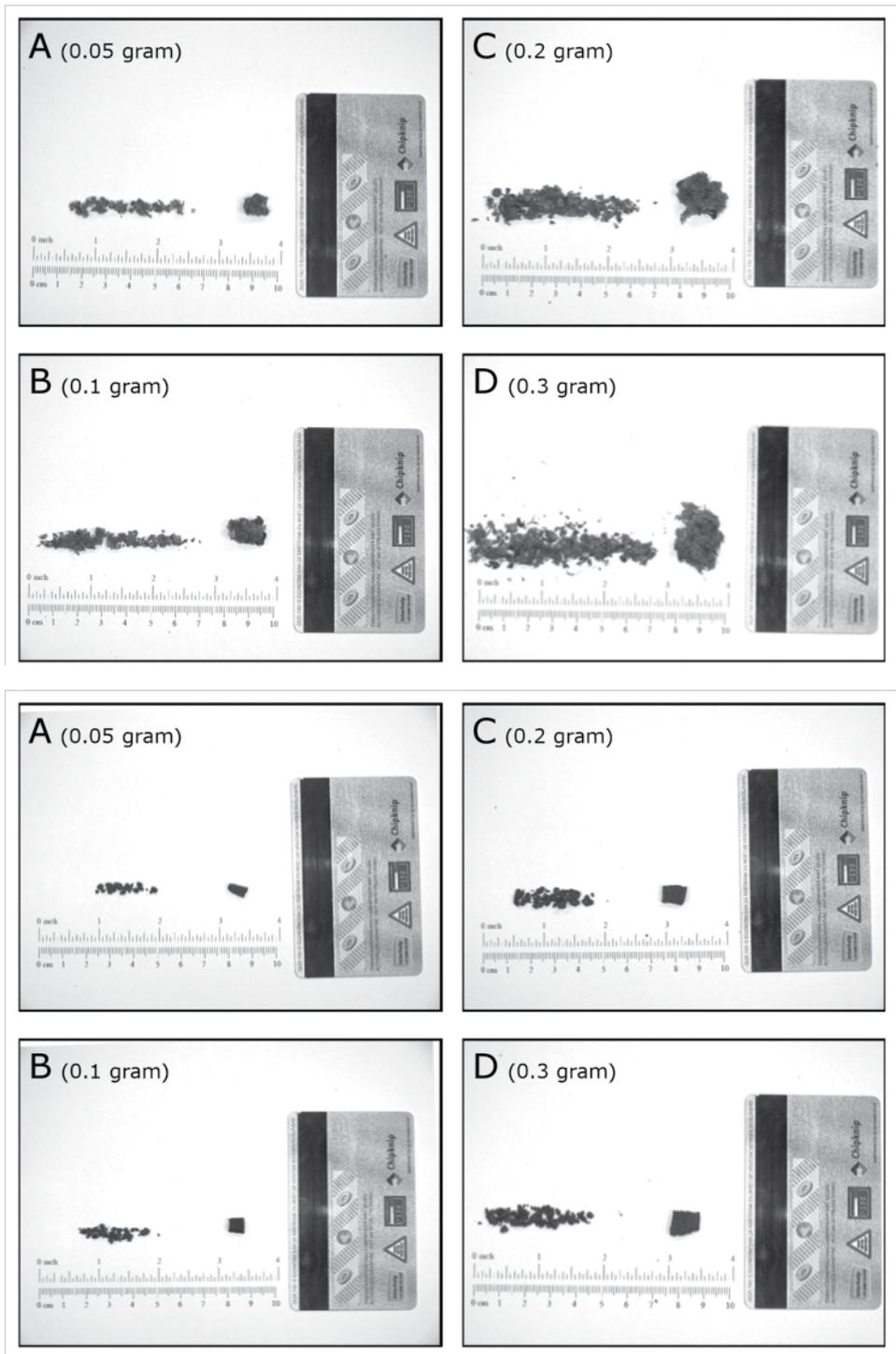
In the web survey respondents were asked to indicate how many units of cannabis they consumed on 'the last consumption day' and on a 'typical cannabis consumption day'. They were also asked to estimate how much cannabis they typically put in their unit. The questions on 'typical consumption' were used in further analyses as it was assumed to better reflect the 'average' situation of users, without situational exceptions. Nonetheless, both measures were strongly correlated (Pearson's  $r=.74$ ,  $P=.0001$  for the units).

With regard to the number of units, respondents could answer in whole numbers ranging from 1 to 50. However, the maximum number of joints smoked on a typical day was truncated at 20, as it was shown that respondents indicating the use of more than 20 units per day were outliers on many other variables, and their answers could be generally considered as unreliable. In the total sample of 15-64 years this was less than 1%.

The amount of cannabis put in a unit appeared to be more difficult to assess. When designing the web survey, it was recognized that cannabis users may have difficulties in estimating the amount of cannabis they usually put in a joint. In a Dutch field study, the dose per joint was estimated in two ways: by asking cannabis users how many joints they usually made out of a gram of cannabis and by showing picture cards with different amounts of hash or marijuana and asking respondents which picture card best reflected the amount they usually put in their joint (Korf et al. 2007). The last method was also applied in the current study (with some adaptations) because the investigators (Korf et al. 2007) assumed that it provided the most accurate estimates. Moreover, in most countries users often do not purchase quantities of cannabis per gram or any other standard amount, which makes the first method unfeasible. In another recent study these different methods have been validated in a naturalistic field experiment ((Van der Pol et al. 2013); see discussion). In the current report the amount of cannabis consumed per month as based on the number of use days multiplied by the number of units per day and the amount per unit will be compared with a method based on prices per gram and amount of money spent on buying cannabis in the past month (see chapter 4.i).

In the web survey subjects could estimate the doses on the basis of four picture cards showing different amounts of hashish and marijuana, both in crumbled and non-crumbled form, together with a ruler (in inches and centimetres) and credit card to facilitate estimation (see figure 3.5). The amounts on the four pictures were: 0.05 gram (A), 0.1 gram (B), 0.2 gram (C) and 0.3 gram (D).

Figure 3.5: Picture cards showing four different amounts of marihuana (upper panel) or hash (lower panel)



There were nine answer categories: less than A; A; between A and B; B; between B and C; C; between C and D; D; more than D. Midpoint values were assigned to intermediate answer categories in the analyses. The first category (less than A) was coded to 0.025 mg. The highest dose (more than D) was coded to 0.4 gram. This deviates from the study by Korf et al. (2007) in which this category has been coded to 0.5 gram. As there was no compelling reason to choose either 0.4 or 0.5 gram, we have decided to use 0.4 gram as conservative estimate, but will show in separate sensitivity analyses how estimates change when applying the 0.5 gram dose.

As the number of units (primarily joints) on a typical day and the amount of cannabis per unit might be different for hashish and marihuana, values for these variables for respondents who consumed both hashish and marihuana were based on weighted averages. Weights were defined on the ratio of the number of use days of hashish and number of use days of marihuana. We will analyze separately whether consumption variables do indeed differ by type of cannabis (hash or marihuana). There are various factors beyond the type of cannabis that may affect figures of the number of cannabis units consumed on a typical use day and the amount of cannabis consumed per unit. These include the type of unit (e.g. joint, dry pipe/chillum or water pipe), and age and gender. If the analysis of variance yielded significant main or interaction effects involving these factors, we have analyzed data at the different levels of these factors. Moreover, we have carried out several sensitivity analyses.

First, there may be variations between countries in the distribution of the number of use days within user groups, which may affect consumption estimates. This factor may be evident especially in the categories of regular and intensive users with fairly broadly defined frequency boundaries. We have therefore also analyzed user groups at a six-level classification, which may reduce variance between countries in the average number of use days per category.

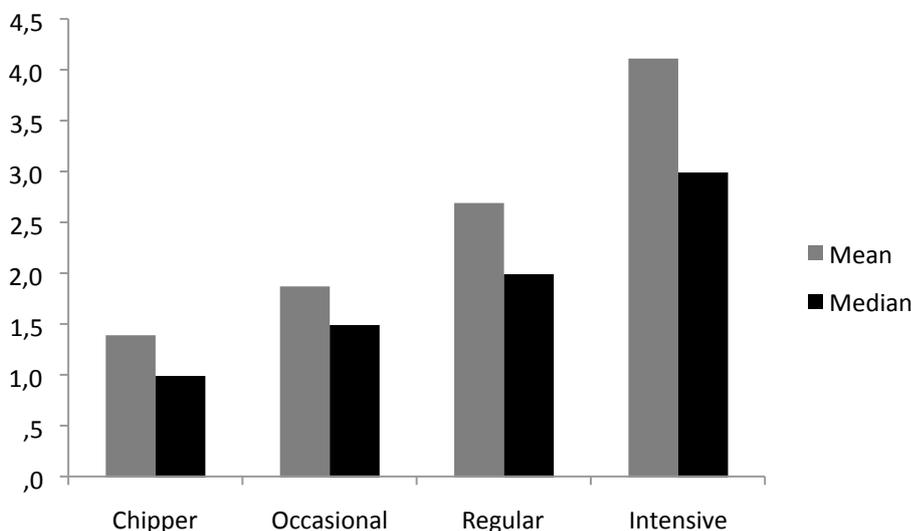
Second, answer categories for reporting the number of cannabis units consumed on a typical day did not allow for decimals. Hence, the lowest number respondents could indicate, was '1'. However, several studies show that part of the cannabis using population, especially the infrequent users, may consume less than one joint per session or day (e.g. Benschop et al. 2011; Nabben et al. 2010; Zeisser et al. 2012). We will examine how estimates change if it is assumed that a certain proportion of the users actually take less than one joint on a typical consumption day.

Finally, the highest dose of cannabis per unit shown on picture card D was 0.3 gram. Answers of people who indicated to use 'more than the amount on picture card D' were coded to 0.4 gram. We will also analyze how average doses change when these answers are coded to 0.5 g instead of 0.4 gram.

**Number of units per typical use day**

Overall, the number of units consumed per typical cannabis use day increased with increasing frequency of use (i.e. user groups) (Pearson's  $r=.48$ ,  $P=.0001$ ). Figure 3.6 shows that for all countries combined, the mean number of units progressively increased from 1.4 among chippers to 4.1 among intensive users.

**Figure 3.6: Mean and median number of units consumed on a typical cannabis consumption day per user group**



This pattern was visible in all countries (see table 3.17). Values for chippers ranged from 1.2 units in Bulgaria and the Netherlands to 1.6 units in Sweden and the Czech Republic. Among intensive users the mean number of units varied between 3.6 in Portugal to 5.2 in England & Wales. In most countries the median values were lower than the mean numbers, indicating that the distribution of the number of units was skewed to the right, and that a minority of users were using relatively high numbers of units.

Statistical analyses revealed a significant main effects for user group ( $F = 165.2$ ,  $P = .000$ ) and country ( $F = 6.9$ ,  $P = .000$ ), and a significant interaction between user group and country ( $F = 1.9$ ,  $P = .01$ ). Post-hoc analyses for all countries combined showed significant differences between all pairs of user groups.

Analyses per country showed a significant overall effect of user groups in all countries. Post hoc analyses revealed differences between various pairs of user groups in most countries. However, only in Sweden four homogeneous subsets of users were identified on the basis of pair wise post-hoc analyses. In the Czech Republic, Italy, the Netherlands and England & Wales, three subsets were identified (chippers/occasional users versus regular (/occasional) users versus intensive users). In Bulgaria and Portugal, only two sub sets were found, which might be related to the low number of respondents in some user groups in these countries. In Bulgaria only intensive users were distinguished from the other groups, and in Portugal two subsets with overlapping user groups (chippers/occasional/regular versus occasional/regular/intensive).

**Table 3.17: Number of units consumed on a typical cannabis consumption day per user group and country\***

		Chipper	Occasional	Regular	Intensive
Bulgaria	Mean	1.2	1.5	2.0	4.0
	Median	1.0	1.0	2.0	3.0
	N	64	19	53	18
Czech Republic	Mean	1.6	1.8	2.3	4.0
	Median	1.0	1.0	2.0	3.0
	N	96	79	123	127
Italy	Mean	1.4	1.7	2.7	4.0
	Median	1.0	1.0	2.1	3.0
	N	141	127	289	312
Netherlands	Mean	1.2	1.6	2.4	4.1
	Median	1.0	1.0	2.0	3.0
	N	295	181	207	202
Portugal	Mean	1.4	2.5	2.8	3.6
	Median	1.0	2.0	2.3	2.9
	N	46	17	31	39
Sweden	Mean	1.6	2.4	3.2	4.4
	Median	1.0	2.0	3.0	3.3
	N	175	168	215	90
England & Wales	Mean	1.5	1.7	2.9	5.2
	Median	1.0	1.0	2.0	4.0
	N	54	48	60	62
All countries	Mean	1.4	1.9	2.7	4.1
	Median	1.0	1.5	2.0	3.0
	N	871	639	978	850

\* Differences between user groups were significant in all countries at  $p < .000$ .

Note, however that these 'average findings' do not reflect the degree of variation within user groups. For example, table 3.18 shows that one in ten intensive users consumed no more than one unit a day, and thirty percent uses no more than 2 joints per day. The reverse, i.e. infrequent users who now and then 'binge', is rare.

**Table 3.18: Proportion of cannabis users by number of units usually consumed by user group\***

Number of units	Chipper	Occasional	Regular	Intensive
1	74.4%	47.7%	24.7%	11.3%
. >1-2	16.6%	32.9%	29.3%	18.9%
>2 -3	5.1%	11.9%	22.1%	21.9%
>3-4	2.1%	2.8%	10.2%	12.6%
>4-5	.8%	2.3%	5.7%	12.2%
>5-6	.7%	.9%	3.3%	7.5%
>6-10	.3%	.8%	3.9%	12.2%
>10	0%	.6%	.7%	3.3%

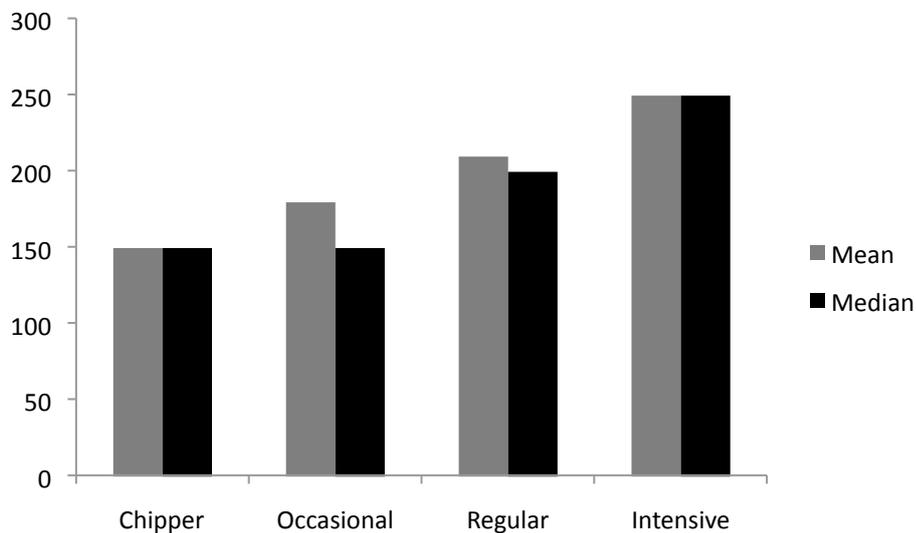
\* Column percentages sum to 100.

Data on the number of joints consumed per day by intensive users found in this web survey are generally in line with findings from (Dutch) studies on frequent cannabis users (e.g. Korf et al. 2007; Van der Pol et al. 2013), but we are not aware of studies in the sample countries that explicitly examined the association between the frequency of use and amount consumed per day. Such an association has been reported by Zeisser et al. (2012) and is also consistent with data from the US household survey in 2001/2002, in which the average number of joints per day increased from 1.2 respondents who used cannabis on less than one day per month (cf. chippers) to 3.9 joints per day for those who used on 20 or more days per month.

### **Amount of cannabis per unit**

Similarly to the pattern of effects reported for the number of units, the amount of cannabis per unit progressively increased from chippers (150 mg) to intensive users (250 mg) (figure 3.7). This pattern was found in most countries, although differences were sometimes small between successive user groups and there were also exceptions. For example, in Bulgaria and the Czech Republic the expected differences were not observed between occasional and regular users (table 3.19). Averages among chippers varied from 113 mg in Portugal to 163 mg in the Netherlands. Among intensive users averages ranged from 181 mg in Portugal to 257 mg in Sweden.

**Figure 3.7: Mean and median amount of cannabis per unit (mg) consumed on a typical cannabis consumption day per user group**



Statistical analyses revealed a significant main effect of user group ( $F = 83.5, P = .000$ ) and country ( $F = 8.4, P = .000$ ), and a significant interaction between user group and country ( $F = 3.1, P = .01$ ). Post-hoc analyses for all countries combined showed significant differences between all pairs of user groups.

The overall effect of user groups was also significant in all individual countries, but post-hoc analyses did not yield significant differences between all pairs of user groups. To some extent this might be related to the relatively small numbers of respondents in some countries.

Table 3.19: Amount of cannabis (gram) consumed per unit per user group and country\*

		Chipper	Occasional	Regular	Intensive
<b>Bulgaria</b>	<b>Mean</b>	<b>.124</b>	<b>.194</b>	<b>.152</b>	<b>.205</b>
	Median	.100	.200	.150	.200
	N	77	22	58	22
<b>Czech Republic</b>	<b>Mean</b>	<b>.154</b>	<b>.196</b>	<b>.193</b>	<b>.245</b>
	Median	.125	.184	.192	.250
	N	110	85	133	133
<b>Italy</b>	<b>Mean</b>	<b>.135</b>	<b>.166</b>	<b>.230</b>	<b>.265</b>
	Median	.100	.150	.243	.277
	N	174	138	323	327
<b>Netherlands</b>	<b>Mean</b>	<b>.163</b>	<b>.175</b>	<b>.202</b>	<b>.246</b>
	Median	.150	.150	.200	.250
	N	362	198	225	228
<b>Portugal</b>	<b>Mean</b>	<b>.113</b>	<b>.169</b>	<b>.177</b>	<b>.181</b>
	Median	.100	.200	.163	.167
	N	48	18	32	39
<b>Sweden</b>	<b>Mean</b>	<b>.160</b>	<b>.178</b>	<b>.220</b>	<b>.275</b>
	Median	.150	.150	.228	.300
	N	200	177	229	97
<b>England &amp; Wales</b>	<b>Mean</b>	<b>.134</b>	<b>.160</b>	<b>.170</b>	<b>.224</b>
	Median	.106	.150	.150	.220
	N	68	50	66	67
<b>All countries</b>	<b>Mean</b>	<b>.150</b>	<b>.176</b>	<b>.208</b>	<b>.250</b>
	Median	.150	.150	.200	.250
	N	1,039	688	1,066	913

\* Differences between user groups were significant in all countries at  $p \leq .001$ .

In spite of these generally consistent findings across countries and user groups, the estimates of the amounts of cannabis consumed per unit depend highly on the validity of the applied method. As mentioned in the introduction of this section, results of a recent 'ecological study' suggest that the photo card method may underestimate the true amount of cannabis put in a joint (Van der Pol et al. 2013). In this Dutch study, a sample of 106 frequent cannabis users drawn from a larger cohort were interviewed in a natural setting, such as their own home or a coffee shop. Using the photo cards, the subjects were asked to estimate the amount of cannabis usually put in a joint. They were asked beforehand to take along a gram of cannabis they usually smoked. After the interview the cannabis sample was weighed using a pocket size scale and the subjects were asked to make a joint in their habitual manner. Thereafter the cannabis sample was weighed again. In addition, the dose was calculated as the inverse of the self-reported average number of joints made out of one gram of cannabis. The results showed that the true average cannabis dose as measured by weighing the amounts was 260 mg. However, the photo card estimate resulted in an average that was half as large (130 mg). The average dose estimated by the number of joints per gram was close to the 'true' average (280 mg). Nonetheless, for both self-reported measures, correlations with the objectively measured amounts were low, which may make them both unsuitable to be applied in studies on *individual* health outcomes of cannabis. However, in (market) studies where *averages* are the main unit of analysis, the joint per gram method seems to be most promising, although only feasible in countries where consumers are accustomed to buy their cannabis in 'grams' or parts of it.

In the current web survey, intensive cannabis users in the Netherlands estimated the average dose per unit at 245 mg (or 247 mg for joints only), which compares well with the average amount objectively measured in the ecological study. However, this result is hard to reconcile with the conclusion that the photo card method underestimated the actual amount of cannabis. The photo cards employed in the ecological study resembled those used in the current web survey but there were also differences: a ruler and a joint were depicted as estimation aids and the amounts were not disclosed on the photos, which were presented in printed versions. In the web survey, a credit card instead of a joint was depicted and the true amounts were reported

on the photos, which may have facilitated the estimation. On the other hand, intensive users in the web survey formed on average a heavier user group compared to the subjects in the field experiment (25 use days against 21 use days and 4.1 joints against 2.7 joints per day). It might be that doses objectively measured in the field study would be higher for more heavy users. If this were true, the web survey would definitely underestimate the amount per joint. However, post-hoc analyses on a subsample of subjects (n=78) using on more than 4 days a week, with an average of 25 use days in the past month and average of 4.2 joints per use day, revealed the same results (true dose: 251 mg; photo card: 125 mg; joint/gram method: 280 mg). Therefore, it is not likely that differences in the intensity of cannabis consumption between users in the field study and web survey explain differences between study outcomes.

Nonetheless, although our web survey yielded an average amount that was close to the amount measured objectively in the field study, the possibility of an underestimation cannot be fully excluded. So far we have no clue to indicate the degree of underestimation.

In conclusion, these data suggest that the more frequently (in terms of use days) cannabis is used, the more units are consumed per day and the more cannabis is put in a unit, although there remain questions on the 'true amounts'. All these factors may contribute to enhance exposure especially among high frequency users.

We will now look whether these consumption variables differ between type of units, between male and females and between younger and older users. Note, however, that in some countries the numbers of respondents per subgroup is fairly low and the results should be interpreted with caution.

### Type of unit

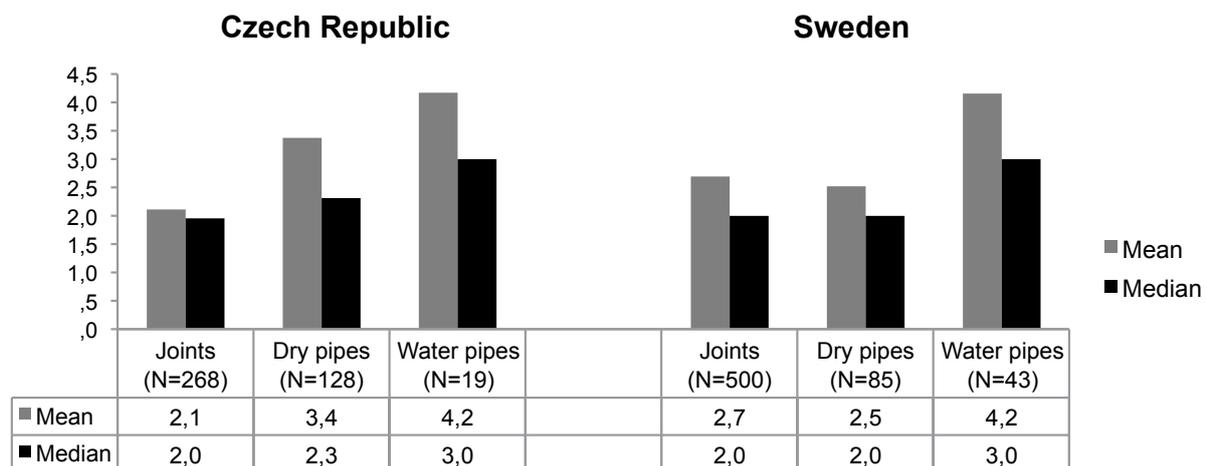
The three most common types of units (joints, dry pipes and water pipes) were included in the statistical analyses, as numbers of respondents who mainly consumed cannabis in food or beverages were too low.

With regard to the number of units smoked per day, the analyses revealed a marginally significant main effect of type of unit ( $F=3.4, P=.041$ ) and a significant three-way interaction between type of unit, member state and user group ( $F=1.9, P=.004$ ). Analyses per country, revealed a significant main effect of unit type in the Czech Republic ( $F=7.4, P=.001$ ) and Sweden ( $F=12.3, P=.000$ ) and a significant unit type by user group interaction in the Netherlands ( $F=6.4, P=.000$ ).

Post hoc analyses showed that in the Czech Republic both the number of dry pipes and water pipes consumed per typical use day were overall significantly higher compared to the number of joints (see figure 3.8). In Sweden, the number of water pipes, but not dry pipes, was higher compared to the number of joints smoked per day.

In the Netherlands, the numbers of respondents consuming cannabis by dry or water pipe per user type are very low, but the data suggest that chippers who smoke cannabis mainly by dry pipe (n=12) consume on average 0.7 units more per typical day compared to those who smoke joints (1.9 and 1.2 on average). Moreover, daily users who smoked cannabis predominantly in water pipes seemed to smoke more units, but their number was too low to draw conclusions (n=4).

Figure 3.8: Average number of units consumed on a typical cannabis consumption day per type of unit in the Czech Republic and Sweden



Given these differences between countries, it is important to see whether the pattern seen for the number of units per user group changes when the analyses are restricted to the most common type of unit (joints). Table 3.20 shows the results for joints only. The underlined figures show changes from averages for the total number of units as summarized in table 3.17. Overall averages tend to be somewhat lower, most notably in the Czech Republic. However, because other units (than joints) are used by a minority in the other countries, the impact on the overall averages is relatively small. Statistical analyses show the same pattern of effects pointing at a progressively increasing number of joints with increasing frequency of use, as expressed by the different user groups.

**Table 3.20: Mean number of joints consumed on a typical day**

		Only joints			
		Chipper	Occasional	Regular	Intensive
Bulgaria	Mean	1.2	1.5	2.0	4.0
	N	63	18	53	17
Czech Republic	Mean	1.6	<u>1.5</u>	<u>2.0</u>	<u>3.6</u>
	N	82	54	73	59
Italy	Mean	1.4	1.7	2.7	3.8
	N	136	124	275	270
Netherlands	Mean	1.2	1.6	<u>2.5</u>	<u>3.9</u>
	N	262	171	200	192
Portugal	Mean	1.5	2.5	2.8	<u>3.7</u>
	N	41	17	31	37
Sweden	Mean	1.5	<u>2.3</u>	<u>3.3</u>	<u>4.3</u>
	N	141	118	169	73
England & Wales	Mean	1.5	<u>1.6</u>	<u>2.5</u>	<u>5.3</u>
	N	48	37	47	39
All countries	Mean	1.4	<u>1.8</u>	2.7	<u>4.0</u>
	N	773	539	848	687
P=.		.000	.000	.000	.000

Differences between user groups were significant in all countries at  $p < .000$ . Underlined figures refer to differences between the number of joints and the total number units.

The amount of cannabis usually put in a unit was only marginally significant between types of units ( $F=2.9$ ,  $P=.052$ ) and there were no significant interactions with countries or user types. On average 196 mg cannabis was put in a joint, 190 mg in a dry pipe and 198 mg in a water pipe.

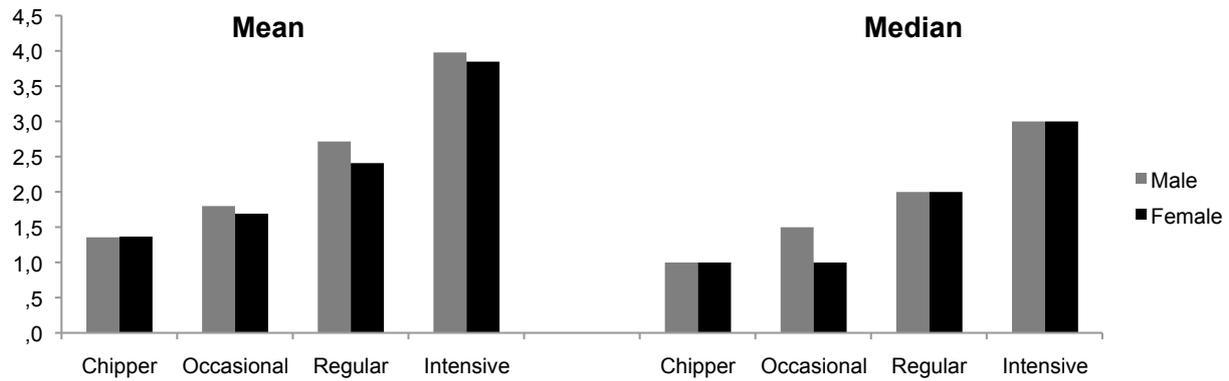
### Gender and age

Because of the above mentioned reported differences, we will refine subsequent analyses into age and gender differences to joints only. We will analyze these factors separately. It will be shown that there are minor differences between males and females and between younger and older users with regard to the number of joints smoked on a typical cannabis day. However, males and younger users tend to consume more cannabis per joint compared to females and older users. We will illustrate this in the next section.

Figure 3.9 shows that there were overall minor differences between male and female cannabis users within user groups in the mean and median number of joints they typically smoke per day. Note, however, that the number of female users was very low in several countries, especially among daily users (less than 8 in Bulgaria, Czech Republic, Portugal, England & Wales and Sweden).

There was no main effect of gender, and only a marginal significant interaction between gender and country ( $F=6.9$ ,  $P=.04$ ) and a marginally three way interaction between gender, country and user group ( $F=1.7$ ,  $P=.04$ ).

**Figure 3.9: Mean and median number of joints smoked on a typical cannabis consumption day by gender and user group for all countries combined**



However, males consumed significantly more cannabis per joint compared to females (212 mg against 155 mg;  $F=41.6$ ,  $P=.0001$ ). Gender differences were comparable across user groups and countries (no interactions). However, analyses at country level showed that gender differences were not significant in Portugal, and only marginally significant in Bulgaria and England & Wales, which might be related to the smaller samples sizes in these countries.

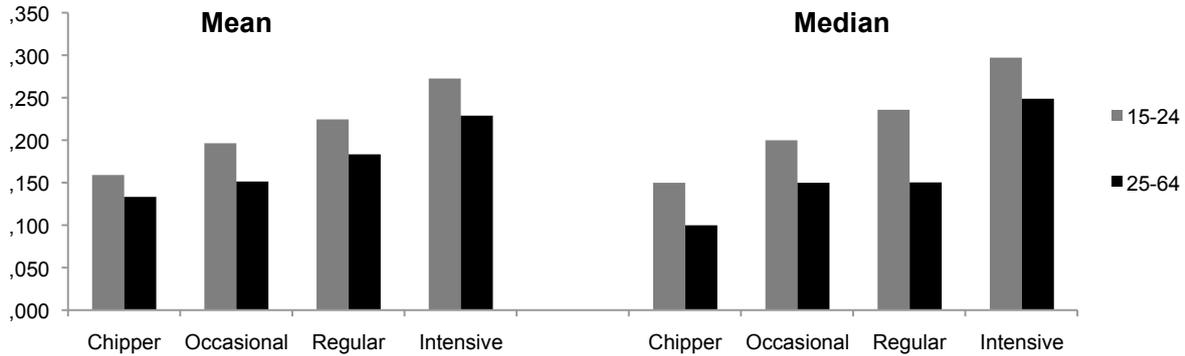
**Table 3.21: Mean amount of cannabis (gram) by gender, user group and country**

Country	Gender	P(gender)	Chipper	Occasional	Regular	Intensive	Total
Bulgaria	Males	.054	.138	.207	.170	.214	.169
	Females		.114	.174	.115	.188	.128
Czech Republic	Males	.001	.172	.231	.207	.253	.218
	Females		.138	.159	.165	.222	.155
Italy	Males	.000	.161	.177	.237	.263	.227
	Females		.093	.133	.202	.229	.153
Netherland	Males	.000	.171	.192	.210	.261	.207
	Females		.150	.151	.188	.210	.170
Portugal	Males	.430	.111	.190	.204	.175	.166
	Females		.110	.145	.147	.223	.138
Sweden	Males	.003	.179	.188	.226	.295	.215
	Females		.123	.199	.169	.221	.155
England & Wales	Males	.042	.154	.180	.186	.216	.187
	Females		.124	.144	.119	.212	.134
All countries	Males	.000	.166	.190	.219	.257	.212
	Females		.127	.152	.173	.216	.155

### Age group

There were no differences between cannabis users of 15-24 years (mean 21 years) and those aged 25-64 years (mean 32 years) in the number of joints usually smoked per day. This was 2.4 joints overall for both age groups. There were also no differences between countries and user groups.

**Figure 3.10: Mean and median amount of cannabis smoked per joint by age group (15-24 and 25-64 years) and user group for all countries combined**



However, younger users consumed significantly more cannabis per joint (overall 209 mg) compared to older users (178 mg) ( $F=45.9$ ,  $P=.0000$ ; see figure 3.10). There was no significant interaction between age group and country or age group and user group. Nonetheless, analyses per country failed to find significant age group differences in Bulgaria, and only a marginally significant difference for the Czech Republic (table 3.22).

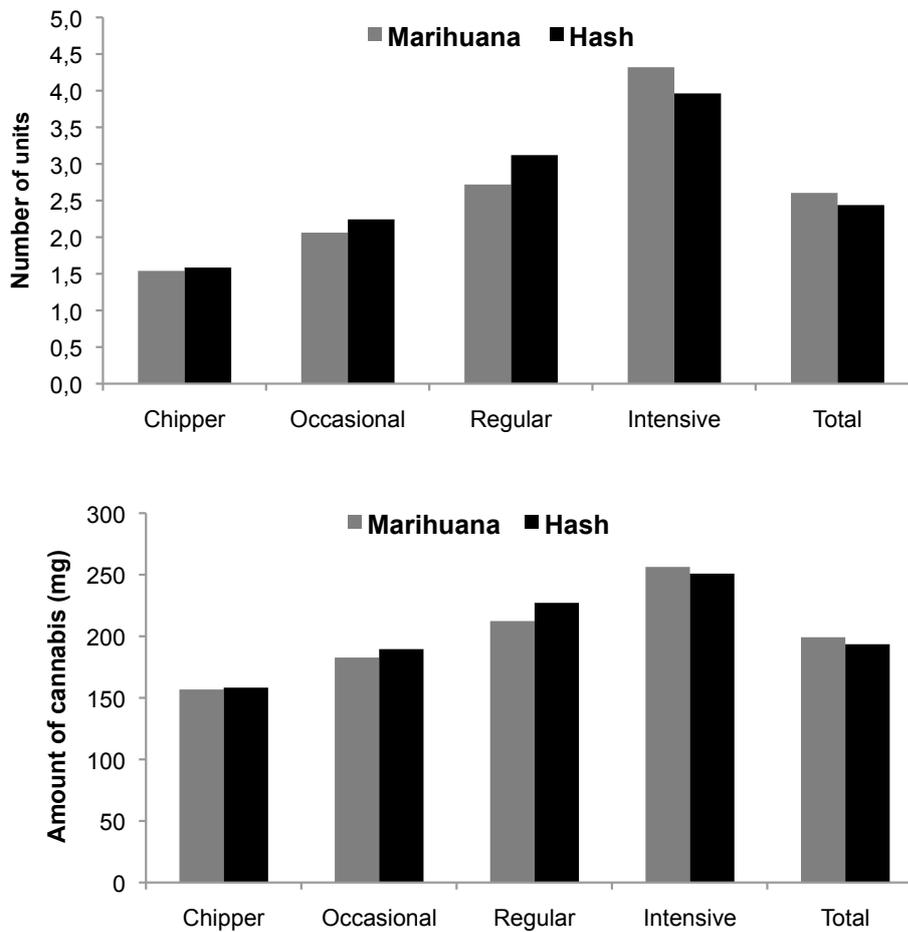
**Table 3.22: Mean amount of cannabis (gram) put in a joint by age group, user group and country**

Country	Age group	p = (age group)	Chipper	Occasional	Regular	Intensive	Total
Bulgaria	15-24	.815	.145	.187	.149	.202	.158
	25-64		.088	.195	.162	.220	.141
Czech Republic	15-24	.032	.152	.217	.214	.249	.201
	25-64		.149	.167	.161	.248	.178
Italy	15-24	.000	.138	.182	.249	.285	.226
	25-64		.123	.139	.205	.235	.193
Netherlands	15-24	.000	.170	.194	.218	.273	.206
	25-64		.148	.148	.176	.222	.177
Portugal	15-24	.003	.121	.196	.199	.223	.176
	25-64		.102	.105	.156	.167	.139
Sweden	15-24	.000	.179	.209	.236	.308	.222
	25-64		.147	.162	.191	.270	.185
England & Wales	15-24	.012	.149	.195	.189	.226	.184
	25-64		.125	.134	.139	.211	.154
All countries	15-24	.000	.159	.197	.225	.273	.209
	25-64		.133	.151	.183	.229	.178

**Type of cannabis (hash or marihuana)**

When users were classified on the basis of their frequency of use of hash or marihuana, there were little differences in the pattern across user groups. Overall, the number of units consumed per day or the amount consumed per unit were virtually the same for hash and marihuana (see figure 3.11).

**Figure 3.11: Average number of units (upper panel) and average amount (lower panel) of hash and marihuana separately by user group**



### **Sensitivity analyses**

#### *Differentiating six user groups*

In order to reduce variance between countries with regard to the number of use days within user categories, the broad categories of regular and intensive users was further split up, yielding in a classification of users at six different levels. This resulted in low numbers (<25) of respondents in one or more user groups in Bulgaria, the Czech Republic, Portugal and England & Wales. Nonetheless, a quite consistent pattern is seen in that the number of number of joints consumed on a typical day increased progressively from 1.4 among chippers to 4.8 among daily users.

The main effects of user group ( $F=163.1$ ,  $P=.0001$ ) and countries ( $F=7.3$ ,  $P=.0001$ ) and user group by country interaction ( $F=2.7$ ,  $P=.0001$ ) were significant. Differences between all successive groups of users in post-hoc analyses were significant in the total sample. Also in most individual countries the pattern shown in figure 3.12 is seen (annex 1, table A3), but not all differences between user groups were significant. Post-hoc analyses identified six homogeneous subgroups of users in the total sample, four in the Netherlands, Sweden and Italy, three in the Czech Republic, Bulgaria, and England & Wales and two in Portugal. The lower number of distinct sub groups might also be related to the smaller sample sizes.

Figure 3.12: Mean and median number of joints by user group (six levels)

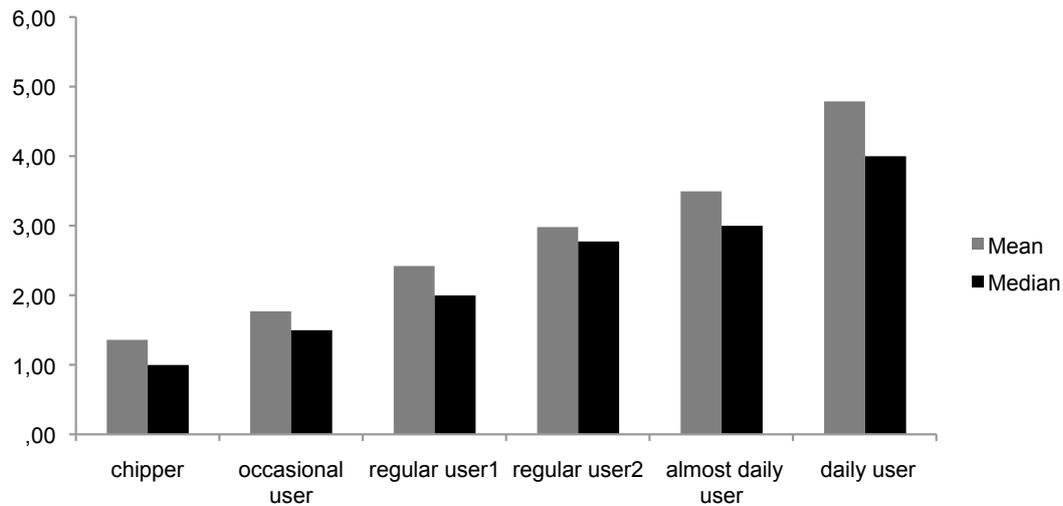
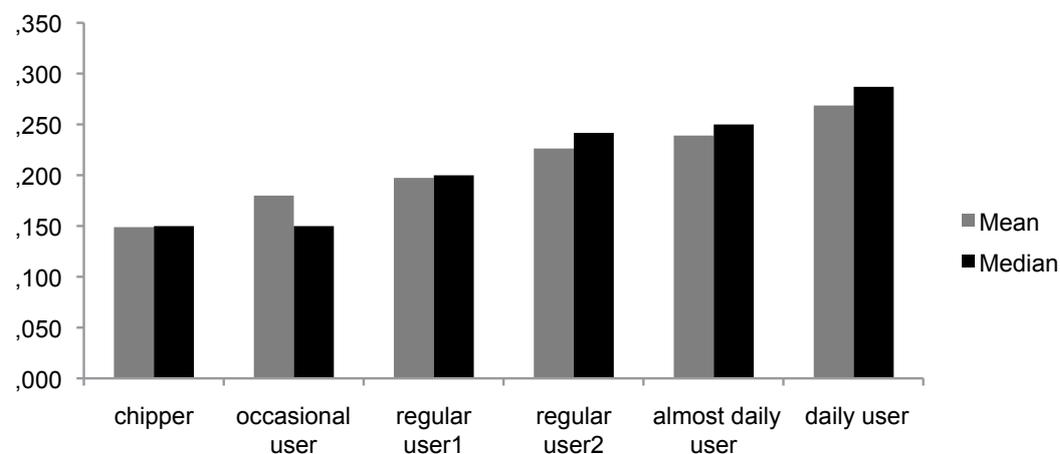


Figure 3.13 shows a similar pattern for the amount of cannabis per joint, although differences between some user groups were fairly small. For all countries combined the average amount of cannabis varied from 149 mg among chippers to 269 among daily users. The main effects of user group ( $F=50.9$ ,  $P=.0001$ ) and countries ( $F=10.3$ ,  $P=.0001$ ) and user group by country interaction ( $F=2.7$ ,  $P=.0001$ ) were significant. Post-hoc analyses showed that chippers and daily users differed significantly from all other groups. Occasional users differed from all subgroups except for modest regular users and frequent regular users differed from all groups but not almost daily users. Thus, four homogeneous sub sets of users could be identified: 1) chippers, 2) occasional and modest regular users, 3) frequent regular users and almost daily users and 4) daily users.

At country level, an increasing amount of cannabis per joint with increasing frequency is seen in most countries, but not in all (annex 1, table A4). In Bulgaria, post-hoc analyses revealed only two subgroups: daily users versus all the others. In the Netherlands, Portugal and England & Wales also two sub groups were found (bit all different between countries), while in Sweden and Italy four homogeneous sub groups of users could be identified.

Note again, that the relatively small sample sizes in some countries may have played a role in the outcomes.

Figure 3.13: Mean and median amount (gram) of cannabis per joint by user group (six levels)



*Adjusting the minimum number of joints*

Various studies suggest that a significant part of the cannabis users, especially the more infrequent users, take less than one joint per day. For example, Zeisser et al (2012) showed that 32% of those who had consumed cannabis on one to four days in the past month used 0.1-0.8 joints. Of those who used cannabis on 21 days or more this was only 3%. Of the total sample, including a wide variety of use frequencies, 14% consumed less than one joint per use day. Also in three field studies among

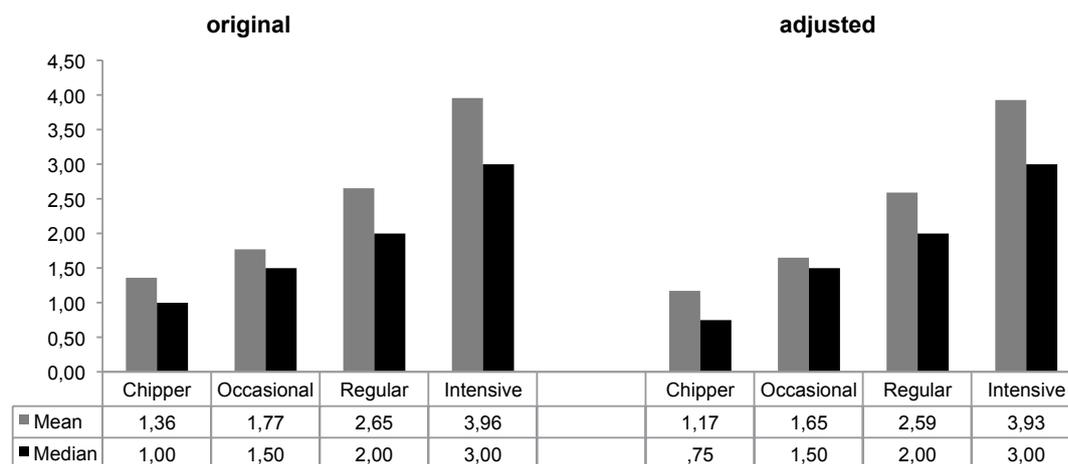
different samples of cannabis users in Amsterdam (recruited in pubs, clubs or coffee shops), the proportion of last year users who consumed less than one joint varied from 2% to 20%, depending on whether the majority of users were occasional/recreational users or more frequent users (Benschop et al. 2009; Benschop et al. 2011; Nabben et al. 2010).

In the current study the lowest number of units consumed on a typical day respondents could answer was '1' and no decimal values were allowed. Hence, this could result in an overestimation of the amount of cannabis consumed. We have therefore recalculated the number of joints smoked on a typical day, assuming that about 50% of the users who indicated to consume one joint on a typical use day actually consumed half a joint. It is clear from figure 4 that the impact of this change is most obvious for the chippers. The mean number of joints is reduced with 0.19 per typical use day and the median drops with 0.25 joint.

This seems to be consistent with the fact that the proportion of users having shared their unit on the last occasion was generally highest among chippers users, and this also applies to the proportion of users indicating that they get or share cannabis from other people instead of buying themselves (see chapter 3.5.b).

Nonetheless, if we would assume that 20% of all respondents who indicated to use 1 joint on a typical day would actually use 0.5 joint, then this would have marginally affected the estimates of the average number of joints per user group.

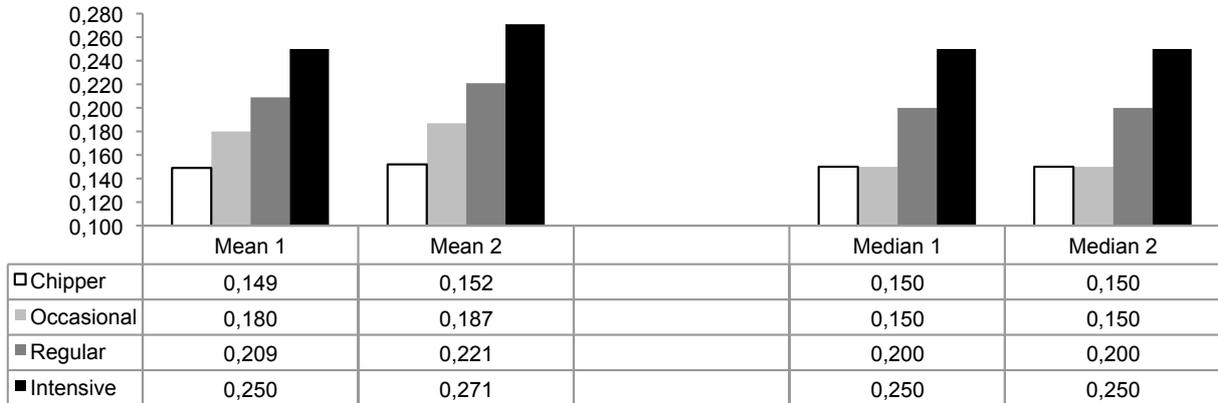
**Figure 3.14:** Mean and median number of joints smoked on a typical use day with one joint as the minimum number (original situation, left panel) and after recoding 50% of this category into 0.5 joint (right panel)



*Increasing the maximum amount of cannabis per unit*

As described earlier in this section, subjects could estimate the doses of cannabis they consumed per unit on the basis of four picture cards showing different amounts of hashish and marihuana. One answer category involved 'more than shown on picture D' (which showed the highest dose =0.3 gram), which was mentioned by some 10% of the total sample. These answers were coded as 0.4 gram. Imagine, however, that the estimated dose would be more in the range of 0.5 gram instead of 0.4 gram. Figure 3.15 shows the mean and median values per user group if the highest dose was set at 0.4 gram or 0.5 gram (see annex 1, table A5). As expected this affected mostly the mean amounts per joint for the regular and intensive users. Among regulars users the mean amount consumed increased from 0.209 gram to 0.221 gram and among intensive users from 0.250 gram to 0.271 gram. However, the median values remained unchanged both in the total sample and in the individual countries.

**Figure 3.15: Mean and median amount of cannabis consumed per joint by user group if the highest dose is set at 0.4 gram (mean 1 and median 1) or 0.5 gram (mean 2 and median 2)**



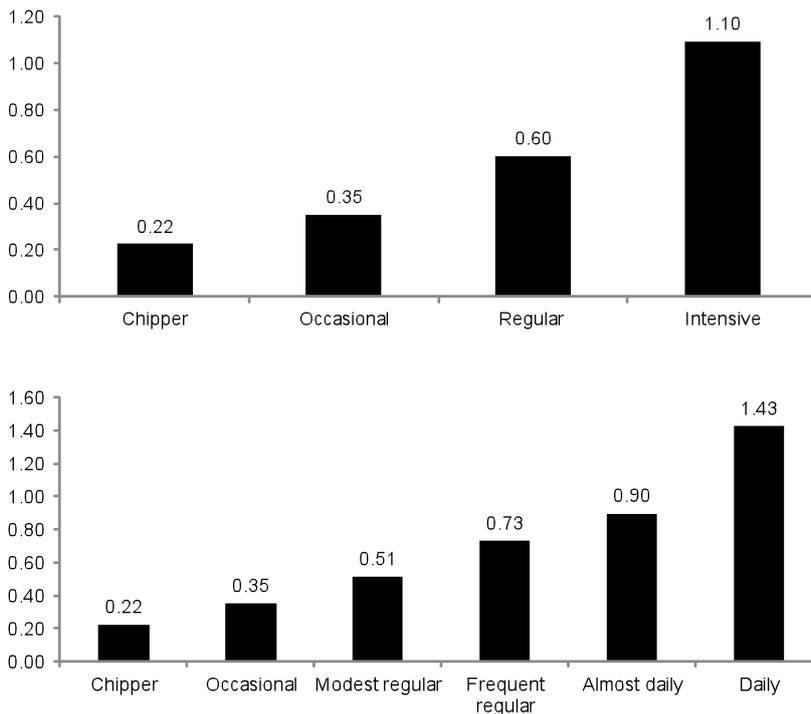
**f. Estimated daily dose and annual consumption**

Now we know how many units cannabis users consume per typical use day, how much they consume per unit and on how many days in the past year, we may calculate the total annual amount of cannabis consumed by each of the user groups. We will first start with estimating the dose consumed on a typical cannabis use day, as this is a variable that has been referred to in previous research and is commonly based on assumptions or extrapolations from local research.

**Daily dose**

Figure 3.16 shows the mean amount of cannabis consumed on a typical use day for the entire sample and including all types of units. Using a four level classification of users, mean amounts increase from 0.22 gram for chippers to 1.10 gram for intensive users ( $F=294.7, p<.0001$ ). All differences between pairs of user groups were significant in post-hoc tests. If we split up users into six different frequency categories, a similar progressive increase in daily dose is seen, with the highest average amount found for daily users (1.4 gram) ( $F=219.6, p<.0001$ ).

**Figure 3.16: Amount (gram) of cannabis consumed on a typical use day by 4-level (upper panel) or 6-level user group (lower panel)**



The daily doses among chippers varied from .18 gram in Bulgaria and .19 gram in Portugal to .26 gram in Sweden and .28 gram in the Czech Republic (see annex 1, table A8). Among intensive users the mean daily doses varied from .64 gram in Portugal and .87 gram in Bulgaria to 1.28 gram in Sweden and 1.31 gram in England & Wales.

Daily doses differed according to the type of unit consumed in the Netherlands ( $F=3.0$ ,  $P=.007$  for the interaction between type of unit and user group) and Sweden ( $F=9.2$ ,  $P=.000$  for type of unit) (restricting the analyses to joints, dry pipes and water pipes). In the Netherlands, analyses per user group suggested a higher daily dose for chippers who consumed cannabis by dry pipe/chillum compared to those who smoked joints (.43 gram against .20 gram). Differences between unit types did not reach significance for the other user groups. Note, however, that the numbers of respondents using cannabis through other types of units than joints is very low. In Sweden respondents who used cannabis in water pipes consumed more per day compare to those who smoked joints (1.2 gram against .69 gram), which is probably due to the higher number of joints rather than a greater amount of cannabis per unit.

The average amounts for the entire sample are very close to those reported in the Finnish study by Hakkarainen et al. (2008), who assumed a daily cannabis consumption of 0.2 gram for experimenters (1-4 use days per year), 0.4 gram for occasional users (5-51 use days per year), 0.5 gram for weekly users (52-181 use days per year) and 1 gram for daily users (182-365 use days per year). However, doses are lower than those reported in the former drugs market study, although a direct comparison is hampered by differences in classifications. Kilmer & Pacula (2009) assumed a dose per use day of 1 gram (range 0.57 – 1.55 gram) for last month users, and a dose of 0.5 gram (range 0.29 – 0.77 gram) for past year users who did not use in the past month. While the dose range for last month users would capture the regular and intensive users, the current study has shown that it is too high for the other user groups (Kilmer and Pacula 2009). Taking the high proportion of last month users who belong to the groups of chippers and occasional users into consideration (see table 4.5), it is likely that these amounts result in an overestimation if all last month users are considered to be regular and intensive users.

On the other hand, if it could be proven that the photo card method underestimates the amounts of cannabis put in joints, the degree of overestimation would be much smaller (see chapter 3.4.e).

### ***Annual consumption per user group***

Next we will estimate the annual consumption per user group by multiplying for each respondent the number of use days with the number of units multiplied and the amount consumed. Thereafter, this variable will be used to calculate other statistics (mean, median, 5% trimmed mean, see later) at group level. Note that this is a different (and more specific) approach than multiplying at aggregated level the average amount consumed with the average number of use days. The latter usually results in a higher estimate when amount and use days are positively correlated

We will make these calculations for the total sample at the 4-level as well as the 6-level user group classification. We will then look whether there is a difference if all types of units are considered or if we select those who only consume joints. Moreover, we will analyze age and gender differences. Finally a model will be applied, in which adjustments have been made for differences between countries with regard to the proportions males and females, age distribution and distribution of use days within each user group. Note that these estimates do not yet take into account the possible impact of sharing cannabis with others (see next chapters).

Figure 3.17 shows that for all countries combined, the average amount increased from about 1 gram for chippers to 363 gram for intensive users. When users were classified into 6 groups it becomes clear that the groups of regular and intensive users are quite heterogeneous. Daily users even consume on average almost twice (or at least twice, when looking at the medians) compared to almost daily users (figure 3.18).

The much higher values for the mean compared to the median values suggest that the distribution of the amount of cannabis consumed is highly skewed to the right. This means that few respondents use high amounts and may have a fairly great impact on the group average. For example, if we look at the intensive users, there were 16 users who consumed more than 1,424 gram cannabis in the past year, which may equal the use of more than 10 joints with the highest cannabis dose (0.4 gram), every day of the year. If we exclude these bulk users, the average for the intensive user group decreased with 29 gram (from 363 to 334 gram). The median value was, as expected, less affected and dropped with 4 gram (from 262 to 258 gram). For making annual consumption estimates per country, it might be more appropriate to use the 5% trimmed mean, which is based on the 2.5% to 97.5% range and therefore excludes outliers. These trimmed means have been included in table 3.23. Using these 5% trimmed means, the amount of cannabis consumed annually by intensive users ranged from 184 gram in Portugal to 374 gram in England & Wales.

Figure 3.17: Amount (gram) of cannabis annually consumed by 4-level user group user group for all units together

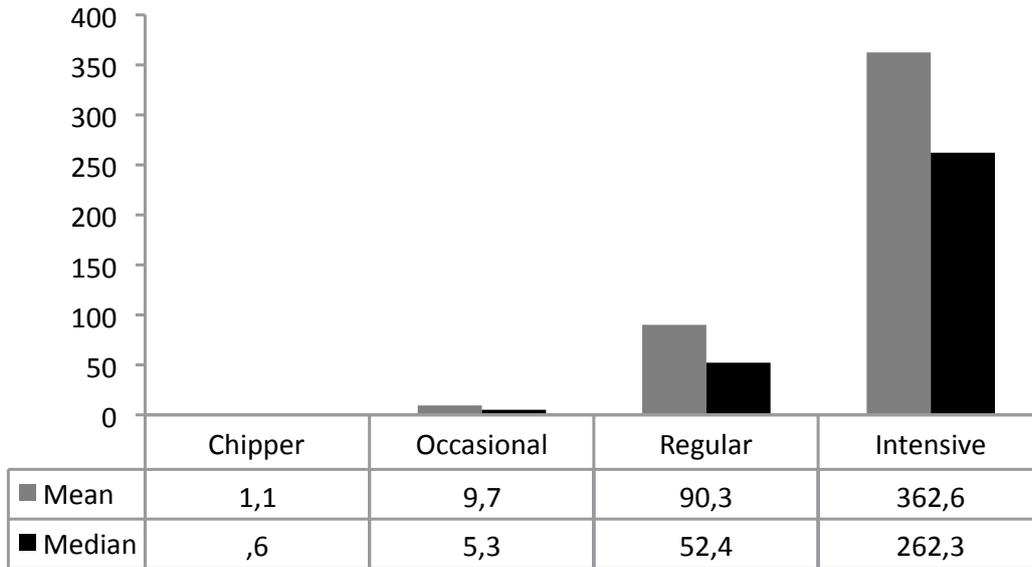
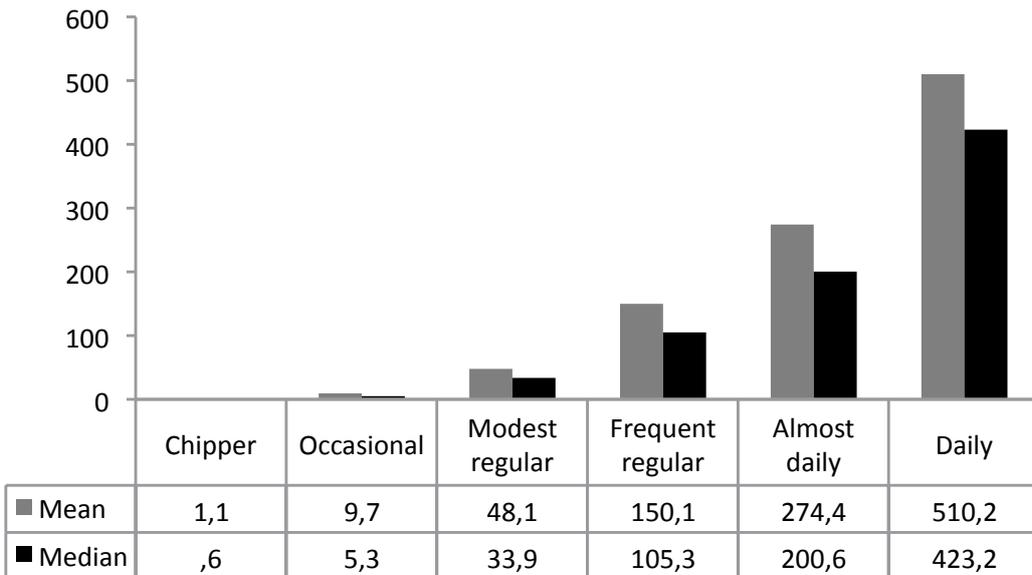


Figure 3.18: Amount (gram) of cannabis annually consumed by 6-level user group user group for all units together



**Table 3.23: Estimated annual consumption of cannabis (gram) by user group and country for all units together (means, 5% trimmed means<sup>1</sup> and medians)**

		Chipper	Occasional	Regular	Intensive
Bulgaria	Mean	0.7	5.8	46.3	285.4
	<b>5% Trimmed mean</b>	<b>0.7</b>	<b>5.4</b>	<b>39.8</b>	<b>282.6</b>
	Median	0.5	4.7	28.2	231.9
Czech Republic	Mean	1.3	10.4	71.6	334.2
	<b>5% Trimmed mean</b>	<b>1.1</b>	<b>9.4</b>	<b>54.3</b>	<b>303.8</b>
	Median	0.8	6.6	35.8	248.0
Italy	Mean	1.1	7.8	106.9	372.3
	<b>5% Trimmed mean</b>	<b>0.8</b>	<b>6.7</b>	<b>89.4</b>	<b>339.9</b>
	Median	0.5	4.7	65.9	275.1
Netherlands	Mean	1.0	7.7	74.9	357.0
	<b>5% Trimmed mean</b>	<b>0.8</b>	<b>6.5</b>	<b>63.3</b>	<b>310.5</b>
	Median	0.6	4.7	45.1	245.6
Portugal	Mean	1.0	10.9	94.5	201.6
	<b>5% Trimmed mean</b>	<b>0.8</b>	<b>10.3</b>	<b>79.5</b>	<b>183.9</b>
	Median	0.5	9.3	50.7	138.5
Sweden	Mean	1.3	13.6	109.8	412.4
	<b>5% Trimmed mean</b>	<b>1.0</b>	<b>9.9</b>	<b>90.7</b>	<b>362.8</b>
	Median	0.7	7.0	65.7	303.1
England & Wales	Mean	1.1	8.4	67.0	441.8
	<b>5% Trimmed mean</b>	<b>0.8</b>	<b>6.8</b>	<b>55.6</b>	<b>373.8</b>
	Median	0.5	5.0	34.3	285.2
All countries	Mean	1.1	9.7	90.3	362.6
	<b>5% Trimmed mean</b>	<b>0.9</b>	<b>7.7</b>	<b>74.0</b>	<b>321.3</b>
	Median	0.6	5.3	52.4	262.3

\*Differences between groups were significant for all countries at  $P=0.0001$ .

1. Based on values within the 2.5% to 97.5% range.

It was found in chapter 3.4.e that the number of units (but not amount of cannabis) in some countries, especially the Czech Republic and Sweden, was higher among those who consume cannabis not in joints but pipes (water and/or dry pipes).

Table 3.24 shows the amount annually consumed if only users of joints are included. When looking at the mean and median differences in cannabis consumption if all units are taken together and if only users of joints are included, the mean amounts drop mostly among intensive users, with values ranging from 10 gram in the Netherlands to 47 gram in the Czech Republic. England & Wales is an exception in that the amount consumed increases with 48 gram when only joints are included.

Note, however, that the medians are much less affected, except for Bulgaria, where the low numbers of intensive users included in the analyses ( $n=22$ ) may play a role. In the Czech Republic, the median among intensive users did not change at all, while the mean increased with 47 gram, as reported above.

**Table 3.24: Estimated annual consumption of cannabis (gram) by user group and country only for respondents who consume mainly joints**

		Chipper	Occasional	Regular	Intensive
<b>Bulgaria</b>	Mean	.7	5.2	46.3	272.8
	5% Trimmed mean				
	Median	.6	4.7	28.2	195.3
<b>Czech Republic</b>	Mean	1.2	9.2	55.5	286.9
	5% Trimmed mean				
	Median	.6	6.2	33.7	248.0
<b>Italy</b>	Mean	1.1	7.9	107.4	352.3
	5% Trimmed mean				
	Median	.5	5.3	65.9	263.5
<b>Netherlands</b>	Mean	.9	7.9	76.1	346.8
	5% Trimmed mean				
	Median	.6	4.7	45.6	245.6
<b>Portugal</b>	Mean	1.0	10.9	94.5	206.2
	5% Trimmed mean				
	Median	.5	9.3	50.7	138.5
<b>Sweden</b>	Mean	1.3	12.6	114.3	396.5
	5% Trimmed mean				
	Median	.7	7.1	67.7	313.0
<b>England &amp; Wales</b>	Mean	1.0	7.9	57.6	489.4
	5% Trimmed mean				
	Median	.6	5.3	28.3	286.4
<b>All countries</b>	Mean	1.0	9.1	89.9	347.5
	5% Trimmed mean				
	Median	.6	5.6	52.4	257.8

\*Differences between groups were significant for all countries at  $P=0.001$ .

### **Age and gender differences in annual cannabis consumption**

We have described in chapter 3.4.e that there were hardly any gender and age group differences in the number of joints consumed. However, males and younger users put more cannabis in a joint than females and older users. It could therefore be expected that estimates of annual cannabis consumption would also reflect these differences.

Averages indeed tended to be higher for male compared to female users (annex 1, table A7) but the overall analysis revealed no significant main effect for gender, nor any interaction with country or user group. Probably, the wide variability already present within each measure multiplies when estimating annual consumption. Moreover, in several countries the number of female users within use groups was probably too low to detect differences (e.g. less than 10 female intensive users in Bulgaria, Czech Republic, Portugal, Sweden and England & Wales).

Nonetheless, when analyses were carried out per country, there was a significant overall difference in the Czech Republic ( $P=0.006$ ), and marginally significant differences in the Netherlands ( $P=0.030$ ) and Bulgaria ( $P=0.025$ ). In Portugal the significant interaction between gender and user groups pointed at an aberrant pattern of much higher consumption among female intensive users compared to male users. As the number of females in this user group was only 7 we will not attach much significance to this finding.

Similarly, the overall analysis including user type, age group and member state as factors no yielded no significant differences between younger (15-24 years) and older (25-64 years) users, and no interaction with the other factors. At a descriptive level differences between age groups were fairly inconsistent across user groups and countries, and when present they were less strong compared to gender differences. Nonetheless, when data were analyzed per country a significant age group difference was found in the Netherlands ( $F=10.5$ ,  $P=0.001$ ), and a significant age group by user group interaction ( $F=6.2$ ,  $P=0.0001$ ). When analyzed per user group, (marginally) significant age group differences were found for regular users (86 against 56 gram;  $P=0.019$ ) and intensive users (409 gram against 280 gram;  $P=0.008$ ), suggesting higher consumption for the younger compared to the older users.

### 3.5 Circumstances of cannabis use

In this chapter we will describe the circumstances in which respondents consume their cannabis and whether there are differences between user groups and countries. More specifically the following aspects are covered:

- a. Days of the week and periods of the day cannabis is usually consumed
- b. Main location of use
- c. Sharing cannabis.

#### **a. Consumption by days of the week and periods of the day**

Table 3.25 shows on which days of the week respondents usually consume cannabis for all countries combined. There are obvious differences between user groups ( $P=.0001$ ). Perhaps not surprisingly, the majority (75%) of the intensive users consume cannabis as often on weekends as week days. In contrast, the majority of the chippers take cannabis only on weekends (51%) or more often on weekends than on week days (24%). Occasional users are most close to chippers: almost three quarters consume cannabis only or mostly during weekends. Regular users are somewhere in between occasional and intensive users. The use of cannabis more often or only on week days is rare in all user groups.

This consumption pattern is remarkably similar in all countries (annex 1, table x), although there are some differences. The percentage of intensive users consuming as often on week days as weekends varied from 66% in the Czech Republic to 83% in Italy. The proportion of chippers consuming cannabis only during the weekend varied from 34% in Italy to 70% in the Netherlands. If categories only and more often on weekend days are taken together, proportions vary from 61% in Italy and 63% in Bulgaria and Portugal to 84% in Sweden and 85% in the Netherlands.

**Table 3.25: Days of the week on which cannabis is usually consumed by user group**

	Chipper	Occasional	Regular	Intensive	Total
<b>Total N (100%)</b>	1,101	714	1,109	950	3,874
<b>Only on weekend days</b>	52%	31%	7%	1%	23%
<b>More often on weekend days than on weekdays</b>	24%	40%	40%	20%	31%
<b>Just as often on weekend days as on weekdays</b>	18%	24%	46%	75%	41%
<b>More often on weekdays than on weekends</b>	3%	4%	6%	5%	4%
<b>Only on weekdays</b>	3%	2%	1%	0%	1%

Table 3.26 shows that four to six out of ten cannabis users have a preference for using cannabis mostly in the evening, suggesting a predominant social and relaxation function. However, the proportion of users taking cannabis usually all day through is clearly highest for daily users (about one quarter). Still, for almost one quarter of the users the consumption of cannabis is not bound to a specific time period of the day. The overall difference between groups was significant ( $P=.0001$ ).

In most countries, except Portugal, differences between user groups were significant (annex 1, table A13). The proportion intensive users consuming cannabis all day ranged from 19% in Portugal to 37% in the Czech Republic. In most countries, use in the evening is most commonly mentioned, except for Portugal, where between 50% to 80% of the users report to use cannabis mainly at night. This may refer to the same time period as the Portuguese translation for evening refers to time period from about 6 to 8 PM (between work and dinner), while 'at night' both refer to a later time period (e.g. up to after midnight), which is more associated with relaxation.

Table 3.26: Time of the day on which cannabis is usually consumed by user group

	Chipper	Occasional	Regular	Intensive	Total
<b>Total N</b>	1,101	714	1,109	950	3,874
<b>All day</b>	1%	1%	8%	26%	9%
<b>At night</b>	21%	15%	10%	6%	13%
<b>In the evening</b>	54%	60%	50%	39%	50%
<b>In the afternoon</b>	4%	5%	6%	4%	5%
<b>In the morning</b>	0%	1%	1%	0%	0%
<b>No specific time</b>	20%	19%	25%	25%	22%
	100%	100%	100%	100%	100%

### **b. Location where cannabis is usually consumed**

Table 3.27 shows for all countries combined where respondents usually use their cannabis. There were several country-specific answers, collapsed in the category 'other' (see footnote under table). The largest proportion of all users take cannabis usually at their own home, but there is a clear difference between user groups. The more frequent cannabis is used, the more likely it is that this takes place at the users own home, with proportions being almost three times higher among intensive users (64%) compared to chippers (23%). A reverse but less strong pattern is seen for 'using at someone else's home', ranging from 8% for daily users to 23% for occasional users and 27% for chippers. An overall similarly popular location to use cannabis is on the street or in a park, with little differences between user groups.

Other locations are mentioned by less than 6% of the users, except chippers, of whom 16% usually take cannabis at a private party. Use at a seller's home or at the workplace is by (virtually) no respondents indicated as main locations of use. The nightlife and entertainment scene are also not popular as the most common locations of cannabis use. Note that this does not mean that use never happens there, but they are not or only rarely mentioned as the most usual locations.

Table 3.27: Location where cannabis users usually consume their cannabis by user group

	Chipper	Occasional	Regular	Intensive	Total
<b>Total N</b>	1010	675	1049	898	3632
<b>At my own home</b>	23%	40%	52%	64%	45%
<b>At seller's home</b>	0%	0%	0%	0%	0%
<b>At someone else's home</b>	27%	23%	15%	8%	18%
<b>At a private party</b>	12%	5%	1%	0%	5%
<b>At my workplace</b>	0%	0%	1%	0%	0%
<b>At school, college, university</b>	1%	2%	1%	1%	1%
<b>On the street or in a park</b>	16%	16%	19%	15%	17%
<b>At a cafe/pub/bar</b>	2%	3%	2%	2%	2%
<b>Other place of entertainment</b>	3%	3%	1%	0%	2%
<b>At a music concert or festival</b>	4%	2%	0%	1%	2%
<b>Other *</b>	10%	7%	8%	9%	8%
	100%	100%	100%	100%	100%

\* Smart shops and other locations in Portugal; tea house and other locations in the Czech Republic; Coffee shops and other locations in the Netherlands; other locations in Bulgaria, Italy, Sweden and England & Wales.

Differences between user groups were significant for all countries, except for Bulgaria (annex 1, table A14). For information we have also summarized in table 3.28 the locations of use per country for all user groups combined, but note that differences between groups and differences in the numbers of respondents per group may affect the overall averages per country.

In all countries, someone's own home as main location of use was highest among intensive users, with proportions varying from 40% in the Czech Republic to 80% in England & Wales and 82% in Sweden (annex 1, table A14). In the Czech Republic and Bulgaria, relatively high proportions (39% and 34%) of intensive users consume their cannabis mainly in the street of the park. Use at someone else's home was fairly common among chippers, in most countries - about one in three - except Bulgaria and Czech Republic, with about half of these percentages.

In the Netherlands, coffee shops –outlets for the small scale sale of cannabis - were the main locations for using cannabis for between 3% and 5% of the users. This seems to be low. Note, however that in about three-quarters of the Dutch cities and towns no coffee shops are present. Moreover, their function as a take away place (instead of place of social function) has increased as of 1 July 2008 with the implementation of the (tobacco) smoking ban in the catering industry, including coffee shops.

**Table 3.28: Location where cannabis users usually consume their cannabis by country**

	BG	CZ	IT	NL	PT	SE	E&W	Total
<b>Total N</b>	173	443	945	999	132	693	247	3,632
<b>At my own home</b>	22.5%	26.9%	46.5%	41.2%	40.9%	57.7%	63.2%	44.6%
<b>At seller's home</b>	0.0%	0.5%	0.1%	0.2%	0.0%	0.1%	0.0%	0.2%
<b>At someone else's home</b>	17.9%	8.8%	17.7%	23.2%	16.7%	18.2%	16.2%	18.1%
<b>At a private party</b>	7.5%	5.2%	3.5%	4.4%	3.8%	4.9%	6.5%	4.6%
<b>At my workplace</b>	0.0%	0.0%	0.3%	0.4%	0.0%	0.3%	0.8%	0.3%
<b>At school, college, university</b>	1.2%	1.1%	1.4%	0.4%	15.9%	0.1%	0.8%	1.3%
<b>On the street or in a park</b>	33.5%	28.4%	19.9%	13.3%	11.4%	10.7%	5.3%	16.7%
<b>At a pub/bar</b>	0.6%	10.2%	1.4%	1.2%	2.3%	0.1%	0.8%	2.1%
<b>Other place of entertainment</b>	2.3%	3.6%	0.8%	2.4%	2.3%	0.1%	0.0%	1.5%
<b>At a music concert or festival</b>	1.2%	3.4%	0.4%	2.2%	5.3%	0.7%	2.4%	1.7%
<b>Other</b>	13.3%	11.5%	8.0%	6.5%	0.0%	6.9%	4.0%	7.5%
<b>Tea house</b>	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
<b>Coffee shop</b>	0.0%	0.0%	0.0%	4.5%	0.0%	0.0%	0.0%	1.2%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

### ***c. Sharing of cannabis***

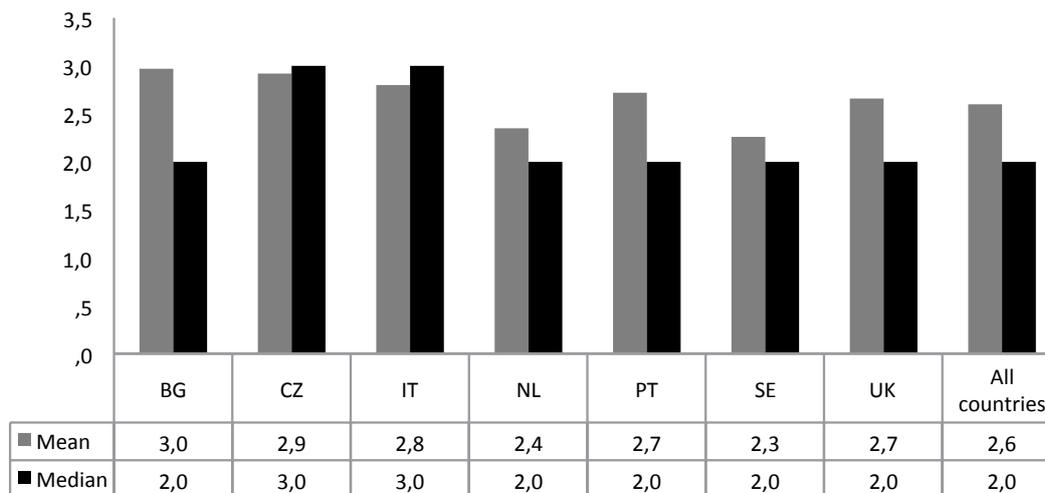
Cannabis users often take cannabis in company of others, which is compatible with the social and recreational function for a majority of users (e.g. Hall and Degenhardt 2009). Typically, this behaviour is accompanied by sharing cannabis units with one or more others. Table 3.29 shows the proportion of users having shared their cannabis on the last use occasion. It is clear that intensive users are least likely to share their cannabis (67%) while chippers and occasional users seem to be most 'social' in this respect (overall 90% and 81%). Nonetheless, sharing seems to be a common phenomenon, even among intensive users. Nonetheless, there are clear differences between countries, with proportions ranging from 50% in England & Wales to 91% in Bulgaria. Differences between user groups were significant in all countries, except for Bulgaria, where sharing seems to be the rule in all user groups.

Figure 3.19 shows that the respondents shared their cannabis on the last occasion on average with two to three people. When data for all countries were taken together, 30% of the users had shared their cannabis with 1 person, 26% with 2 persons, 23% with 3 persons, 12% with 4 persons, 6% with 5 persons, 2% with 6 persons and 2% with 7 or more persons. There were no significant differences between user groups.

Table 3.29: Percentage of users who shared their cannabis during the last consumption day by user group and country

	Chipper	Occasional	Regular	Intensive	Total	P=
Bulgaria	96%	100%	91%	91%	94%	.362
Czech Republic	90%	90%	80%	73%	82%	.001
Italy	95%	81%	81%	75%	82%	.000
Netherlands	91%	89%	74%	56%	79%	.000
Portugal	94%	94%	84%	59%	82%	.000
Sweden	85%	68%	67%	61%	72%	.000
England & Wales	84%	66%	56%	50%	64%	.000
Total	90%	81%	75%	67%	79%	.000

Figure 3.19: Mean and median number of people with whom cannabis was shared on the last occasion



A key question is whether sharing may affect the validity of the findings on the number of units typically consumed per day, as questions on the amount of units did not specifically emphasize that users should only indicate their own consumption. In line with Korf et al. (2007) we addressed this issue by looking whether the number of units smoked the last day differed between those who indicated to have shared their unit and those who did not. As both the number of units consumed typically or on the last day as well as sharing of units are associated with the frequency of use, the latter factor was included in the analysis as covariate. The results showed that there was no significant difference between the number of joints smoked by those who had shared and those who did not share (2.36 and 2.21 on average,  $P=.07$ ). If analyzed per user group, there was a significant difference only for regular users between those who shared and those who did not share (table 3.30). It might be that those who shared actually consumed a bit less than the reported number of units.

Table 3.30: Mean number of units consumed on the last use day by user group among those who shared their unit and those who did not

User group	Shared	Not shared	P=
Chippers	1.37	1.27	.486
Occasional users	1.71	1.80	.579
Regular users	2.50	2.11	.015
Intensive users	3.51	3.45	.772

Looking at those who did share, the correlation with the average number of units consumed the past time and the number of people shared with was very low ( $r=.055$ ). All in all, it seems that most people who reported the number of units typically smoked largely referred to the number they consumed themselves, as also concluded by Korf et al. (2007) although this might not apply to all respondents.

It can, however, not be determined from these analyses whether people who share and those who do not share are actually different types of users, who really differ in the number of units they consume.

It can be further questioned whether there is a difference in total amount of cannabis consumed per user. Table 3.31 shows the amount (grams) per user and user group among those who indicated to have shared their unit on the last occasion, and those who did not. No significant difference was found in annual consumption between those who share and those who not shared their unit on the last occasion ( $P=.105$ ). There was also no significant interaction between sharing and user group ( $P=.310$ ).

When the user groups are analyzed separately (in spite of a non significant interaction), the chippers who shared consumed significantly less than those who did not share. The difference is not significant for occasional users. For regular users it might seem that those who shared consumed more than those who did not share (but only at  $P=.013$ ) and this seemed also the case for the intensive users but the difference was not even marginally significant ( $P=.151$ ).

These data do not suggest that people who share have indicated higher amounts (mainly numbers of units) while they in fact consumed less themselves, although a trend in this direction for the more frequent user groups can be observed. It should be noted, however, that we have already concluded that the average number of units consumed seems to be slightly higher only among regular users, and this should be the core variable to draw conclusions about sharing.

Taken all the data together it seems that we do not overestimate consumption too much by not taking the sharing of units into account. Possibly, most people have indicated primarily the number of units consumed themselves.

However, this issue remains to be further and it would be recommended for future research to explicitly ask for the number of units consumed by the person him or herself, and/or to ask how many units and what part of a unit is shared.

**Table 3.31: Amount of cannabis (gram) consumed in the past 12 months per individual per user group by those who shared their unit on the last occasion and those who did not**

User group	Shared on last occasion	Not shared on last occasion	Total
Chipper	1.1	1.5	1.1
Occasional user	9.6	10.2	9.7
Regular user	95.3	74.3	90.2
Intensive user	375.5	338.3	363.2

### 3.6 Use of other substances

Respondents were asked whether they had used other drugs than cannabis in the past year or in the past month. Table 3.32 lists the outcomes. The Netherlands is an exception as prevalence rates of ecstasy, cocaine, amphetamine and GHB were appreciably higher compared to other countries. This is probably related to the recruitment strategy, whereby a significant proportion of respondents were recruited through websites on upcoming festivals and parties. Overall, the use of other drugs seemed to be lowest among Italian cannabis users. Note, however, that these data do not reflect 'normal' prevalence rates, as the sample a priori consists of drug users instead of the general population. Subjects were explicitly recruited on the basis of their drug use in the past year, and those who were randomized to the cannabis track, even if they consumed cannabis only a few times in the past year, are probably more likely to have had more experience with other drugs compared, to respondents in a population sample. For illustration, in the British Crime Survey of 2010/2011, the use of Spice, Khat (both 0.2%), BZP (0.1%) and GBL/GHB (0.0%) was very low in the general population (Smith and Flatley 2011). However, 91% of those taking mephedrone had also taken another illegal drug in the last year with 72% using cannabis, 53% cocaine and 48% using ecstasy.

Apart from the Netherlands, cocaine use in the past year is relatively often reported by cannabis users from England & Wales and Bulgaria (14% and 13%), but last month prevalence is much lower, especially in Bulgaria. Last year prevalence of ecstasy use varied from 1.4% in Italy to 21% in England & Wales, with a peak of 60% in the Netherlands. For amphetamine last year use was lowest in Italy and highest in Bulgaria (23%), after the Netherlands (39%).

Heroin use was relatively uncommon in most countries. With a last year prevalence of 12%, methamphetamine was most common in the Czech Republic. Spice or 'synthetic cannabis' peaked in Sweden and Portugal with about one in five cannabis users having consumed these substances in the past year.

Alcohol is, as expected, the most common consumed other substance in all countries. There were small but significant differences between user groups, with slightly lower prevalence rates among intensive and regular users compared to chippers and occasional users (table 3.33). For other drugs minor consistent differences were found between user groups.

**Table 3.32: Last year and last month prevalence (%) of other drug use among cannabis users by country**

		BG	CZ	IT	NL	PT	SE	E&W
<b>Any drug</b>	Last year	27.9%	21.5%	10.3%	54.9%	25.3%	24.8%	26.1%
	Last month	13.0%	9.4%	4.3%	41.5%	13.3%	10.4%	9.9%
– Cocaine	Last year	13.2%	7.3%	5.7%	36.2%	10.4%	3.5%	14.9%
	Last month	1.3%	1.7%	1.1%	20.8%	3.2%	.6%	4.4%
– Ecstasy	Last year	12.5%	13.3%	1.4%	60.0%	8.0%	5.0%	20.6%
	Last month	3.9%	3.9%	.2%	38.6%	4.0%	1.3%	6.1%
– Amphetamine	Last year	23.0%	7.5%	1.7%	39.1%	4.8%	6.9%	3.1%
	Last month	12.5%	2.2%	.3%	25.3%	2.4%	1.9%	.9%
– Heroin	Last year	.7%	1.2%	.9%	1.2%	2.4%	.8%	3.5%
	Last month		.7%	.2%	.8%	.8%	.2%	1.3%
– Methamphetamine	Last year	3.9%	12.1%	1.1%	6.6%	1.6%	1.7%	1.3%
	Last month	1.3%	6.5%	.3%	3.2%		.2%	.4%
– GHB	Last year	.7%	.5%	.2%	20.4%		1.4%	1.3%
	Last month		.2%		11.2%		.5%	.9%
– Spice	Last year	8.6%	4.8%	5.4%	1.9%	20.8%	21.8%	4.4%
	Last month	2.6%	1.0%	3.0%	1.1%	9.6%	10.0%	.4%
– Mephedrone	Last year	.7%	3.4%	.1%	4.7%	4.8%	.9%	5.3%
	Last month		.5%	.1%	1.3%		.3%	1.8%
<b>Alcohol</b>	Last year	91.4%	93.2%	85.0%	92.9%	91.2%	*	93.0%
	Last month	83.6%	87.4%	74.0%	86.5%	83.2%	*	83.3%

\* No data for Sweden (due to a programming error).

**Table 3.33: Use of alcohol in the past year and past month by user group\***

	Chippers	Occasional	Regular	Intensive
Last year	92.2%	93.5%	87.8%	88.6%
Last month	85.9%	86.4%	80.5%	76.7%

\* Excluding Sweden.

### 3.7 Problematic cannabis use

The 6-item Cannabis Abuse Screening Test (CAST) was used as a proxy for problematic cannabis use. This scale is one of the instruments proposed by the EMCDDA to be included in population surveys to get a better picture of the more risk forms of cannabis use, which is comparable across countries. The CAST has also been optionally included in the ESPAD surveys among pupils of 15 and 16 years. In 2011, the CAST was used in 13 out of the 36 countries participating in the ESPAD, including the Czech Republic, Italy and the Netherlands.

In the current study, the frequency of occurrence in the past year of the following items was scored by all cannabis users on a 5-point scale (0 "never", 1 "rarely", 2 "from time to time", 3 "quite often", and 4 "very often").

1. Have you ever smoked cannabis before midday?
2. Have you ever smoked cannabis when you were alone?
3. Have you ever had memory problems when you smoke cannabis?
4. Have friends or members of your family ever told you that you ought to reduce or stop your cannabis use?
5. Have you ever tried to reduce or stop your cannabis use without succeeding?

6. Have you ever had problems because of your use of cannabis (arguments, fight, accident, bad results at school, etc.)? Using full scale scores (0 – 24), cut-off sum scores of 7 and 12 have been found to be predictive of moderate and severe dependence, respectively, in a sample of young adults (18-25 years) (Cuenca-Royo et al. 2012).

Internal consistency was acceptable in the total sample (Cronbach's  $\alpha$  0.73) and in most individual countries (Bulgaria 0.62; Czech Republic 0.73; Italy 0.64; the Netherlands 0.81; Portugal 0.78; Sweden 0.73; England & Wales 0.70). In the total sample, average CAST sum scores correlated significantly with the number of use days in the past 12 months ( $r=0.58$ ,  $P=.0001$ ). In the individual countries correlations were all significant and varied between 0.53 in Italy to 0.65 in the Netherlands and Portugal.

Table 3.34 shows that in all countries the average CAST scores increased progressively from the chippers to the intensive users. There was a significant main effect of user group ( $F=401.1$ ,  $P=.0001$ ) and country ( $F=8.3$ ,  $P=.0001$ ) and significant interaction between country and user group ( $F=3.7$ ,  $P=.0001$ ). All differences between user groups were significant in post-hoc tests. User groups also differed significantly in all individual countries at  $P=.0001$ . Average values for chippers were lowest in England & Wales and Portugal (1.6 and 1.7, respectively) and highest in Bulgaria (3.0), but differences between countries were not significant. Differences between countries among occasional users were marginally significant ( $P=.03$ ). The overall significant difference among regular users ( $F=3.6$ ,  $P=.002$ ) could be attributed in post-hoc analyses to higher scores in Sweden compared to Bulgaria, the Czech Republic and Italy. Averages for intensive users varied from 7.9 in Italy to 10.6 in the Netherlands ( $F=11.9$ ,  $P=.0001$ ). Post-hoc analyses revealed significantly higher averages in the Netherlands compared to Bulgaria, the Czech Republic and Italy.

When evaluating gender and age group effects, it appeared that males had an overall higher summed CAST score compared to females (6.2 against 4.3). These differed not by user type or country. There were no significant age group differences.

When analyzed per item of the CAST (see annex 1, table A9), differences between user groups were significant for all items ( $P=.0001$ ).

**Table 3.34: Mean and median summed scores on the Cannabis Abuse Screening Test (CAST) by user group and country\***

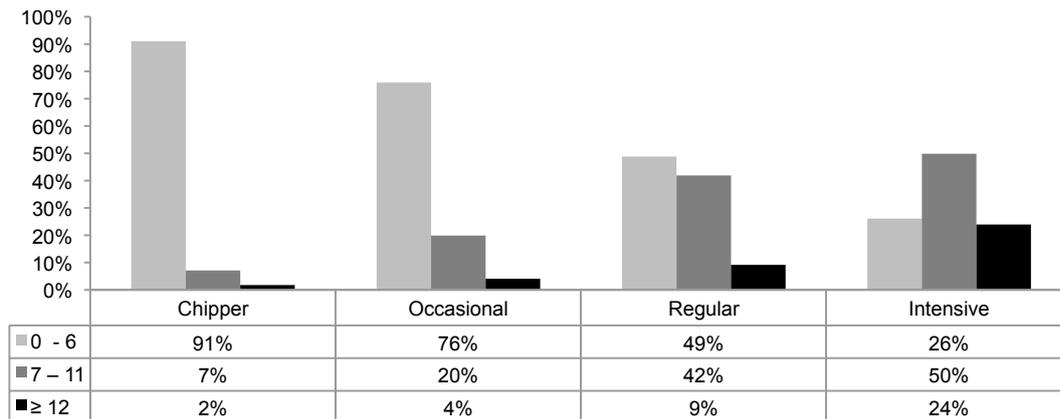
		Chipper	Occasional	Regular	Intensive
<b>Bulgaria</b>	Mean	3.0	4.7	5.8	9.2
	Median	2.0	3.5	5.0	9.0
<b>Czech Republic</b>	Mean	2.3	4.1	6.3	9.0
	Median	2.0	3.0	6.0	8.0
<b>Italy</b>	Mean	2.0	4.2	6.7	7.9
	Median	1.0	4.0	6.0	8.0
<b>Netherland</b>	Mean	2.2	4.3	7.2	10.6
	Median	1.0	4.0	7.0	10.0
<b>Portugal</b>	Mean	1.7	3.8	6.5	9.6
	Median	.0	4.0	6.0	9.0
<b>Sweden</b>	Mean	2.5	5.3	7.7	9.7
	Median	1.0	5.0	8.0	9.0
<b>England &amp; Wales</b>	Mean	1.6	5.0	6.9	9.2
	Median	1.0	4.0	7.0	9.0
<b>All countries</b>	Mean	2.2	4.6	6.9	9.1
	Median	1.0	4.0	7.0	9.0

\*Differences between groups were significant in all individual countries at  $P=.0001$ .

Figure 3.20 shows that one quarter (24%) of all intensive users fulfilled criteria for severe dependence. The large majority of the chippers (91%) scored below any criterion of problematic use. Figures for the individual countries are given in annex 1, table A10. Differences between countries were fairly small for chippers: about nine in ten users fell below a cut-off of 7. However, there was more variation with regard to the proportion of intensive users having a score of 12 or more. The lowest averages were found in Italy (13%), England & Wales (17%) and Bulgaria (17%). The highest average was reported in the Netherlands (41%).

The high summed CAST score among intensive users in the Netherlands might be (somehow) associated with the recruitment of a high proportion of users who entered the web survey through a website for party visitors. Separating those out from other cannabis users by differentiating respondents who had used ecstasy in the past year and those who did not showed a two-point significantly higher sum CAST score among intensive users (11.5 against 9.5) for those who used ecstasy. This outcome did not differ when adjusted for age (which was notably lower among intensive users who consumed ecstasy – i.e. 25 years against 33 years). Cannabis consumption measures did not differ between ecstasy and non-ecstasy users. Moreover, the proportion of intensive cannabis users who had also consumed ecstasy with a CAST score  $\geq 12$ , was higher (49% against 30%, respectively). It is not known how these findings should be explained, but they do point at different subtypes of intensive users.

**Figure 3.20: Proportion of users with CAST scores in range 0-6, 7-11 and 12 or more by user group**



### 3.8 Conclusions

In chapter 3 we have investigated whether there were differences between cannabis user groups and countries on a number of demographic and cannabis use related variables. The results revealed many differences between user groups, which seemed to be more or less 'universal', but there were sometimes also notable differences between countries.

Overall, intensive users were most strongly distinguished from other user groups – especially the chippers and occasional users- in that they had a relatively early onset of first cannabis use, were more often male, were older (except for Bulgaria and the Czech Republic), used more units (mainly joints) on a typical use day, put more cannabis in a unit, less often shared their units with others, consumed cannabis more often at home and during the whole week and all parts of the day, consumed appreciably more cannabis annually and had more symptoms of problematic use, compared to the less frequent user groups.

For most variables there was a gradient in outcome, in that differences tended to increase with increasing frequency of use. This is especially evident for consumption data for six user groups at increasing levels of frequency. Overall, differences between chippers, who consumed cannabis on average less than once a month, and occasional users, who consumed cannabis at least monthly but no more than once a week, were small. Nonetheless, consistent increases were found in average scores for problematic use with increasing frequency and also the difference between chippers and occasional users was significant.

Despite these overall main differences between user groups, there were quite some specific differences between countries:

- **Age of first use:** The average age of first cannabis use was overall clearly higher in Sweden compared to all other countries. While it is hard to explain this difference on the basis of these data, this finding may be associated with the long-standing relatively restrictive Swedish drug policy aimed at a drug-free society.
- **Type of unit:** While the majority of the cannabis users consumed their cannabis by smoking a joint, up to 45% of the intensive users in the Czech Republic preferred smoking cannabis by dry pipes/chillums. Health concerns related to tobacco smoking, better options to titrate the cannabis dose, smoking efficiency and cultural factors, have been put forward as possible explanations for the popularity of this consumption method in the Czech Republic.
- **Mixing cannabis:** Although the majority of the cannabis users mixed their cannabis with tobacco, there were clear differences between countries, with proportions of users who consumed cannabis 'pure' varying from 9% or less in Italy, the Netherlands and Portugal up to 28% in the Czech Republic and 33% in Bulgaria.

- Preference for hash or marihuana: The proportion of users with a preference for marihuana was highest in Bulgaria and the Czech Republic (96%), at close distance followed by the UK (83%). Preference for marihuana was lowest in Portugal (38%), where hash tended to be more popular (overall 43%), especially among intensive users (69%). As indicated in before, in some countries marihuana consumption seems to be more common than would be suggested by other sources several years ago.
- Amount of cannabis consumed: Annual cannabis consumption among intensive users tended to be lowest in Portugal (184 gram) and highest in Sweden and the UK (363 and 374 gram, respectively), but confidence intervals are fairly wide.
- Location where cannabis used: In the Czech Republic and Bulgaria, the street or park is a relatively often mentioned location where cannabis is usually consumed, while this location is least common in England & Wales. In this latter country, the proportion of users who take cannabis at their own home is highest.
- Sharing on the last occasion: Although sharing was common among most users, especially the less frequent users, proportions among intensive users varied from 50% in England & Wales to 91% in Bulgaria. It is hard to explain such differences. Apart from possible cultural differences, it is likely that sharing is associated with the main location of use (see above). Indeed, using cannabis at home is more common among those who did not share compare to those who shared their cannabis.

## 4 Availability of cannabis

In this chapter we will describe for all user groups and countries the following aspects related to the availability and accessibility of cannabis, including buying behaviour:

- a. Way of obtaining cannabis
- b. Usual location of purchase and reasons to buy there
- c. Availability of other drugs at location of purchase
- d. Amount usually bought per purchase and price paid for it
- e. Estimated price per gram
- f. Buying for someone else
- g. Ease of obtaining cannabis and inability to buy
- h. Buying in the past 30 days: number of times and amount of money spent
- i. Comparing methods of estimating consumption in the past month.

### **a. Way of obtaining cannabis**

Table 4.1 shows how respondents usually their cannabis. In all countries, buying cannabis is the most common way to obtain the drug for regular and intensive users. In all countries the proportion of those who usually buy their cannabis increases from chippers to intensive users, while the proportion of those who get it from others decreases. However, having said this there are also notable differences between countries. While buying cannabis is the main way to obtain cannabis for only 14% to 20% of the chippers in the Czech Republic, Portugal and Italy, it is as high as 60% for the chippers in Netherlands. The proportion intensive users who predominantly buy cannabis vary from 53% in the Czech Republic to 89% in the Netherlands. Intensive users who get cannabis mainly from others or share it is rare in Sweden, the Netherlands, England & Wales and Italy (2% to 4%), but higher percentages are found in the Czech Republic and Bulgaria (18% and 19%).

Note that growing may differ between regions in Bulgaria. In their 2009 National Report, the Bulgarian focal point reported that growing of cannabis is mostly concentrated in the South-western part of the country.

Growing cannabis as primary way to obtain cannabis for personal consumption is uncommon in the Netherlands (1% to 5%), followed by England & Wales (0% to 9%), but higher percentages are reported in most other countries, especially among intensive users. The Czech Republic and Italy are on top of the list with 21% and 19%, respectively, of the intensive users who usually grow their own cannabis.

Table 4.1: Way of obtaining cannabis by user group\*

	Chipper	Occasional	Regular	Intensive	Total
<b>Bulgaria</b>					
I buy it	30%	29%	61%	67%	45%
People give or share it with me for free	69%	67%	37%	19%	52%
I grow it	0%	0%	2%	10%	2%
Other	1%	5%	0%	5%	2%
<b>Czech Republic</b>					
I buy it	14%	30%	44%	53%	37%
People give or share it with me for free	73%	57%	39%	18%	44%
I grow it	12%	11%	12%	21%	14%
Other	2%	3%	5%	8%	5%
<b>Italy</b>					
I buy it	20%	48%	73%	70%	59%
People give or share it with me for free	75%	46%	13%	4%	26%
I grow it	2%	5%	9%	19%	11%
Other	2%	2%	5%	6%	5%
<b>Netherlands</b>					
I buy it	60%	68%	90%	89%	75%
People give or share it with me for free	38%	29%	7%	2%	21%
I grow it	1%	1%	1%	5%	2%
Other	1%	2%	2%	4%	2%
<b>Portugal</b>					
I buy it	19%	44%	67%	68%	47%
People give or share it with me for free	77%	56%	13%	11%	41%
I grow it	2%	0%	3%	16%	6%
Other	2%	0%	17%	5%	6%
<b>Sweden</b>					
I buy it	46%	73%	85%	76%	69%
People give or share it with me for free	49%	15%	4%	3%	20%
I grow it	4%	9%	7%	18%	8%
Other	1%	4%	4%	3%	3%
<b>England &amp; Wales</b>					
I buy it	26%	68%	74%	85%	63%
People give or share it with me for free	71%	26%	14%	3%	29%
I grow it	0%	4%	9%	9%	6%
Other	3%	2%	2%	3%	3%
<b>All countries</b>					
I buy it	40%	59%	75%	74%	62%
People give or share it with me for free	56%	34%	15%	6%	28%
I grow it	3%	5%	6%	15%	7%
Other	2%	3%	4%	5%	3%

\*Differences between groups were significant in all individual countries at  $P=0.0001$ .

### b. Usual location of purchase and reasons to buy there

For those who *usually* buy their cannabis, table x shows the locations of purchase. There were only significant differences between user groups in Italy ( $P=0.0001$ ). Note, however, that the numbers of chippers and occasional users who usually buy are very low in several countries, not allowing a detailed assessment by user group.

There were clear differences between countries in the main locations of purchase. At street or in a park was mentioned by the majority of the Bulgarian cannabis users (58%), at distance followed by Italy (34%), Portugal (23%), Sweden (27%) and England & Wales (20%).

Home locations (seller or someone else's) are commonly reported locations in many countries. In the Czech Republic, Italy, Portugal and Sweden, cannabis was commonly bought at a seller's home (between 35% and 45%), and also in Portugal and England & Wales this location was regularly mentioned (21% 29%). In Italy, the proportion of cannabis users buying mainly at this location was highest among intensive users (43%) and lowest among chippers (18%). Buying at someone else's home, who is apparently not the seller, was reported by almost one in four to five cannabis users from Portugal (23%) and the Czech Republic (19%).

As expected, coffee shops were the most likely source for buying cannabis in the Netherlands for about nine in ten users. Coffee shops are outlets where the sale of cannabis to adults is tolerated under strict conditions.

Pubs and bars are mentioned by one in ten users in the Czech Republic and Portugal.

Someone's work place, music festivals or other places of entertainment, private parties, public transportation stations, smart shops, school or college or someone's own home were rarely reported as the main location for buying cannabis. This also applied to buying through internet.

**Table 4.2: Usual locations for purchasing cannabis by country**

	BG	CZ	IT	NL	PT	SE	E&W
<i>N</i>	73	155	545	738	62	464	150
At a coffee shop	1.4%	.0%	.0%	87.1%	.0%	.0%	8.7%
At a pub/bar	.0%	11.6%	4.8%	.4%	8.1%	1.1%	1.3%
At other place of entertainment	4.1%	1.9%	.2%	.1%	1.6%	.4%	.0%
At a private party	1.4%	.0%	1.1%	.8%	.0%	1.5%	.0%
At a music concert or festival	.0%	.0%	.2%	.3%	.0%	.2%	.0%
On the street or in a park	57.5%	12.3%	34.1%	2.7%	22.6%	27.4%	20.0%
At a public transport station	.0%	.0%	.2%	.0%	.0%	1.3%	.7%
At a community centre, youth club association	.0%	.0%	.4%	.0%	1.6%	.2%	.7%
At seller's home	9.6%	45.2%	35.8%	3.3%	21.0%	34.7%	29.3%
At my own home	1.4%	1.9%	3.5%	.7%	4.8%	2.8%	10.0%
At someone else's home	4.1%	19.4%	.0%	2.4%	22.6%	10.3%	16.0%
At a smart shop	.0%	.0%	.2%	.3%	1.6%	.0%	.0%
Through the Internet	2.7%	.0%	.2%	.0%	.0%	3.2%	.7%
At my workplace	.0%	1.3%	.9%	.0%	1.6%	1.3%	1.3%
At school, college or university	1.4%	3.2%	5.0%	.3%	4.8%	.9%	.7%
Other	16.4%	3.2%	13.6%	1.6%	9.7%	14.7%	10.7%

Data from the 2008 general population survey in the Czech Republic point at a difference ranking in location of purchase. The most common places for cannabis transactions in this survey are bars, clubs or restaurants (36 %), followed by private events or homes (31 %), public places (20 %) and sellers' homes (13 %) (Mravcik et al. 2009).

In the Bulgarian National Report (2009) other methods are described, which may be covered by the category 'other'. For example, taxi drivers as suppliers of cannabis may pick up clients from a designated address and then sell them cannabis before dropping them further down the street. Also, sellers may transit a specific route at a specific time, information that is known to potential buyers, who wait along the route (Bulgarian National Focal Point on Drugs and Drug Addictions 2009).

### ***Reasons for buying at a specific location***

Respondents who usually buy their cannabis were asked what the main reason was for buying at that specific location. Table 4.3 summarizes these reasons for each country. The statistical analysis revealed only a significant difference between user in the Netherlands, but in most countries the number of users per cell was insufficient to test for differences.

There were peculiar differences between countries. Personal contacts seem to play an important role in Portugal (63%) and the Czech Republic (56%) and to a lesser extent also in other countries (32% to 46%), except for the Netherlands (6%). This is perhaps logically given the presence of coffee shops, which does not make informal networks necessary. In the Netherlands,

the significant differences between user groups merely pointed at the greater role of habits among intensive users (34%) compared to chippers (19%), and the greater importance of local availability for chippers (60%) compared to intensive users (32%), with the other use groups being somewhere in between.

The risk of police detection as main reason to buy at a specific location was highest in Bulgaria and Sweden (16% in both countries) and lowest in the Netherlands (2%). The proportion of respondents mentioning price varied from about 3% in Sweden and England & Wales to 11% in Bulgaria.

**Table 4.3: Main reason for buying at a specific location by country**

	BG	CZ	IT	NL	PT	SE	E&W
Local availability	23.3%	16.8%	29.5%	45.0%	6.5%	22.0%	27.3%
Price	11.0%	9.0%	3.9%	7.5%	6.5%	3.4%	3.3%
Opening hour	4.1%	1.3%	.9%	1.5%	.0%	.4%	.7%
Personal contacts	31.5%	56.1%	38.9%	6.1%	62.9%	46.1%	46.0%
Habits	4.1%	7.1%	9.7%	28.3%	8.1%	4.1%	1.3%
Risk of police detection	16.4%	4.5%	11.9%	1.6%	9.7%	15.7%	10.7%
Other	9.6%	5.2%	5.1%	10.0%	6.5%	8.2%	10.7%

### ***c. Availability of other drugs at the location where cannabis is usually purchased***

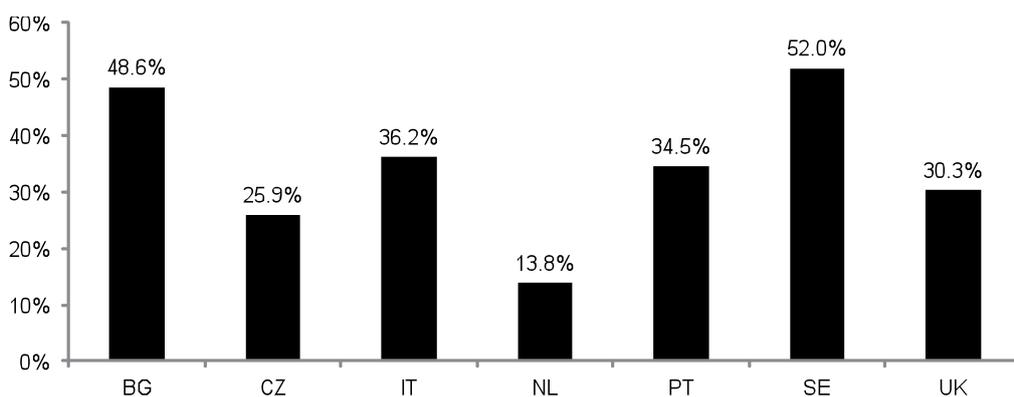
Figure 4.1 shows the percentage of respondents in each country who indicated that there were other drugs (excluding alcohol and tobacco) available at the locations where they usually buy their cannabis. Insofar the numbers of respondents allowed an analysis by user group, the results did not reveal significant differences.

Percentages cannabis users who indicate that other drugs are available vary from 14% in the Netherlands up to 49% in Bulgaria and 52% in Sweden. The relatively low figure for the Netherlands (14%) is consistent with the fact that most cannabis users in the Netherlands buy their cannabis in coffee shops, where the sale of other drugs is strictly forbidden. If the statistical analyses are restricted to those who mainly buy in coffee shops, this percentage further drops to 9%. Nonetheless, also in several other countries which do not officially pursue a separation of markets policy, the majority of users of cannabis are apparently not exposed to other (illicit) drugs when purchasing their cannabis.

In the Czech Republic, the increasing commercialization of the cannabis market in the past decade, due to increased demand and reduction of home growing, seems to have led to an intermingling of the 'hard' and 'soft' drugs markets (Miovsky 2007). Nonetheless, these figures suggest that this would only pertain to a quarter of the cannabis users. As they only refer to those who usually buy their cannabis, not those who grow it, the overall population of cannabis users may be even lower, especially in countries where growing is more common.

These data suggest that in most countries, the cannabis market at retail level seems to be quite 'specialized', albeit to different degrees.

**Figure 4.1: Proportion of users who indicate that other drugs are available at the location where they usually purchase cannabis**



***d. Amount usually bought per purchase and price paid for it***

During the preparation of the study it appeared that cannabis users often do not know precisely how much (grams) of cannabis they typically buy. Therefore, photo cards were used, which depicted four amounts of marihuana and hash (A. 0.5 gram, B. 1 gram, C. 2 gram and D. 5 gram). They were similar to those in chapter 3.4 but showed different amounts. Respondents could choose between nine answer categories: less than 0.5 gram, 0.5 gram, between 0.5 gram and 1 gram, 1 gram, between 1 and 2 gram, 2 gram, between 2 and 5 gram, 5 gram and more than 5 gram. For comparing means, the category 'less than 0.5 gram' was coded to 0.25 gram and 'more than 5 gram' was set at 7 gram. Midpoint values were used for the other intermediate categories. Note that we do not have any information on the reliability and validity of this method. It was, however, the most feasible option to apply in a web survey in countries with widely varying market situations. Respondents who consumed both hash and marihuana were assigned to the type they bought in the greatest amounts.

The results suggest that overall the amounts usually bought progressively increased from 2.2 gram on average for chippers to 4.0 gram on average for intensive users ( $F=24.2$ ,  $P=.0001$ ). All differences between pairs of groups were significant in post-hoc analyses). There were, however, differences between countries. Average amounts among chippers were lowest in Bulgaria (1.3 gram), the Netherlands (1.6 gram) and the Czech Republic (1.8 gram) and were highest in Sweden (3.5 gram). Among intensive users averages amounts usually purchased varied between 2.0 gram in Bulgaria to 5.0 gram in Sweden and 5.3 gram in Portugal.

Table 4.4 shows that differences between user groups did not reach the required (agreed) significance level in Bulgaria, the Czech Republic and Portugal. This might be related to the small(er) number of respondents per user group in these countries, which in fact did not allow a proper subgroup analysis.

In their insight on the cannabis markets, the EMCDDA reported that the majority of the buyers in the United Kingdom would seem to purchase, on average, up to 4 grams (Carpentier et al. 2012), which seems to be consistent with data from the current web survey. For the Czech Republic, the most common practice have been reported to be purchases of one gram or less, with a maximum of two grams. This seems to be slight lower compared to the current web survey, although the medians are more in line with these other data.

Table 4.4: Mean and median amount of cannabis usually bought per purchase

		Chipper	Occasional	Regular	Intensive	Total	P
Bulgaria	Mean	1.3	(3.6)	1.3	2.0	1.6	.036
	Median	1.0	(2.0)	1.0	1.0	1.0	
	N	18	5	29	11	63	
Czech Republic	Mean	1.8	2.7	1.7	2.9	2.4	.019
	Median	1.0	1.0	1.0	2.0	1.0	
	N	12	20	51	62	145	
Italy	Mean	2.7	2.6	3.8	4.7	4.0	.000
	Median	2.0	2.0	3.5	5.0	3.5	
	N	32	63	210	207	512	
Netherlands	Mean	1.6	1.7	2.4	3.1	2.2	.000
	Median	1.0	1.0	2.0	2.0	1.5	
	N	186	125	182	187	680	
Portugal	Mean	(2.8)	(3.1)	4.3	5.3	4.3	.029
	Median	(2.5)	(2.0)	5.0	5.0	5.0	
	N	8	7	19	23	57	
Sweden	Mean	3.5	4.1	4.8	5.0	4.4	.000
	Median	3.5	5.0	5.0	5.0	5.0	
	N	81	117	173	69	440	
England & Wales	Mean	2.3	3.1	3.7	4.7	3.7	.000
	Median	1.3	3.5	3.5	5.0	3.5	
	N	16	33	43	50	142	
All countries	Mean	2.2	2.8	3.4	4.0	3.3	.000
	Median	1.5	2.0	3.5	3.5	3.5	
	N	353	370	707	609	2,039	

Respondents were also asked how much they usually paid for this purchase. For non-Euro countries (Bulgaria, the Czech Republic, Sweden and England & Wales) the national currencies were converted to Euro's using currency exchange rates of March 31 2012 ([www.xe.com](http://www.xe.com)).

Fifty-seven respondents (2.9%) indicated to pay usually over €125 per purchase: 31 in Italy, 8 in the Netherlands, 1 in Portugal, 13 in Sweden and 4 in England & Wales. As it is likely that they were not consumers and probably also bought much more than the maximum allowed amount of 7 gram per purchase, they were considered as outliers and excluded from the analyses. (NB: For the Netherlands, some of these respondents indicated to be owners of coffee shops).

There were major overall differences between countries. Table 4.5 shows that the highest amounts of money spent per purchase were reported in Sweden (between €40 and €53 per transaction) and the lowest in Bulgaria (around €7 to €15).

Overall, chippers (who indicated to usually buy their cannabis instead of getting it) spent on average €20 per purchase, occasional users €27 and regular and intensive users both €31. Analyses for individual countries revealed a less clear pattern for the user groups, except for the Netherlands, where regular and intensive users spent less on buying cannabis than both intensive and occasional users. In Italy regular and intensive users paid less per purchase than occasional users. In Sweden only chippers and regulars users differed significantly. In England & Wales, only intensive users bought significantly more cannabis at a time compared to chippers. In the other countries, differences between user groups were not significant, but again, note the occasionally small number of respondents in some user groups.

Price and amount of cannabis usually purchased were significantly correlated ( $r=0.64$ ,  $P=.0001$  in the total sample). Correlations varied between .57 ( $P=.0001$ ) in Sweden and .69 ( $P=.0001$ ) in England & Wales, except for Portugal ( $r=.27$ , ns).

**Table 4.5: Mean and median prices (€) paid per cannabis purchase**

		Chipper	Occasional	Regular	Intensive	Total	P
<b>Bulgaria</b>	<b>Mean</b>	<b>7.3</b>	<b>14.5</b>	<b>11.5</b>	<b>14.4</b>	<b>11.2</b>	<b>.149</b>
	Median	5.1	15.3	10.2	10.2	10.2	
	N	15	5	28	11	59	
<b>Czech Republic</b>	<b>Mean</b>	<b>20.0</b>	<b>16.8</b>	<b>12.1</b>	<b>17.8</b>	<b>15.8</b>	<b>.372</b>
	Median	8.0	8.0	8.0	8.0	8.0	
	N	12	20	51	62	145	
<b>Italy</b>	<b>Mean</b>	<b>23.5</b>	<b>20.7</b>	<b>31.5</b>	<b>36.6</b>	<b>31.5</b>	<b>.000</b>
	Median	15.0	15.0	20.0	30.0	20.0	
	N	31	63	198	183	475	
<b>Netherlands</b>	<b>Mean</b>	<b>10.9</b>	<b>12.3</b>	<b>16.0</b>	<b>20.3</b>	<b>15.3</b>	<b>.000</b>
	Median	10.0	10.0	15.0	15.0	10.0	
	N	158	118	176	177	629	
<b>Portugal</b>	<b>Mean</b>	<b>15.8</b>	<b>10.8</b>	<b>21.5</b>	<b>31.0</b>	<b>23.5</b>	<b>.168</b>
	Median	17.5	10.0	20.0	20.0	15.0	
	N	6	6	17	21	50	
<b>Sweden</b>	<b>Mean</b>	<b>40.7</b>	<b>47.9</b>	<b>53.0</b>	<b>47.0</b>	<b>48.4</b>	<b>.001</b>
	Median	49.5	55.0	55.0	55.0	55.0	
	N	81	114	165	63	423	
<b>England &amp; Wales</b>	<b>Mean</b>	<b>17.8</b>	<b>31.4</b>	<b>39.1</b>	<b>44.9</b>	<b>36.8</b>	<b>.007</b>
	Median	18.0	24.0	24.0	30.0	24.0	
	N	15	33	43	45	136	
<b>All countries</b>	<b>Mean</b>	<b>20.3</b>	<b>27.1</b>	<b>30.6</b>	<b>30.6</b>	<b>28.2</b>	<b>.000</b>
	Median	10.2	16.5	20.0	20.0	20.0	
	N	318	359	678	562	1917	

**e. Estimated price per gram**

Now we have estimated how many grams respondents usually buy per purchase and how much they pay for it, we may try to estimate the prices per gram. We will do this separately for hash and marihuana, as prices for both cannabis types may differ. Although we have asked for more detailed information on the types of hashish or marihuana (e.g. locally or domestically grown or imported) quite some users did not know which type they usually consumed, or the answers were not deemed reliable (i.e. inconsistent with other sources). In the analysis, prices per gram over €70 (0.4%) were excluded from the analysis. They were likely due to imprecision in estimates (erroneous answers, suggesting mistakes in decimals).

Table 4.6 shows that mean prices per gram marihuana varied from €7.6 in the Czech Republic to €13.3 in Sweden. Prices per gram of hash varied from a low €6.0 in Portugal to €14.4 in the Czech Republic, but note that median values are much lower in these countries (table 4.7).

Differences between user groups were not significant for hash. When analyzed per country, a significant difference in marihuana price between user groups was found in the Netherlands ( $P=.004$ ), indicating that prices per gram were lower for regular and intensive users (€7.8 for both groups) compared to occasional users and chippers (€9.3 and €9.6, respectively). The marginally significant differences in Italy ( $P=.034$ ) and Sweden ( $P=.019$ ) also suggested decreasing marihuana prices from chippers to intensive users (€13.9, €12.4, €12.3 and €9.9 per gram for Italy; €14.8, €13.8, €12.1 and €10.5 per gram for Sweden). This would be consistent with the fact that drugs bought in larger quantities are cheaper, thus lowering the price per gram (bulk discounts).

Table 4.6: Price per gram marihuana from different sources at retail level

Country		Other sources (EMCDDA)			This study		
		N	Mean	Median	N	Mean	Median
Bulgaria		24	7.0	7.0	59	10.7	10.2
Czech Republic		269	7.8	7.9	143	7.6	8.0
Italy		:	8.5	:	468	11.6	10.0
Netherlands	Imported	14	5.9	:	556	8.5	7.5
	Dutch	58	9.3				
Portugal*		:	:	:	47	11.4	10.0
Sweden		42	10.9	10.5	403	13.3	13.2
England & Wales	total	:	3.3	:	135	12.1	12.0
	skunk		6.7				

\* The data may not be fully representative for retail level.

Source: EMCDDA 2012b; Niesink and Rigter 2012.

Table 4.7: Price per gram hash from different sources at retail level

Country	Other sources (EMCDDA)			This study		
	N	Mean	Median	N	Mean	Median
Bulgaria	:	11.5	12.5	9	10.5	5.1
Czech Republic	7	8.6	9.9	80	14.4	8.0
Italy	:	11.2	:	421	9.9	7.1
Netherlands	57	9.7	:	394	9.7	8.3
Portugal*	:	3.6	:	41	6.0	2.9
Sweden	42	9.7	10.0	347	12.8	11.0
England & Wales	:	3.3	:		10.4	12.0

\* The data may not be fully representative for retail level.

Source: EMCDDA 2012b; Niesink and Rigter 2012.

Tables 4.6 and 4.7 also give the prices at retail level reported by different sources to the EMCDDA (EMCDDA 2012b). Note that the figures are for 2010, except for the Netherlands, where the latest figures for January 2012 have been presented. Prices may have changed in the past years.

There are both similarities and changes from the prices in the web survey. While most price data, regardless of the source, show considerable ranges, it must be reminded that the way prices have been calculated in the web survey may include different estimation errors (e.g. estimating amounts on the basis of photo cards, neglect of price differences between types of marihuana or types of hash).

In Bulgaria, prices have also been reported for marihuana from Dutch origin: a mean of €12 per gram and median of €12.5. It is not known, however, what the share of Dutch marihuana is in the Bulgarian market. Prices on the basis of the web survey are consistent for hash but higher for marihuana.

For the Czech Republic prices for marihuana from both sources seem to match. The number of samples for hash reported by the EMCDDA is too small to allow a comparison.

In a study collecting cannabis samples annually from Dutch coffee shops, the mean price per gram of Dutch marihuana (most popular) and imported hash, the two most common cannabis types in the Netherlands, were €8.1 and €9.1, respectively in January 2010, and €9.3 and €9.7, respectively in January 2012 (Niesink and Rigter 2012). These prices fit well with those found in the web survey. The slightly lower price for marihuana might be due to the fact that a minority of users may consume imported marihuana, which is much cheaper.

For Italy and England & Wales marijuana prices are also higher in the web survey. For Italy, price data collected in 2011 among 12 cities by local police squads revealed a price range for one gram marijuana from €7.2 and €9.4, which seems indeed to be lower compared to the web survey (Ministry of Interiors – Central Directorate for Antidrug Services). The price for one gram hash varied between €8.3 and €11.5, which seems to correspond with the web survey estimates.

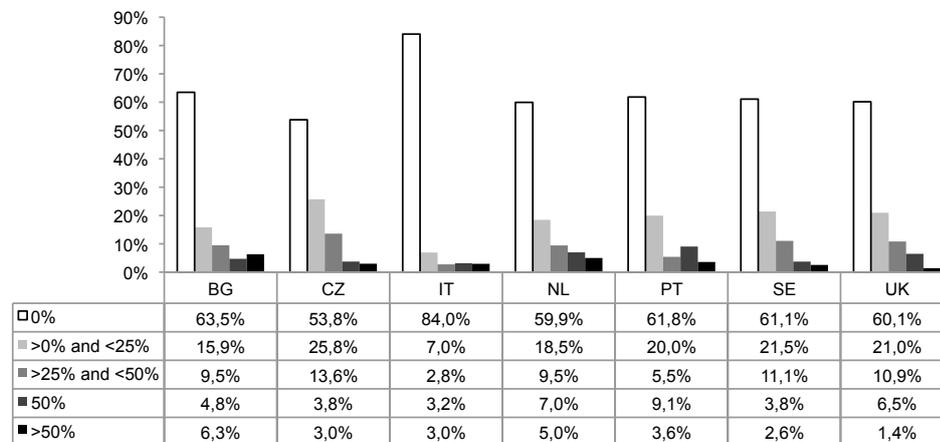
**f. Buying for someone else**

Quite a number of cannabis users (on average 47%) had also bought cannabis in the past 12 months for someone else, with fairly small differences between countries (43%-54%). Overall, intensive and regular users had more often bought cannabis for others (55% and 56%) than occasional users (39%) and chippers (25%). Moreover, in the past year, intensive users had bought cannabis on average for 16.3 persons, regular users for 9.2 persons, occasional users for 6.4 persons and chippers for 3.4 other persons. Differences between all user groups were significant, except for chippers and occasional users.

We have also asked users why they bought cannabis for someone else. The most frequently cited reason was “somebody asked me a favour” (67%). This proportion varied between countries from 57% in England & Wales to 81% in the Czech Republic. At a distance, “convenience” ranked as second most frequent reason with proportions varying from 5% in the Czech Republic to 21% in the Netherlands and 24% in England & Wales. “To cover my costs of my cannabis” was mentioned overall by 7%, but higher proportions were mentioned in Bulgaria (16%), Italy (11%) and Czech Republic (8%). To earn extra money was mentioned by between 2% (Netherlands) to 11% (Italy) of the users.

Apparently, part of the cannabis users do not consume all the cannabis they purchase themselves. Figure 4.2 depicts how many cannabis respondents who usually buy their cannabis usually give away or sell to others. The proportion cannabis users who seem to keep all the cannabis they buy themselves varies from 54% in the Czech Republic to 84% in Italy. Between 7% (Italy) and 26% (the Czech Republic) give or sell less than 25%. Proportions of users who give or sell more than half of their purchase are relatively low.

**Figure 4.2: Proportion of cannabis usually sold or given away and country\***



\* Percentage of users according to the proportion of cannabis sold or given away.

**g. Buying in the past 30 days: number of times and amount of money spent**

Of those respondents who usually buy their cannabis, 78% had also done this in the past 30 days (figure 4.3). This proportion was highest for intensive and regular users (95% and 87%, respectively), followed by occasional users (67%), and chippers (43%). Nine percent of the intensive users bought cannabis (almost) daily, and the large majority seems to buy cannabis at least weekly. Among those who had bought cannabis at least once in the past month, the average number of purchases increased from 1.8 among chippers to 8.9 among intensive users (see annex 1, table A15 for country data).

**Figure 4.3: Number of purchases of cannabis in the past 30 days by user group**

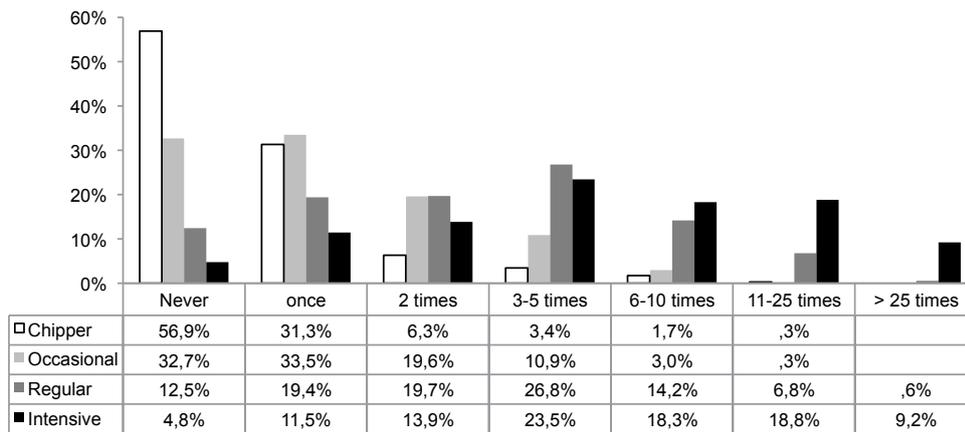


Table 4.8 gives the mean and median amount of money spent in the past 30 days. Note that in Portugal and Bulgaria the number of users per user group, especially the chippers and occasional users, is very small.

For the entire sample, the amount of money spent per month doubles from chippers and occasional to regular users and then again to intensive users. The difference between occasional users and chippers was not significant.

In most countries and user groups, the means are (much) higher than the medians suggesting a skewed distribution with outlying values. In the total sample 99% of the expenditures fell within a range of 1 to 400 Euro. One percent fell between 400 and 600 Euro.

There were notable differences between countries. Swedish cannabis users spent overall the highest amounts of money to buy cannabis and users from Bulgaria, the Czech Republic and Portugal the lowest amounts.

**Table 4.8: Mean and median amount of money (€) spent in the past 30 days by user group and country\***

		Chipper	Occasional	Regular	Intensive
<b>Bulgaria</b>	<b>Mean</b>	<b>15.7</b>	<b>13.6</b>	<b>33.7</b>	<b>71.9</b>
	Median	10.2	15.3	28.1	76.5
	N	8	3	26	10
<b>Czech Republic</b>	<b>Mean</b>	<b>16.3</b>	<b>20.8</b>	<b>37.9</b>	<b>72.6</b>
	Median	10.0	16.0	28.0	60.0
	N	6	12	46	57
<b>Italy</b>	<b>Mean</b>	<b>70.4</b>	<b>30.2</b>	<b>77.4</b>	<b>132.5</b>
	Median	20.0	20.0	50.0	100.0
	N	13	44	186	189
<b>Netherlands</b>	<b>Mean</b>	<b>16.0</b>	<b>21.0</b>	<b>56.9</b>	<b>141.2</b>
	Median	10.0	15.0	40.0	125.0
	N	80	95	161	169
<b>Portugal</b>	<b>Mean</b>	<b>8.3</b>	<b>8.3</b>	<b>36.3</b>	<b>80.8</b>
	Median	5.0	10.0	40.0	62.5
	N	3	3	16	20
<b>Sweden</b>	<b>Mean</b>	<b>57.9</b>	<b>75.1</b>	<b>116.8</b>	<b>185.0</b>
	Median	44.0	55.0	88.0	165.0
	N	34	68	135	63
<b>England &amp; Wales</b>	<b>Mean</b>	<b>25.2</b>	<b>48.0</b>	<b>87.6</b>	<b>145.2</b>
	Median	24.0	24.0	60.0	120.0
	N	6	22	34	48
<b>All countries</b>	<b>Mean</b>	<b>30.9</b>	<b>39.9</b>	<b>75.4</b>	<b>132.7</b>
	Median	15.0	24.0	50.0	100.0
	N	150	247	604	556

\*Among those who had bought cannabis at least once in the past 30 days.

#### ***h. Ease of obtaining cannabis and inability to buy***

Indicators of the ease of obtaining cannabis included the estimated time respondents needed to obtain the cannabis they usually purchased, the ease to obtain cannabis within 24 hours and whether they sometimes wanted to buy cannabis but were not able to do so.

Table 4.9 shows that the proportion of cannabis users who estimated to obtain their cannabis within half an hour is by far highest in the Netherlands (71%), at some distance followed by the Czech Republic (44%), and was lowest in Sweden (22%), Italy (27%) and Portugal (28%). The proportion of users it may take more than two hours to obtain their cannabis varied from 5% in the Netherlands and 17% in the Czech Republic to between 30% and 40% in the other countries.

While population density and country size may probably play a role in these statistics, the presence of coffee shops in the Netherlands where most cannabis users indicated to buy their cannabis will probably explain differences between the Netherlands and other countries. Note, however, that this survey was conducted just before certain policy measures were implemented in the Netherlands (see chapter 1), which might have had an impact on these variables.

Differences between user groups were significant in Bulgaria and Italy, but note that the number of users per cell was often too low to conduct subgroup analyses. In Bulgaria the proportion of intensive users who needed less than half an hour to obtain their cannabis was higher (58%, n=7) compared to chippers (18%, n=4). In Italy a similar pattern was found (%, n=74 against 21%, n=7); moreover, the proportion chippers who estimated it might take them more than 24 hours to get their cannabis was higher compared to intensive users (30%, n=10 against 12%, n=26).

**Table 4.9: Estimated time needed to buy the amount of cannabis usually purchased**

	BG	CZ	IT	NL	PT	SE	E&W	All
<b>Less than half an hour</b>	34.3%	43.5%	26.7%	70.9%	28.3%	22.4%	27.9%	42.2%
<b>0,5-1 hour</b>	30.0%	30.5%	22.0%	19.1%	21.7%	23.3%	19.7%	22.0%
<b>1-2 hours</b>	5.7%	9.1%	11.7%	5.1%	11.7%	19.8%	22.4%	11.6%
<b>Between 2 and 12 hours</b>	14.3%	9.7%	9.8%	2.8%	5.0%	16.3%	9.5%	8.8%
<b>Between 12 and 24 hours</b>	2.9%	3.9%	13.0%	.6%	8.3%	5.4%	3.4%	5.4%
<b>More than 24 hours</b>	12.9%	3.2%	16.9%	1.5%	25.0%	12.8%	17.0%	10.0%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4.10 shows that the proportion of users who indicate that cannabis is very easy to obtain within 24 hours, is highest in the Netherlands (82%). This finding is consistent with the previously mentioned data. In other countries the proportion 'very easy' varies from about 32% in Italy and Portugal to 57% in the Czech Republic. One in five users in Italy indicates that it is fairly or very difficult to obtain cannabis within 24 hours.

As expected the amount of time to obtain cannabis and ease to obtain cannabis were significantly correlated ( $r=-.057$ ,  $p<.000$ ).

In virtually all countries, the proportion of respondents indicating that it was very easy to obtain cannabis was obviously higher among intensive users compared to less frequent users, except for the Netherlands, where cannabis was very easy available for the majority of all user types.

**Table 4.10: Proportion of cannabis users indicating how easy or difficult it is to obtain cannabis within 24 hours**

	BG	CZ	IT	NL	PT	SE	E&W	All
<b>Very difficult</b>	.6%	.0%	5.9%	.4%	5.6%	4.3%	3.9%	3.0%
<b>Fairly difficult</b>	8.3%	5.0%	15.3%	1.4%	9.5%	10.6%	12.0%	8.6%
<b>Fairly easy</b>	26.8%	34.0%	38.3%	13.7%	41.3%	33.9%	38.2%	29.8%
<b>Very easy</b>	54.1%	56.8%	31.8%	81.8%	32.5%	46.9%	41.6%	53.0%
<b>Don't know</b>	10.2%	4.3%	8.7%	2.7%	11.1%	4.3%	4.3%	5.6%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

### **Unable to buy**

There were similarly great variations between users in the different countries who indicated that they had cash but were now and then unable to buy cannabis in the past 12 months. The lowest proportion was found in the Netherlands (18%) and the highest in Italy (78%).

Significant differences between user groups were found in Italy, the Netherlands and Sweden. In Italy the proportion of users who had now and then problems in obtaining cannabis ranged from 55% among chippers to 75% among intensive users. This finding probably relates to the lower frequency of buying cannabis among chippers. In the Netherlands this proportion varied from 5% among chippers and 9% among occasional users to 28% among regular and 29% among intensive users. In Sweden a less clear pattern was found: 42% among chippers, 60% among occasional users, 66% among regular users and 56% among intensive users.

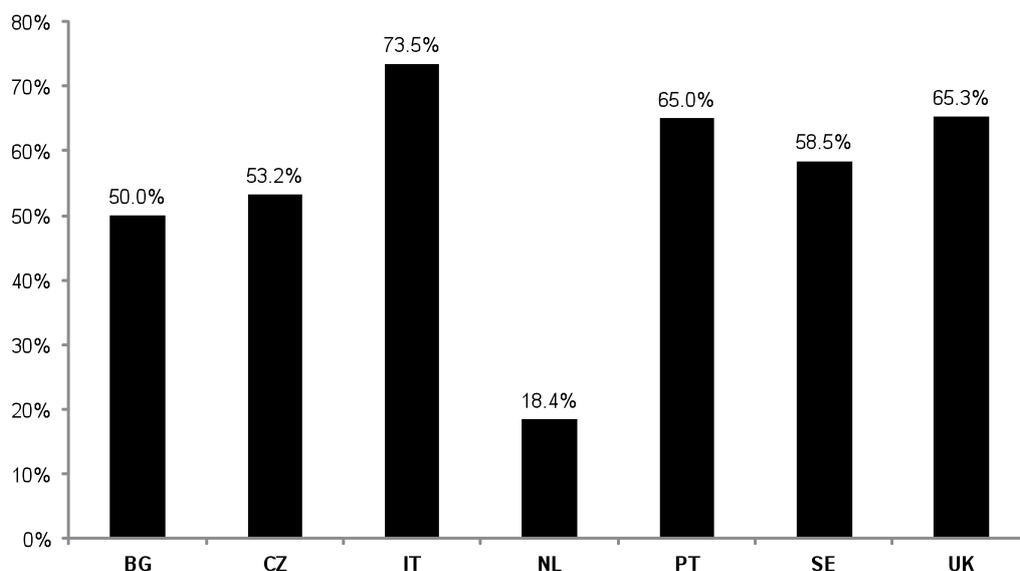
**Figure 4.4: Proportion cannabis users who indicated that there were times they had cash but were not able to purchase cannabis in the past 12 months**

Table 4.11 shows the main reasons for not being able to buy cannabis while having money available. Only a select group of users have answered this question, i.e. only those who usually buy their cannabis and who had times they were unable to acquire the drug. The most commonly cited reasons were that no sellers were available or that sellers did not have any cannabis. Quality played a role for 10% to 14% of the users in all countries, with lower proportions reported in Bulgaria and the Netherlands. Police activities and too high prices were relatively infrequently mentioned reasons.

In the Netherlands, the largest category comprised 'other reasons', including items like 'shops closed', 'no transportation' or 'personal (health) problems'.

**Table 4.11: Reasons for not being able to buy cannabis**

	BG	CZ	IT	NL	PT	SE	E&W	Total
<b>No sellers were available</b>	60.0%	41.5%	29.9%	30.3%	17.9%	40.9%	33.3%	34.6%
<b>Sellers did not have any</b>	14.3%	39.0%	39.6%	6.8%	43.6%	36.1%	45.8%	34.4%
<b>Sellers did not have the quality I wanted</b>	8.6%	12.2%	13.8%	4.5%	12.8%	10.4%	10.4%	11.1%
<b>Sellers were charging too much</b>	8.6%	2.4%	3.3%	.8%	7.7%	2.2%	2.1%	2.9%
<b>Police activity kept me from the sellers</b>	2.9%	2.4%	4.1%	2.3%	.0%	.7%	2.1%	2.5%
<b>Don't know</b>	2.9%	1.2%	4.1%	9.1%	7.7%	1.9%	1.0%	3.7%
<b>Other</b>	2.9%	1.2%	5.1%	46.2%	10.3%	7.8%	5.2%	10.8%
<b>Number</b>	35	82	391	132	39	269	96	1,044
	100%	100%	100%	100%	100%	100%	100%	100%

#### ***i. Comparing methods of estimating consumption in the past month***

In chapter 3.4.f we have estimated the amount of cannabis consumed in the past 12 months by multiplying the number of units usually consumed with the amount of cannabis usually put in a unit and the average number of use days. We can also do this for the consumption of cannabis in the past 30 days or month.

Another method of estimating the amount of cannabis consumed is by dividing the total amount of money spent in the past 30 days by the estimated usual cost per gram of cannabis. As not all cannabis bought in the past month is consumed by the buyer himself, we have to take the proportion of cannabis usually sold or given away into account.

Note that this comparison can only be done for those who have bought cannabis at least once in the past month and have used cannabis in the past month. This is therefore a fairly selective group of users, especially as it concerns the less frequent user groups (chippers and occasional users). Therefore a differentiation into user groups is not useful and in fact not necessary as the main focus is on investigating the degree of concordance between measures.

Table 4.12 shows the mean and median values using both estimation methods. Averages and medians are fairly similar. However, there were some more extreme values under the second method; 0.7% of the cases estimated under the second method concerned amounts higher than 140 gram in the past month, and 90% fell below 25 gram. Under the first method 0.4% concerned cases above 90 grams, and 90% of the values fell below 32 gram.

However, both measures were only weakly correlated in the entire sample ( $r=.28$ ,  $P=.000$  for all units;  $r=.29$ ,  $P=.000$  for joints only). There are many uncertainties and possible sources of error, e.g. when estimating amounts from photo cards, or estimating prices of usual amounts bought and from there estimating prices per gram, and when estimating usual proportions of cannabis sold or given away (with fairly broad answer categories). This is probably the reason why correlations are better when only the amount of money spent in the past 30 days is correlated with the amount consumed based on the number of use days and grams per day ( $r=.52$ ,  $P=.000$ ).

There are, however, differences between countries in the consistency between estimation methods (see annex 1, table A16). Correlations between both consumption measures varied from .23 in Sweden to .51 in Portugal and .55 in the Netherlands. In the Czech Republic correlations increased from .31 to .43 when only joints were taken into account. Means and medians do not show a consistent pattern in that one or other method systematically overestimates or underestimates the amount consumed.

As indicated before, correlations were higher for the amount of cannabis consumed (gram/use days and the amount of money spent in the past 30 days, with Pearson's  $r$  ranging from between .47 in Bulgaria to .55 in England & Wales and Sweden, to .59 in Portugal and .69 in the Netherlands. Moreover, if only joints were taken into account correlations increased in the Czech Republic from .43 to .71 (all significant at .002 or higher).

**Table 4.12: Estimates of the amount of cannabis consumed (gram) in the past 30 days using different methods and for all units together and joints separately**

	All units		Joints	
	Amount of cannabis (gram) based on number of use days and daily amount*	Amount of cannabis (gram) based on money spent and price per gram**	Amount of cannabis (gram) based on number of use days and daily amount*	Amount of cannabis (gram) based on money spent and price per gram**
Mean	11.99	12.45	11.80	12.77
Median	4.80	5.00	4.80	5.25
Std. Deviation	16.99	29.42	16.43	29.89
Minimum	.03	.00	.03	.00
Maximum	129.69	560.00	129.69	560.00
N	1,307	1,307	1,127	1,127

\* Grams per typical use day (amount per unit x number of units) \* number of use days in past 30 days.

\*\*Grams bought in past 30 days\*(100-percent usually sold or given away)/100.

## 4.1 Conclusions

Similar to the findings on user characteristics and consumption patterns, differences between user groups were found with regard to availability indicators. However, differences between countries feature more prominently than differences between user groups.

In general, the proportion of users who buy their cannabis instead of employing other modes to acquire the drug was highest among regular and intensive users and was lowest among chippers, who most often get cannabis from others (including sharing). Growing cannabis was mentioned between 15% to over 21% of the intensive users in five countries, but hardly

played a role as primary way to obtain cannabis among less frequent users.

Of those users who usually buy their cannabis, the amount of cannabis bought per purchase increased from chippers to intensive users, as did the frequency of buying and amount of money spent on cannabis purchases in the past month. Intensive users also more commonly bought cannabis for others, and more often indicated that it was very easy to obtain the drug, compared to less frequent users.

In addition to these common trends across user groups, there were many more remarkable differences between countries on availability indicators.

- Growing cannabis as the dominant way of obtaining cannabis among intensive users was lowest in the Netherlands (5%) and England & Wales (9%) and highest in the Czech Republic (21%), Italy (19%) and Sweden (18%). Yet, only in the Czech Republic growing seems to play a role in all user groups (10%), suggesting that it is more widespread than elsewhere.
- Locations of purchase: Coffee shops were mentioned as the main location of buying cannabis for the vast majority of users in the Netherlands (87%), while buying on the street or in a park was mentioned by over half of the users in Bulgaria (58%), and by between 20% to 34% in Italy, Sweden, Portugal and England & Wales. Buying at a seller's home was a relevant source especially in the Czech Republic (45%) and for between 21% and 36% in the other countries, except for Bulgaria (10%) and the Netherlands (3%).
- Reasons to buy at a specific location: Personal contacts played a role in all countries (32% up to 63% of the users), except for the Netherlands (6%), where local availability and habits were mentioned relatively often. Risk of police detection as the main reason to buy at a certain location was most often mentioned in Bulgaria and Sweden (16%)
- Availability of other drugs: Excluding the Netherlands, between 26% (the Czech Republic) and 52% (Sweden%) of the cannabis users indicated that other drugs were available at the location where they usually bought cannabis. The relatively low proportion in the Netherlands (14% overall, 9% for those who buy in coffee shops), is likely to reflect the policy of separation of the cannabis and hard drugs markets, but figures in other countries also suggest that cannabis markets at retail level seem to be specialized, albeit to different degrees.
- Amounts bought and prices: Among intensive users, the amount of cannabis bought per purchase was lowest in Bulgaria and highest in Italy, Portugal, Sweden and England & Wales, and prices paid for it were lowest in Bulgaria and highest in Sweden.
- Money spent on cannabis: In the past 30 days, Swedish cannabis users spent by far the greatest amount of money on buying cannabis (on average €185 by intensive users), while cannabis users in Bulgaria, Czech Republic and Portugal spent the lowest amount (e.g. on average €72, €73 and €81, respectively, for intensive users).
- Time and ease to obtain cannabis: The proportion of cannabis users estimating that they would be able to buy their usual amount of cannabis within half an hour was highest in the Netherlands (71%) and varied between 22% (Sweden) and 44% (the Czech Republic) in the other countries. In all countries, the majority of the users indicated that it is easy or very easy to obtain cannabis, but in the Netherlands the qualification "very easy" peaked among users (82%), against about 32% (Italy and Portugal) up to 57% (the Czech Republic) in other countries. Ratings of the 'ease' of obtaining cannabis were correlated with the times needed to obtain it. Note that these findings may be associated with the size of a country and population density, and differences in urbanicity between sample respondents.
- Unable to buy. The proportion of users who was now and then unable to buy cannabis in the past 12 months varied from 18% in the Netherlands up to 78% in Italy. The lack of available sellers or sellers who had no cannabis available were the most frequently cited explanations.

## 5 Estimating annual cannabis consumption

### 5.1 Methodology

In chapter 3 we have presented estimates on the amount of cannabis (gram) consumed annually per user group and country. These data have to be multiplied with the number of users per user group to arrive at a final estimate of the amount of cannabis consumed annually in a country.

In order to estimate the number of users per user group we have to match prevalence data from population surveys with the classification of user types in the current study. This is not as straightforward as it looks.

From most population surveys we can quantify the following categories:

- a. the total number of last year users
- b. the number of last year users who did not use in the last month
- c. the total number of last month users
- d. the number of last month users per frequency category

Using data from Eurostat on the size of the population (2011) and prevalence data from population surveys (see tables 5.1 and 5.2), we can calculate the numbers of last year (category a) and last month (category c) cannabis users. The differences in numbers between both tables belong to category c. Moreover, the Czech Republic, Portugal, Netherlands and England & Wales have applied the frequency categories from the EMCDDA (1-3, 4-9, 10-19, 20+ days), which can be used to estimate category d. For Bulgaria, slightly different ranges have been used, while for Italy estimates of users groups are based on an indirect estimation method (see later). For Sweden frequency data are not available but data from Norway and Finland will be used as a proxy measures. Note that data collection years for the population surveys range from 2007 (Portugal) to 2010/2011 (England & Wales).

Table 5.1: Population size by country and age group (2011)

Country	15-24 years	15-34 years	15-64 years
Bulgaria	891,814	1,985,033	5,141,057
Czech Republic	1,274,659	2,917,541	7,378,802
Italy	6,069,233	13,602,678	39,811,683
Netherlands	2,041,473	4,047,775	11,153,778
Portugal	1,162,855	2,696,370	7,097,788
Sweden <sup>I</sup>	1,250,621	2,414,413	6,113,365
England & Wales	8,207,481	16,443,133	41,177,537

I. 16-24 years (1,140,549), 16-34 years (2,304,341), 16-64 years (6,003,293).

Source: Eurostat (2011)

Table 5.2: Number of last year cannabis users by country and age

Country	Year of survey	Age <sup>I</sup>		
		15-24	15-34	15-64
Bulgaria	2008	77,588	119,102	138,809
Czech Republic	2008	475,448	828,582	1,128,957
Italy <sup>II</sup>	2008	1,353,439	2,761,344	5,693,071
Netherlands	2009	328,677	554,545	780,764
Portugal	2007	76,748	180,657	255,520
Sweden <sup>I</sup>	2010	91,295	149,694	171,174
England & Wales	2010/2011	1,403,479	2,055,392	2,800,073

I. Age limits in England & Wales 16 – 59 and in Sweden 16-64. II. Low response rate (32%); figures should be interpreted with caution.

Indirect estimates on the number of cannabis users are applied in calculations on annual consumption.

Sources: EMCDDA, Statistical Bulletin 2012; National Reports of Focal Points; contact persons of the sample countries; Eurostat.

**Table 5.3: Number of last month cannabis users by country and age**

Country	Year of survey	Age <sup>I</sup>		
		15-24	15-34	15-64
Bulgaria	2008	43,699	61,536	71,975
Czech Republic	2008	285,524	487,229	634,577
Italy <sup>II</sup>	2008	667,616	1,346,665	2,747,006
Netherlands	2009	167,401	311,679	468,459
Portugal	2007	47,677	121,337	170,347
Sweden <sup>I</sup>	2010	27,514	50,703	61,134
England & Wales	2010/2011	738,673	1,118,133	1,564,746

*I. Age limits in England & Wales 16 – 59 and in Sweden 16-64. II. Low response rate (32%); figures should be interpreted with caution.*

*Indirect estimates on the number of cannabis users are applied in calculations on annual consumption.*

**Sources:** EMCDDA, Statistical Bulletin 2012; National Reports of Focal Points; contact persons of the sample countries; Eurostat.

For Italy, the population surveys in the past years have been considered unreliable due to very low response rates (see chapter 2). Using a combination of an indirect method and population survey data, the total number of last year cannabis users in 2011 was estimated at 8.1 million (Santoro et al. 2011); personal communication prof. dr. C. Rossi).

### **Matching users with user groups**

In the prior drugs market study a classification was made between heavy users (past month users, cat. c) and light users (category b). In the present study we will refine this classification in two ways: by differentiating according to the frequency of use of last month users and by taking into account that past month users do not use each month in the past 12 month, especially the less frequent users.

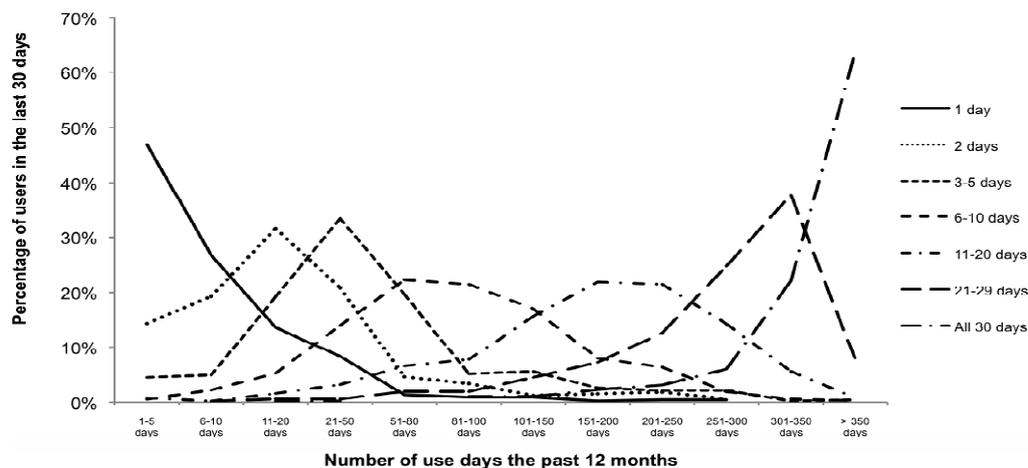
This last finding seems to deviate from prior studies that assumed that past month use could be extrapolated by multiplying frequencies by 12, although it was also acknowledged – but not empirically demonstrated - in a Finnish cannabis market study that past month users may consume cannabis irregularly, even those who consumed nearly every day in the past month (Hakkarainen et al. 2008).

Findings from the current study suggest that this can result in an overestimation of the annual number of use days. Figure 5.1 shows for the past month users in the total sample on how many days they had used in the past month and in the past 12 months. For this analysis we have only selected respondents who had used only hash or marihuana in the past year, to avoid possible misclassification among those who had consumed both and were asked separate questions on hash and marihuana. About half of the users who consumed cannabis on one day in the past month did so on only 1-5 days in the past 12 months. Thus, they apparently did not consume once every month. Similarly, over half of the daily users (63%) actually consumed all days in the past year, but this also means that quite a number consumed less.

Table 5.4 gives the match between last month users by frequency category and the user group, which is based on the number of use days in the past 12 months. As data from population surveys only provide frequencies for last month use and do not allow an estimation of the distribution of last month users over these user categories, the data from this web survey may guide us in this exercise.

Because sample sizes do not seem to be sufficiently large in all countries, we will use data for the total sample to investigate how last month users (and last year but not last month users) are distributed over the different user categories.

Figure 5.1: Percentage of users in the past 30 days by number of use days in the past 12 months



\* For users of only marijuana or only hash in the entire sample (N=1,631)

Table 5.4 shows that indeed the majority of those who had used in the past year but not in the past month (88%) could be classified as chipper. Moreover, two-thirds of those who had used cannabis on one or two days in the past month also belonged to the group of chippers. On the other extreme, the majority of those who used on 20 days or more could be classified as intensive users (84%). Almost three-quarters of those who used on 11-20 days fell within the group of regular users. Those who used cannabis in the past month (almost) weekly up to a couple of times a week were almost equally distributed over the group of occasional and regular users.

Table 5.4: Distribution of last year users over user groups on the basis of their number of use days in the past month (all countries)\*

	0	1 -2	3 – 10	11 - 20	>20
Chipper	87.5%	68.4%	10.5%	3.0%	0.4%
Occasional user	7.4%	27.4%	42.2%	6.7%	1.7%
Regular user	4.3%	3.9%	45.7%	76.3%	14.5%
Intensive user	0.8%	0.2%	1.6%	14.1%	83.5%

\* Users of only marijuana and only hash (N=1,631)

As noted in the introduction, the frequency categories for last month use in the web survey did not exactly match those indicated in the model questionnaire of the EMCDDA. Therefore, the numbers of users as obtained for the different user groups will be recalculated under the assumption of an equal distribution of users per use day within frequency categories, which might be questionable but still seems the most appropriate way in the absence of more detailed data. Moreover, insofar samples sizes were large enough to allow analyses per country, the results showed roughly the same distributions.

Thereafter the proportions listed in table 5.4 will be matched with the numbers of users estimated on the basis of population surveys in the Czech Republic, Netherlands, Portugal and England & Wales. For Sweden, data on the frequency of use in the past month are not available. As a proxy measure, we will use data from population surveys in Norway and Finland, which may be a better reflecting of the situation in Sweden compared to an overall measure based on European averages. For Bulgaria, a similar method will be applied but with different frequency categories, adapted to those applied in the 2008 population survey. For Italy, indirect estimates of the numbers of users per user category will be used (see later).

**Assumptions and methodological considerations**

Once we have obtained the number of users per user group (chippers, occasional users, regular users and intensive users) in each country, we may estimate the amount of cannabis consumed annually by multiplying these figures with estimates of the mean annual consumption per individual per user group. However, there are several methodological issues to consider first.

*Extrapolation of annual consumption from web survey sample to general population*

We have seen in chapter 3.4 that the amount of cannabis consumed annually may depend on the type of unit, being male or female or being a younger or older user, although such differences are not apparent and/or significant in each country. Whether these differences should be taken into account depends on whether we can expect that the characteristic in question

is highly differently distributed in the general population compared to our web survey sample. For example, if in this survey younger people have been found to consume more cannabis annually compared to older users, while they seem to be overrepresented compared to the general population, this will result in an overestimate of the amount of cannabis consumed annually in a country. In this case it would be necessary to make different estimates per age group. Age differences were significant in the Czech Republic and the Netherlands. Hence, consumption estimates in these countries were made separately for age groups 15-24 and 25-64 years.

It was not possible to differentiate between male and female users, since in most countries the number of female users was too low (especially among intensive users) to allow separate consumption estimates. Nonetheless, in most countries this would probably not make a big difference, since gender distributions in the web survey and in the general population surveys seemed to match fairly well. Moreover, in the overall analyses, neither the main gender effect nor the interactions with user groups and/or countries was significant.

Moreover, estimates will be based for user of all types of units included in Bulgaria, the Netherlands, Italy, Portugal, and Sweden. In these countries, the distribution of the main types of units consumed seemed to correspond with the 'normal' situation and/or no major differences were found in annual consumption for these types of units. In the Czech Republic and England & Wales, estimates will be presented both for all types of units as well as joints only, since differences might be expected in these countries. In the Czech Republic taking all units together is expected to give a more reliable estimate compared to an estimate based on joints only, but the reverse is true in England & Wales (see chapter 3.4.b).

#### *Uncertainty of estimates and sources of error*

Estimates will be based on the 5% trimmed means of the annual consumption estimates per user group as the best estimate. A low and high estimate based on the 95% confidence intervals around these means will be presented as well. It should be noted, however, that there are many sources of error that may affect the precision of the estimates. We will show for some of these potential sources, what their impact could be, while making a priori assumptions on the margins of error. Examples are the amounts per unit as estimated by the photo card method, or the maximum allowed amount of cannabis per unit, which was truncated at 0.4 gram. There are, however, many more possible sources of error, like underreporting and underestimation of the number of users (see 'undercoverage'). Due to data limitations it was not possible to give a full account of these factors. In future studies their potential impact might be investigated in statistically more sophisticated approaches, like Monte Carlo like simulation models (see for example Pudney et al. 2006).

#### *Undercoverage*

As population surveys generally do not capture marginalized populations of problem drug users, or do so to a very low extent, we will use data on cannabis use from the face-to-face interviews among these users together with existing estimates of the size of these populations, to correct for such undercoverage. We then have to accept that part of the cannabis using population may still be missing, e.g. those institutionalized or homeless and other marginalized populations not using other illicit drugs except for cannabis. Moreover, the face-to-face interviews provided (limited) data on the last month prevalence and number of use days among problem users. However, the amounts consumed per day could not be reliably assessed and there are also surprisingly little data on this topic in the literature. The number of problem drug users will be distributed over the groups of occasional, regular and intensive users, so that the average number of use days in the past month will match the average reported in the face-to-face interviews. It should be kept in mind that it is not known whether consumption patterns are indeed the same for this population of users compared to those recruited in the web survey.

It is further assumed that the population younger than 15 years or older than 64 years has zero cannabis consumption, which is of course not tenable given figures on cannabis use from school population surveys. Nonetheless, it seems to be a fair assumption that in these age groups the number of regular users and intensive users, who are responsible for the largest share of the amount of cannabis consumed, is negligible.

#### *Time frame*

The most recent data on the size of the population in each country are from 2011 (Eurostat). Data on consumption patterns were collected in the web surveys in Spring 2012, while data on the prevalence of cannabis use were sampled between 2007 (Portugal) up to 2010/2011 (England & Wales). We have calculated estimates under the assumption that rates of cannabis use remained stable since the last survey, which may be questionable especially in countries with less recent surveys, like Bulgaria (2008), the Czech Republic (2008), Portugal (2007) and the Netherlands (2009). Therefore, estimates do not precisely reflect the 2011/2011 situation, but may be higher or lower depending on recent developments in cannabis use.

We will now first make the final estimates separately for each country and discuss which estimate would seem most appropriate given the specific consumption habits and population characteristics in that country. Thereafter we will integrate findings, show the findings from some sensitivity analyses and make a comparison with prior estimates for four of the sample countries.

## 5.2 Country estimates

### 5.2.1 Bulgaria

There were no significant age group differences and also no differences between types of units with regard to the amount of cannabis consumed in the past 12 months. Therefore data for all units will be included in the estimate and there will be no distinction between age groups. As noted before, the proportion of females in the web survey sample was relatively high in Bulgaria, even higher compared to the proportion of females in the general population surveys, which was already high compared to other countries. However, as there was no gender difference in the amount of cannabis consumed per year, this was expected to have no impact on the overall consumption estimate at population level.

Table 5.5 shows the number of users within user categories on the basis of the classifications in the general population survey in 2008, which were adapted to match the frequency categories of the web survey<sup>3</sup>.

**Table 5.5: Numbers of cannabis users in Bulgaria (15-64 years)\***

	Number of users
Last year	138,809
Last year – not last month	66,834
Last month	113,103
• 1 - 2 days	41,560
• 3 - 10 days	14,990
• 11-20 days	4,930
• > 20 days	10,494

\* Prevalence data from 2008 GPS; population size data from EUROSTAT 2011. Last month frequency categories have been recalculated to match those of the web survey.

Table 5.6 shows the number of cannabis users for each of the user categories as defined in the web survey (chippers, occasional, regular and intensive users) by applying the proportions given in table 5.4 to the number of users listed table 5.5. Of all last year cannabis users, half (50%) belonged to the group of chippers, 22% to the group of occasional users and 16% were regular users. Intensive users formed with 11% the smallest group.

**Table 5.6: Numbers of last year cannabis users per user group in Bulgaria (15-64 years)**

	Total	% of all users
<b>Chipper</b>	88,712	64%
<b>Occasional user</b>	23,150	17%
<b>Regular user</b>	16,648	12%
<b>Intensive user</b>	10,299	7%
<b>Total</b>	138,809	100%

Table 5.7 shows the trimmed averages and upper and lower bound amounts of the 95% confidence intervals consumed per individual user in each user group. Multiplying these values with the number of users within each user group, yields a total amount of cannabis consumed in Bulgaria varying from 2.6 to 5.2 tons, with a (trimmed) mean of 3.8 tons. More than three quarters (77%) can be attributed to the group of intensive users, 18% to the regular users, 3% to the occasional users and 2% to the chippers.

<sup>3</sup> Recalculations were done under the assumption of an equal distribution of cases within each frequency %category.

**Table 5.7: Amount of cannabis consumed per user type and total amount consumed per year in Bulgaria (all units)\***

		Amount (gram) per user per year	Amount (ton) consumed at population level
<b>Chipper</b>	95% CI - lower bound	0.56	0.05
	95% CI - upper bound	0.84	0.07
	<b>5% trimmed mean</b>	<b>0.66</b>	<b>0.06</b>
<b>Occasional user</b>	95% CI - lower bound	3.80	0.09
	95% CI - upper bound	7.86	0.18
	<b>5% trimmed mean</b>	<b>5.40</b>	<b>0.13</b>
<b>Regular user</b>	95% CI - lower bound	31.67	0.53
	95% CI - upper bound	60.87	1.01
	<b>5% trimmed mean</b>	<b>39.82</b>	<b>0.66</b>
<b>Intensive user</b>	95% CI - lower bound	186.44	1.92
	95% CI - upper bound	384.32	3.96
	<b>5% trimmed mean</b>	<b>282.55</b>	<b>2.91</b>
<b>Total</b>	95% CI - lower bound		2.59
	95% CI - upper bound		5.23
	<b>5% trimmed mean</b>		<b>3.76</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

### ***Underreporting and undercoverage***

There are no sources providing information on a possible underreporting of cannabis use in the general population survey. However, it is important to note that the past month prevalence of cannabis use in the GPS of 2008 has been set at 1.4%, but that a different phrasing of the questions yielded a last month prevalence of 2.2% (see chapter 2)<sup>4</sup>. If this last figure would be more reliable, this would have great impact on the final estimate. In this case, the numbers of last month users would increase and the distribution of users across user groups would be different: 50% chippers, 22% occasional users, 16% regular users and 11% intensive users. The corresponding amounts of cannabis consumed by these users would be 0.50 tons, 0.16 tons, 0.90 tons and 4.40 tons, with a total of 5.52 tons. This is an increase of 47% compared to the 3.76 tons reported before.

As far as undercoverage is concerned, it is quite likely that the population of problem opiate and stimulant users have not been included in the estimates on the number of users in the basis of the GPS. In 2009, the size of this population in Bulgaria has been estimated at between 23,050 and 42,920, with a midpoint estimate of 31,316 (EMCDDA 2012b). According to the face-to-face interviews, 11 out of 48 users had used cannabis in the past month, and they did so on 6 days on average. If we take it as representative for the Bulgarian problem drug users, about one-fourth (23%) would be a past month user<sup>5</sup>. If 75% would belong to the group of occasional users, 15% to the group of regular users and 10% to the group of intensive users, this would yield an average number of use days of slightly over 6. Then the overall cannabis consumption estimate would increase with 0.20 to 0.38 tons (midpoint 0.28 tons), which is 5% to 10% (midpoint 7%).

### **5.2.2 Czech Republic**

In the Czech Republic, annual consumption differed between types of units: higher amounts are found for pipe smokers compared to those who smoke joints. There are no data on the prevalence of joint smokers against pipe smokers in the general population. Based on expert opinions, pipe smoking seems to be relatively popular in the Czech Republic and including these users would give a better picture than excluding them. Nonetheless, we will also show what happens when including only smokers of joints.

<sup>4</sup> According to the Bulgarian contact person (M. Vassilev), the first measure was obtained through two questions: "Have you ever used during the last 30 days marijuana..." and "... hashish?". The total for cannabis is a combination between the positive answers of the two questions. The second measure is through question: "In the case you have smoked marijuana or other form of cannabis during the last 30 days in how many days you have done it?"

<sup>5</sup> This seems to be an acceptable assumption. In a study among 901 PHUs carried out by the Bulgarian Focal Point, 16% had used cannabis in the past month. Probably, cannabis consumption is slightly higher among problem stimulant users.

Since overall annual consumption turned out to be significantly different between the two age groups (15-24 and 25-64 years;  $F=6.7$ ,  $P=.01$ ; age by user group  $F=5.4$ ,  $P=.001$ ) and young people were clearly overrepresented among respondents in the web survey, it was deemed important to distinguish between age groups.

Table 5.8 shows the number of users within user categories on the basis of the classifications in the general population survey in 2008, which were adapted to match the frequency categories of the web survey<sup>6</sup>. The frequency of last month use was available for age group 15-64 and 15-34 years, which were roughly similar, and secondary analyses showed that this also applied to the frequency of last month use for age group 15-24 years.

Table 5.9 shows the number of cannabis users for each of the user categories as defined in the web survey (chippers, occasional, regular and intensive users) by applying the proportions given in table 5.4 to the number of users listed table 5.8. Of all last year cannabis users, almost half (52%) belonged to the group of chippers, 20% to the group of occasional users and 22% were regular users. With 6% intensive users were clearly the minority.

**Table 5.8: Numbers of cannabis users in the Czech Republic\***

	15-24**	25-64	Total
<b>Last year users (total)</b>	475,448	653,509	1,128,957
<b>Last year – not last month</b>	189,924	304,456	494,38
<b>Last month</b>	285,524	349,053	634,577
• 1 - 2 days	81,5783	100,432	182,011
• 3 - 10 days	133,924	166,639	300,563
• 11-20 days	45,301	53,039	98,339
• > 20 days	24,721	28,943	53,664

\* Prevalence data from 2008 GPS; population size data from EUROSTAT 2011. Last month frequency categories have been recalculated to match those of the web survey.

\*\*Frequency distribution in the past month for age group 15-24 years is not available. Proportions for age group 15-34 years have been applied to last month prevalence rates for age group 15-24.

**Table 5.9: Numbers of last year cannabis users per user group in the Czech Republic**

	15-24	25-64	Total	% of all users
<b>Chipper</b>	237,630	354,473	592,103	52%
<b>Occasional user</b>	96,284	124,282	220,566	20%
<b>Regular user</b>	110,750	137,922	248,672	22%
<b>Intensive user</b>	30,784	36,832	67,616	6%
<b>Total</b>	475,448	653,509	1,128,957	100%

Now we have estimated the number of users per user group we can calculate the amount of cannabis consumed annually by the different user groups in the Czech Republic by multiplying the average amount of cannabis consumed per user group and numbers of users. This will be done for the two age groups separately, and by adding those data we will obtain national estimates for the population of 15-64 years. We will also show what happens if we would not have differentiated by age group.

<sup>6</sup> Recalculations were done under the assumption of an equal distribution of cases within each frequency category.

**Table 5.10: Amounts of cannabis consumed annually per user type in the Czech Republic (all units)\***

		15-24	25-64	Total**
<b>Chipper</b>	95% CI - lower bound	0.90	0.75	0.99
	95% CI - upper bound	1.72	1.94	1.65
	<b>5% trimmed mean</b>	<b>1.11</b>	<b>1.15</b>	<b>1.12</b>
<b>Occasional user</b>	95% CI - lower bound	7.84	6.22	8.16
	95% CI - upper bound	13.72	12.88	12.61
	<b>5% trimmed mean</b>	<b>9.58</b>	<b>8.94</b>	<b>9.38</b>
<b>Regular user</b>	95% CI - lower bound	54.58	25.65	52.92
	95% CI - upper bound	100.89	89.94	90.23
	<b>5% trimmed mean</b>	<b>60.73</b>	<b>41.42</b>	<b>54.28</b>
<b>Intensive user</b>	95% CI - lower bound	314.28	160.40	283.41
	95% CI - upper bound	444.33	273.30	384.92
	<b>5% trimmed mean</b>	<b>350.70</b>	<b>204.30</b>	<b>303.76</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Based on overall average for total sample.

**Table 5.11: Total amount of cannabis (ton) consumed in the Czech Republic (all units)\***

		15-24	25-64	15-24 & 25-64	Total**
<b>Chipper</b>	95% CI - lower bound	0.21	0.27	0.48	0.59
	95% CI - upper bound	0.41	0.69	1.10	0.98
	<b>5% trimmed mean</b>	<b>0.26</b>	<b>0.41</b>	<b>0.67</b>	<b>0.66</b>
<b>Occasional</b>	95% CI - lower bound	0.75	0.77	1.53	1.80
	95% CI - upper bound	1.32	1.60	2.92	2.78
	<b>5% trimmed mean</b>	<b>0.92</b>	<b>1.11</b>	<b>2.03</b>	<b>2.07</b>
<b>Regular</b>	95% CI - lower bound	6.04	3.54	9.58	13.16
	95% CI - upper bound	11.17	12.40	23.58	22.44
	<b>5% trimmed mean</b>	<b>6.73</b>	<b>5.71</b>	<b>12.44</b>	<b>13.50</b>
<b>Intensive</b>	95% CI - lower bound	9.67	5.91	15.58	19.16
	95% CI - upper bound	13.68	10.07	23.74	26.03
	<b>5% trimmed mean</b>	<b>10.80</b>	<b>7.52</b>	<b>18.32</b>	<b>20.54</b>
<b>Total</b>	95% CI - lower bound	16.69	10.48	27.17	34.71
	95% CI - upper bound	26.58	24.76	51.34	52.22
	<b>5% trimmed mean</b>	<b>18.71</b>	<b>14.76</b>	<b>33.46</b>	<b>36.77</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Based on overall average for total sample, not taking differences between age groups into account.

Table 5.11 shows that the overall amount of cannabis consumed per annum is 33.5 tons, which can be attributed for 55% to the group of intensive users, 37% to the group of regular users, 6% to the group of occasional users and 2% to the group of chippers. Note that this distribution is almost the inverse of the frequency distribution of the number of users.

If we would not have considered differences in consumption by age groups, there would be a slight overestimation of the annual consumption. The total amount consumed would then be estimated at 36.8 tons, with an almost similar distribution among users groups as described before.

In these analyses we have included all types of units, which seem to be the most representative situation for the Czech Republic. If we, on the other hand, include only those who smoked cannabis mainly in a joint, the estimates would have been lower (see table 5.12). The total amount consumed would then be 31.5 tons instead of 33.5 tons.

**Table 5.12: Total amount of cannabis (=ton) consumed in the Czech Republic (only joints)\***

	15-24	25-64	Total 15-24 & 25-64	Total**
Chipper	0.24	0.40	0.64	0.61
Occasional user	0.83	1.05	1.88	1.88
Regular user	5.04	5.97	11.00	11.09
Intensive user	9.08	8.90	17.98	18.58
<b>Total</b>	<b>15.18</b>	<b>16.32</b>	<b>31.50</b>	<b>32.16</b>

\* Population prevalence data for 2008; consumption patterns for 2012.

\*\* Based on average amount consumed per year according to age distribution in web sample.

### **Underreporting and undercoverage**

There are no sources providing information on a possible underreporting in the Czech Republic. As in other countries the majority of the problem opioids and stimulant drug users may have been missed in general population surveys. In the Czech Republic the population of problem methamphetamine and opioid (mainly buprenorphine) users has been estimated at between 32,000 and 46,300 in 2010, with a midpoint of 39,150 (EMCDDA 2012b). According to the face-face-interviews in the framework of the current project, 12 out of 45 methamphetamine/buprenorphine problem users had consumed cannabis in the past month (27%), with an average of 17 use days. The prevalence seems to be low, but might be related, among others, to the relatively low availability of cannabis to methamphetamine users, given the home made production of methamphetamine and related market.

Using these figures, there would be an additional 10,400 last month cannabis users (27% of the summed midpoint estimate). Further assumed that 10% would be an occasional user, 45% and regular and 45% an intensive user (which would give an average of 17 use days in the past month), they would together consume an additional 1.7 tons of cannabis. This is an additional 5% higher compared to the estimate based on population surveys only.

### **5.2.3 Italy**

For Italy, the number of users per user group has been estimated in three ways (see table 5.13). As in other countries, the first estimate was based on prevalence data from the 2008 population survey, with the addition of 2005 data on the frequency of use among past month users. As the response rate for the 2008 GPS was low (32%), the reliability of the outcomes has been questioned (Rossi 2011). Therefore, the University of Rome applied an indirect estimate using registration data on cannabis dealers, which was used in for a capture-recapture analysis (Zelterman's estimate) to estimate the number of (active) cannabis dealers. These data were combined with data on a customer to seller ratio, informed by the scientific literature to estimate the total population of cannabis users (Bouchard and Tremblay 2005); 32 for cannabis. Moreover, in order to estimate different user groups, data from past month frequency of use from school population surveys were extrapolated. Using this indirect method, the number of last year cannabis users was estimated at 5.9 million (Fabi et al. 2011). Note that this estimate is fairly close to the 5.7 million last year cannabis users estimated by the general population survey in 2008. Occasional users formed the largest group with 51%, followed by chippers (19%), regular users (17%) and intensive users (14%). This distribution across user groups in Italy is different from the pattern seen in most other countries, where chippers form by far the majority of the last year users. However, data on last year users who did not consume cannabis in the past month has not been included in this approach, which may contribute to the underestimation of especially the group of chippers.

Another research group from the Catholic University of Milan has reported yet another estimate of the total number of cannabis users i.e. 7,300,000 (only occasional, regular and intensive users). The method applied by these investigators is very simple, but based on assumptions that cannot be verified easily. They used prevalence data from the GPS 2008, assuming that the number of occasional users was underestimated with 20%. For regular users and intensive users underestimation was assumed to be 30% and 50%, respectively. For chippers no underestimation was assumed. In fact, the assumptions seem to be better suitable for a scenario analysis than for an accurate estimate. In order to better estimate chippers that are not accurately estimated by the former indirect estimation method, the best choice might be to use a hybrid method estimating chippers directly from the GPS and the other groups from indirect method. The corresponding estimates are reported in the last column of table 5.14.

**Table 5.13: Numbers of cannabis users per user group in Italy (15-64 years) according to different estimation methods**

	Estimation based on population survey data*		Indirect estimation method**		Adjusted indirect estimation method***	
	Numbers	%	Numbers	%		%
<b>Chipper</b>	3,305,720	58%	1,100,000	19%	3,305,720	41%
<b>Occasional user</b>	963,027	17%	3,000,000	51%	3,000,000	37%
<b>Regular user</b>	972,868	17%	1,000,000	17%	1,000,000	12%
<b>Intensive user</b>	451,456	8%	800,000	14%	800,000	10%
<b>Total</b>	5,693,071	100%	5,900,000	100%	8,105,720	100%

\* Estimate using population survey data (2008/2005).

\*\* Indirect estimation method using data from registered dealers, a dealer to customer ratio and user group distribution from school surveys (Fabi et al. 2012).

\*\*\* Estimate based the indirect estimation method for occasional, regular and intensive users, corrected for underestimation of the group of chippers on the basis of the GPS data for 2008/2005.

Using the numbers of users per user groups reported in the third column of table 5.13 and the corresponding data on amounts of cannabis consumed per user group individual, table 5.14 lists the amount of cannabis consumed annually per user group in Italy at population level. The total amount is estimated at 384 tons, which can be attributed for 1% to the chippers, 5% to the occasional users, 23% to the regular users and 71% to the intensive users.

**Table 5.14: Amount of cannabis consumed per user type and total amount consumed per year in Italy (all units)\***

		Amount (gram) consumed per user per year	Amount (ton) consumed at population level
<b>Chipper</b>	95% CI - lower bound	0.81	2.68
	95% CI - upper bound	1.37	4.53
	<b>5% trimmed mean</b>	0.84	2.78
<b>Occasional user</b>	95% CI - lower bound	6.25	18.75
	95% CI - upper bound	9.30	27.90
	<b>5% trimmed mean</b>	6.74	20.22
<b>Regular user</b>	95% CI - lower bound	92.85	92.85
	95% CI - upper bound	120.99	120.99
	<b>5% trimmed mean</b>	89.39	89.39
<b>Intensive user</b>	95% CI - lower bound	336.19	268.95
	95% CI - upper bound	408.40	326.72
	<b>5% trimmed mean</b>	339.89	271.91
<b>Total</b>	95% CI - lower bound		383.23
	95% CI - upper bound		480.14
	<b>5% trimmed mean</b>		384.30

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

### **Underreporting and undercoverage**

Due to the indirect estimation method applied it is hard to say whether groups of users have been missed. We may assume that the indirect and hybrid estimation methods on the number of cannabis users yields a more comprehensive and reliable estimate compared to the one that would be obtained on the basis of the general population survey only. For illustration, in the latter case (using the figures in the first column of table 5.13), this would result in a total amount of 250 tons of cannabis consumed, instead of 384 tons. This would be almost exclusively caused by the lower number of intensive users and therefore lower consumption (153 against 272 tons), which illustrates the great impact of the reliability of estimates on the number of users within this user group.

## 5.2.4 The Netherlands

Similar to the Czech Republic, it is necessary to make a distinction in consumption between age groups in order to estimate cannabis consumption in the Netherlands, as younger cannabis users have been found to consume more cannabis per annum compared to older users (within user groups). Moreover, younger cannabis users were overrepresented in the web survey compared to the general population survey. Table 5.15 shows the numbers of last year users and last month users in the Netherlands by age group. It has been assumed that the frequency distribution among past month users for age group 15-24 years is similar to that reported for age group 15-34 years. For the Czech Republic this assumption could be roughly confirmed, but we have no data for the Netherlands to verify it.

**Table 5.15: Numbers of last year cannabis users in the Netherlands\***

	15-24**	25-64	Total
<b>Last year users (total)</b>	328,677	452,087	780,764
<b>Last year – not last month</b>	161,276	151,029	312,305
<b>Last month***</b>	167,401	301,058	468,459
• 1 - 2 days	32,253	42,076	74,329
• 3 - 10 days	59,650	87,508	147,158
• 11-20 days	38,365	79,184	117,549
• > 20 days	37,133	92,758	129,891

\* Prevalence data from 2009 GPS; population size data from EUROSTAT 2011. Last month frequency categories have been recalculated to match those of the web survey, under the assumption of an equal distribution of cases within frequency categories.

\*\*Frequency distribution in the past month for age group 15-24 years is not available. Proportions for age group 15-34 years have been applied to last month prevalence rates for age group 15-24.

\*\*\*Numbers from subcategories may not precisely sum to the total due to rounding differences.

**Table 5.16: Numbers of last year cannabis users per user group in the Netherlands**

	15-24	25-64	Total	% of all users
<b>Chipper</b>	170,810	172,941	343,751	44%
<b>Occasional user</b>	49,063	66,391	115,455	15%
<b>Regular user</b>	70,159	122,010	192,169	25%
<b>Intensive user</b>	38,645	91,213	129,858	17%
<b>Total</b>	328,677	452,555	781,233	100%

**Table 5.17: Amounts (gram) of cannabis consumed annually per user type in the Netherlands (all units)\***

		15-24	25-64	Total**
<b>Chipper</b>	95% CI - lower bound	0.9	0.6	0.8
	95% CI - upper bound	1.2	1.4	1.2
	5% trimmed mean	0.9	0.7	0.8
<b>Occasional user</b>	95% CI - lower bound	6.9	3.5	6.4
	95% CI - upper bound	10.0	8.1	8.9
	5% trimmed mean	7.3	4.5	6.5
<b>Regular user</b>	95% CI - lower bound	70.6	33.6	63.1
	95% CI - upper bound	99.1	74.7	86.7
	5% trimmed mean	74.5	40.3	63.2
<b>Intensive user</b>	95% CI - lower bound	338.1	232.1	306.1
	95% CI - upper bound	495.9	358.4	408.0
	5% trimmed mean	367.5	254.6	310.5

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Based on overall average for total sample.

**Table 5.18: Total amount of cannabis (ton) consumed in the Netherlands (all units)\***

		15-24	25-64	15-24 & 25-64	Total**
<b>Chipper</b>	95% CI - lower bound	0.1	0.1	0.2	0.3
	95% CI - upper bound	0.2	0.2	0.4	0.4
	<b>5% trimmed mean</b>	<b>0.2</b>	<b>0.1</b>	<b>0.3</b>	<b>0.3</b>
<b>Occasional</b>	95% CI - lower bound	0.3	0.2	0.6	0.7
	95% CI - upper bound	0.5	0.5	1.0	1.0
	<b>5% trimmed mean</b>	<b>0.4</b>	<b>0.3</b>	<b>0.7</b>	<b>0.7</b>
<b>Regular</b>	95% CI - lower bound	5.0	4.1	9.0	12.1
	95% CI - upper bound	7.0	9.1	16.1	16.7
	<b>5% trimmed mean</b>	<b>5.2</b>	<b>4.9</b>	<b>10.1</b>	<b>12.2</b>
<b>Intensive</b>	95% CI - lower bound	13.1	21.2	34.2	39.7
	95% CI - upper bound	19.2	32.7	51.9	53.0
	<b>5% trimmed mean</b>	<b>14.2</b>	<b>23.2</b>	<b>37.4</b>	<b>40.3</b>
<b>Total</b>	95% CI - lower bound	18.5	25.6	44.1	52.9
	95% CI - upper bound	26.8	42.6	69.4	71.1
	<b>5% trimmed mean</b>	<b>19.9</b>	<b>28.6</b>	<b>48.5</b>	<b>53.5</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Based on overall average for total sample, not taking differences between age groups into account.

The total amount of cannabis consumed per year varies between and 44 and 69 tons, with a (trimmed) mean of 49 tons. The large majority comes on account of the intensive users (77%), followed at distance by the regular users (21%). Both the occasional users and chippers make up less than 2% of the annual cannabis consumption (1.4% and 0.6%, respectively).

There is no difference in the total amount of cannabis consumed when only smokers of joints are taken into account (48.4 tons, which is not surprising given the large share of joint smokers versus users of other types of units and the lack of differences in amounts consumed between unit types).

### ***Underreporting and undercoverage***

It has been generally assumed that there is a lower risk of underreporting of cannabis use in countries where consumption or possession for personal use is not criminalized and/or less stigmatized, compared to countries with more repressive policies where fear of negative (social) consequences may withhold users to admit their drug consumption. Nonetheless, underreporting may also play a role in the Netherlands, where cannabis consumption has been decriminalized since the mid seventies (Spijkerman et al. 2009). Moreover, a change of survey mode in 2009, whereby questions on drug use in a face-to-face interview were self-completed by the respondents compared to 2005 (questions asked and entered by interviewer in face-to-face interview), may have contributed to the higher prevalence rates of drug use in 2009. More specifically, last year prevalence was 30% higher (7.0% against 5.4%) and last month prevalence was 27% higher (4.2% against 3.3%). While it cannot be excluded that there has been an increase in cannabis consumption (although there are no clear indications for such an increase), it is likely that at least part of the difference can be attributed to mode differences. Stated otherwise, the risk of underreporting may be low(er) in the 2009 survey.

The estimates do not include consumption by drug tourists, problem hard drug users and the homeless who do not consume heroin and/or crack. Drug tourism, especially in the border towns and Amsterdam, may account for a significant amount of cannabis bought in the Netherlands, part of which may be consumed at location or be transported across the border for personal use or dealing. In 2003 this amount has been estimated between 6.6 and 13.3 tons (Korf 2003). This amount has probably dropped severely since the introduction of the new measures aiming to curb drug tourism (residence and closed club criterion) in the Southern part of the country as of 1 May 2012.

According to the treatment multiplier method, there were some 18,000 PHUs in the Netherlands in 2008. A large part of this population also consumes crack cocaine. According to the face-to-face interviews conducted in spring 2012 among 45 heroin users, 58% had used cannabis in the past month with an average of 15 days. This fits well with data from a sample of heroin users taking part in a medical heroin prescription programme, revealing a last month prevalence of cannabis use 54% and an average of 18 days in the past month (P. Blanken, personal communication). An older study in 2000 reports a past month

prevalence of cannabis use among problem hard drug users of 64%, with an average of 14 use days in the past month (De Graaf et al. 2000). We can assume on the basis of these data that some sixty percent of the PHUs in the Netherlands are past month cannabis users, including one-third occasional users, one-third regular users and one-third intensive users. This user group distribution would give an average of about 14 use days, but note that the real distribution is not known. Under these assumptions, the total consumption of cannabis in the Netherlands would increase with 1.37 tons.

Finally, a recent study among 500 homeless people in the four big cities showed that less than 10% used hard drugs like cocaine and heroin, but 43% consumed (almost) daily cannabis (Van Straaten et al. 2012). Given the low rate of hard drug use, the majority (90%) of this population does apparently not overlap with that of the problem hard drug users. An estimate by Statistics Netherlands arrived at a number of 18,000 homeless people in 2009 (CBS 2010)<sup>7</sup>. If we combine these data, we have to add an additional 7,000 intensive cannabis users, who account for the consumption of 2.16 tons.

Adding the consumption of the populations of problem drug users and homeless population (roughly 3.5 tons), we arrive at an overall estimate of 52 tons, an increase with 7.3% compared to the 48.5 tons in table 5.18.

### 5.2.5 Portugal

There were no significant age group differences and also no differences between types of units with regard to the amount of cannabis consumed in the past 12 months. Therefore data for all units will be included in the estimate and there will be no distinction between age groups.

Table 5.19 show the numbers of last year and last month users based on the 2007 population survey and table 5.20 shows the numbers of users by user group. Note that the proportion of intensive users (25%) is higher compared to all other sample countries.

**Table 5.19: Numbers of cannabis users in Portugal (15-64 years)\***

	Number of users
Last year	255,520
Last year – not last month	85,173
Last month	170,347
• 1 - 2 days	21,009
• 3 - 10 days	38,339
• 11-20 days	42,704
• > 20 days	68,294

\* Prevalence data from 2007; population size data from Eurostat 2011. Last month frequency categories have been recalculated to match those of the web survey.

**Table 5.20: Numbers of last year cannabis users per user group in Portugal (15-64 years)\***

	Total	% of all users
Chipper	94,516	37%
Occasional user	32,186	13%
Regular user	64,494	25%
Intensive user	64,323	25%
Total	255,520	100%

<sup>7</sup> Note that there may differences in definitions of 'homeless', that cannabis use in the big cities may differ from that elsewhere and that this number may have changed between 2009 and 2012.

Table 5.21 shows that the total amount of cannabis consumed in Portugal varies from 13 to 26 tons, with a (5% trimmed) mean of 17 tons. Two thirds (68%) comes on account of the intensive users, followed by regular users (30%), occasional users (2%) and chippers (<1%).

**Table 5.21: Amount of cannabis consumed per user type and total amount consumed per year in Portugal (15-64 years)\***

		Amount (gram) per user per year	Amount (ton) consumed at population level
<b>Chipper</b>	95% CI - lower bound	0.61	0.06
	95% CI - upper bound	1.36	0.13
	<b>5% trimmed mean</b>	<b>0.80</b>	<b>0.08</b>
<b>Occasional user</b>	95% CI - lower bound	6.19	0.20
	95% CI - upper bound	15.64	0.50
	<b>5% trimmed mean</b>	<b>10.27</b>	<b>0.33</b>
<b>Regular user</b>	95% CI - lower bound	48.73	3.14
	95% CI - upper bound	140.28	9.05
	<b>5% trimmed mean</b>	<b>79.46</b>	<b>5.12</b>
<b>Intensive user</b>	95% CI - lower bound	144.38	9.29
	95% CI - upper bound	258.79	16.65
	<b>5% trimmed mean</b>	<b>183.91</b>	<b>11.83</b>
<b>Total</b>	95% CI - lower bound		12.69
	95% CI - upper bound		26.33
	<b>5% trimmed mean</b>		<b>17.36</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval. Population 15-64 years.

### ***Underreporting and undercoverage***

There are no studies known on underreporting in Portugal. There is also no recent estimate on the number of problem drug users in Portugal. For 2005 a number of 44,653 problem drug users was reported, as estimated by the treatment multiplier method (Santos et al. 2011). In the face- to-face interviews, only 2 out of 53 heroin/cocaine users (4%) consumed cannabis. It is not known whether this finding is representative for the Portuguese problem drug users, but it might suggest that this population would not add much to the total amount of cannabis consumed. Confirmation from other studies is needed before this conclusion can be drawn.

### **5.2.6 Sweden**

In the Swedish sample, males seemed to be overrepresented compared to the general population survey, although it is not known whether this would also apply to the population of intensive users, who generally make up the largest share of the total amount of cannabis consumed. Although statistical analyses revealed no significant gender differences in annual consumption within user groups, the number of females among intensive users was too low to allow a gender comparison of cannabis consumption. Hence, no distinction will be made between males and females, but the reader should be aware that this could result in a (probably slight) overestimation of use, if female intensive cannabis users would in fact consume less than males.

Age group differences were not significant. Moreover, the proportion of users who consumed cannabis in other units than joints was too small to have a significant effect on annual cannabis consumption per individual user (see chapter 3.4). It was not necessary to differentiate estimates by these variables.

A bottleneck is the lack of information on frequency of use in the past month, as this variable is not included in the Swedish general population surveys. We will therefore use frequency data from the Norwegian and Finnish population surveys as a proxy for the frequency distribution in Sweden. While this approach is questionable, it seems to be a more appropriate option than applying a kind of European average. We will take the average percentage of both countries per frequency category, but also show what happens when the two frequency distributions are considered as upper and lower limit. Note that the absolute numbers of cases on which these frequencies are based are very low in both Finland and Norway (see subscript table 5.22). This may limit the precision of the estimates.

Table 5.22: Frequency (number of use days) of last month use in Norway and Finland \*

	1-3 days / less than once a week	4-9 days / at least once a week	10-19 days / several times a week	20 days or more / daily or almost daily
Norway (2009)	61.1	11.1	11.1	16.7
Finland (2010)	39.1	39.1	8.7	13.0
Average	50.1	25.1	9.9	14.9

\*Distribution based on N= 25 (Finland) and N=18 (Norway) last month users. Source: EMCDDA. Statistical Bulletin.

Table 5.23: Numbers of cannabis users in Sweden (16-64 years)\*

	Number of users
Last year	171,174
Last year – not last month	110,040
• 1 - 2 days	61,134
• 3 - 10 days	20,419
• 11-20 days	26,159
• > 20 days	6,303

\* Prevalence data from 2010 GPS; population size data from EUROSTAT 2011. Last month frequency categories are based on the averages of the frequency categories in Finland and Norway, and have been recalculated to match those of the web survey.

\*\*Frequency distribution in the past month for age group 15-24 years is not available. Proportions for age group 15-34 years have been applied to last month prevalence rates for age group 15-24.

Table 5.24: Numbers of last year cannabis users per user group in Sweden (16-64 years)\*

	Total	% of all users
Chipper	113,266	66%
Occasional user	25,301	15%
Regular user	23,531	14%
Intensive user	9,076	5%
Total	171,174	100%

Table 5.25: Amount of cannabis consumed per user type and the total amount consumed per year in Sweden (all units)\*

		Amount (gram) consumed per user per year	Amount (ton) consumed at population level
Chipper	95% CI - lower bound	1.04	0.12
	95% CI - upper bound	1.60	0.18
	<b>5% trimmed mean</b>	<b>1.04</b>	<b>0.12</b>
Occasional user	95% CI - lower bound	10.24	0.26
	95% CI - upper bound	16.98	0.43
	<b>5% trimmed mean</b>	<b>9.87</b>	<b>0.25</b>
Regular user	95% CI - lower bound	91.61	2.16
	95% CI - upper bound	128.03	3.01
	<b>5% trimmed mean</b>	<b>90.70</b>	<b>2.13</b>
Intensive user	95% CI - lower bound	325.42	2.95
	95% CI - upper bound	499.32	4.53
	<b>5% trimmed mean</b>	<b>362.79</b>	<b>3.29</b>
Total	95% CI - lower bound		5.49
	95% CI - upper bound		8.16
	<b>5% trimmed mean</b>		<b>5.79</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

The total amount of cannabis consumed in Sweden per year is 5.8 tons, which can be attributed for 57% to the intensive users, 37% to the regular users, 4% to the occasional users and 2% to the chippers.

If we apply the frequency distributions for either Norway or Finland (instead of the average), the estimates hardly change (overall 5.9 and 5.7 tons, respectively).

### ***Underreporting and undercoverage***

There are no data on the extent of underreporting of cannabis use in Swedish population surveys. In an older study on cannabis use among conscripts it has been reported that fewer subjects in the cohort interviewed face-to-face claimed to have used cannabis and other illicit drugs compared with similar cohorts that used anonymous questionnaires (Zammit et al. 2002). The Swedish population survey in 2010 was carried out by mail, which might be less sensitive to underreporting than face-to-face interviews.

The population of problem drug users in Sweden was estimated at 29,513 in 2007. In this estimate no distinction is made by type of drug. Given the distribution of drugs among drug users in treatment, amphetamine is more common than heroin, with proportions reported for clients outside prison of 29% for amphetamine and 17% for heroin. The sample of problem drug users in the face-to-face interviews consisted of 18 heroin users and 27 amphetamine users, which might more or less reflect the distribution in the overall population of problem drug users. The last month prevalence of cannabis use in this sample was 60%, with an average of 12 use days in the past month. Assume that 40% of these problem drug users (17,708) not only consumed heroin or amphetamines but are occasional cannabis users, 40% regular users and 20% intensive users, this would give an average of 12 use days in the past month. Taking the estimated annual consumption per user group individual into account, this would increase the total consumption with 1.99 tons (or 34% of the estimate based on the general population survey only). Note that there are many uncertainties in making these estimates, and these findings should therefore be interpreted with caution.

### ***5.2.7 England & Wales***

For England & Wales, estimates will be made for the population of 16-59 years in England & Wales only, since this is the population covered by the British Crime Survey. These regions cover about 87% of the total population in England & Wales (Davies et al. 2011). The different age range will probably have little effect on the comparability of consumption estimates between countries, since the large majority of the population of cannabis users will be aged between 16 and 59 years. Estimates will be made for all units and for users of joints only, since the proportion of users of respondents consuming cannabis in other ways than smoking joints seems to be higher than what would be expected among cannabis users in England & Wales. Since the proportions of users by frequency category in the past month do not sum to 100% but to 91% (due to a weighing procedure, personal communication EMCDDA; see table 5.26), the remaining 9% have been weighed and distributed over all frequencies categories (e.g. 4.5% has been added to the largest category of 1-3 days, and 1.5% to the three other categories).

**Table 5.26: Numbers of cannabis users in England & Wales (16-59 years)\***

	Number of users
Last year	2,800,073
Last year – not last month	1,235,326
Last month	1,564,746
• 1 - 2 days	547,661
• 3 - 10 days	540,620
• 11-20 days	241,753
• > 20 days	234,712

\* Prevalence data from 2010/2011 GPS for England and Wales; population size data from EUROSTAT 2011. Last month frequency categories have been recalculated to match those of the web survey.

Table 5.27: Numbers of last year cannabis users per user group in England &amp; Wales (16-59 years)\*

	Total	% of all users
Chipper	1,521,189	54%
Occasional user	489,271	17%
Regular user	540,365	19%
Intensive user	249,247	9%
<b>Total</b>	<b>2,800,073</b>	<b>100%</b>

Table 5.28: Amount of cannabis consumed per user type and total amount consumed per year in England &amp; Wales (all units)\*

		Amount (gram) per user per year	Amount (ton) consumed at population level
Chipper	95% CI - lower bound	0.6	1.0
	95% CI - upper bound	1.5	2.3
	<b>5% trimmed mean</b>	<b>0.8</b>	<b>1.3</b>
Occasional user	95% CI - lower bound	5.3	2.6
	95% CI - upper bound	11.5	5.6
	<b>5% trimmed mean</b>	<b>6.8</b>	<b>3.3</b>
Regular user	95% CI - lower bound	45.5	24.6
	95% CI - upper bound	88.5	47.8
	<b>5% trimmed mean</b>	<b>55.6</b>	<b>30.1</b>
Intensive user	95% CI - lower bound	307.9	76.7
	95% CI - upper bound	575.6	143.5
	<b>5% trimmed mean</b>	<b>373.8</b>	<b>93.2</b>
<b>Total</b>	95% CI - lower bound		104.9
	95% CI - upper bound		199.2
	<b>5% trimmed mean</b>		<b>127.8</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval. Population of 16-59 years.

If the annual consumption would be based on the consumption patterns of users of all units combined, the total amount consumed in England & Wales ranges from 105 to 199 tons, with a midpoint of 128 tons. Intensive users account for three quarters of this amount (73%), followed at distance by the regular users (24%), occasional users (3%) and chippers (1%).

If the consumption patterns of users of other units than joints would be excluded, this would result in a six tons higher estimate (134 ton, ranging from 96 to 221). As the relatively high proportion of users (especially the more frequent ones) who consumed their cannabis in water pipes and dry pipes, seems to be atypical in England & Wales, the estimate based on joints only seems to be the most representative one (table 5.29).

Table 5.29: Total amount of cannabis (ton) consumed in England &amp; Wales (only joints)\*

	Total	% of all users
Chipper	1.2	54%
Occasional user	3.3	17%
Regular user	26.4	19%
Intensive user	102.8	9%
<b>Total</b>	<b>133.8</b>	<b>100%</b>

\* Population prevalence data for 20010/2011 for England & Wales in age group 16-59 years; consumption patterns for 2012. Estimates based on 5% trimmed means of annual consumption per user.

### ***Underreporting and undercoverage***

There are no data on underreporting of drug use in the British Crime Survey. In a very thorough discussion of estimates of the UK drugs markets, Pudney et al. (2006) reported experimental data on underreporting of drug use on the basis of self-reported drug use and urine or saliva drug tests among arrestees (Pudney et al. 2006). These data suggest that underreporting was much lower for cannabis (5.5%) compared to heroin (18%), but no data are available on the non arrestee population.

According to the UK National Focal point the estimated number of problem opiate/crack users in 2009/2010 was 306,150 in England and 16,389 in Wales (UK, National Report 2011). According to the face-to-face interviews with 45 opiate/crack users, 42% had used cannabis in the past month with an average of 12 use days. However, the median was only 4 days, which suggests a highly skewed distribution. We will show estimates for three different scenarios: if the distribution of users would be 40% occasional, 40% regular and 20% intensive users, if it would be 35%, 50%, 15%, respectively and 25%, 75% and 5%, respectively, which would all give an average of about 12 use days in the past month. The amount of cannabis consumed for these scenarios would be 33.8, 28.6 and 18.2 tons, respectively. Thus, if the consumption of this population of problem drug users is taken into account, the total amount of cannabis consumed in England & Wales increases with 13% to 24% compared to the estimate based on the population survey only.

### ***5.2.8 Overview of the estimates of user groups and cannabis consumption***

Table 5.30 shows the number of last year cannabis users by user group. In all countries, chippers formed the largest group of last year users, with percentages varying from 41% in Italy and 44% in the Netherlands to over 60% in Bulgaria and Sweden. The proportion of occasional users was three times that of regular users in Italy, but in most countries differences between these user groups were fairly small. The proportion of intensive users was lowest in all countries, except for Portugal, where intensive and regular users each made up one-fourth of all users. In five countries, one or less in ten users was an intensive user. Nonetheless, table 5.31 shows that this user group accounted for the largest part of the total amount of cannabis consumed in all countries, with proportions varying from 55% in the Czech Republic up to 77% in Bulgaria, the Netherlands and England & Wales.

**Table 5.30: Number of last year cannabis users by country and distribution over user groups**

	BG	CZ	IT	NL	PT	SE	E&W
<b>Number of users</b>	138,809	1,128,957	8,105,720	781,233	255,520	171,174	2,800,073
<b>% Chippers</b>	64%	52%	41%	44%	37%	66%	54%
<b>% Occasional</b>	17%	20%	37%	15%	13%	15%	17%
<b>% Regular</b>	12%	22%	12%	25%	25%	14%	19%
<b>% Intensive</b>	7%	6%	10%	17%	25%	5%	9%

**Table 5.31: Amount of cannabis (ton) consumed annually per country and user group (%)\***

	BG	CZ	IT	NL	PT	SE	E&W
<b>Amount (ton) - lower</b>	2.6	27.2	383.2	44.1	12.7	5.5	96.1
<b>Amount (ton) - upper</b>	5.2	51.3	480.1	69.4	26.3	8.2	221.0
<b>Amount (ton) - average</b>	<b>3.8</b>	<b>33.4</b>	<b>384.3</b>	<b>48.5</b>	<b>17.4</b>	<b>5.8</b>	<b>133.8</b>
<b>% Chippers</b>	2%	2%	1%	<1%	1%	2%	1%
<b>% Occasional</b>	3%	6%	5%	1%	2%	4%	2%
<b>% Regular</b>	18%	37%	23%	21%	30%	37%	20%
<b>% Intensive</b>	77%	55%	71%	77%	68%	57%	77%
<b>Additional amount used by problem drug users</b>	0.2-0.4	1.7	n.a.	1.4	?	2.0	18-34

*Upper and lower values are based on the upper and lower values of the 95% confidence interval for the annual cannabis consumption on the basis of the web survey, multiplied by the number of users according to population surveys (or adapted estimate in Italy). The average is based on the 5% trimmed mean of the 12 months cannabis consumption.*

In these estimates we have not taken possible underreporting of cannabis in general population surveys into account<sup>8</sup>. As described in the previous chapters, there are little data available to allow rationally based adjustments for underreporting. Ideally, such data should be country specific and take the characteristics of the survey into account. Data from the Dutch population surveys in 2005 and 2009 suggest that the degree of underreporting in more privacy respecting survey modes may be up to 30%, although there might be other explanations for the difference. However, it remains to be determined whether this figure can be generalized to other countries, and whether it applies to the same extent to all user groups. If we compare the population survey based estimate for Italy with the indirect/hybrid estimation method, the total number of last year users was 42% higher under the last method, but for intensive users the increase was 77%. Note, however, that the Italian indirect estimate might also compensate for undercoverage of populations that would be missed in population surveys. As far as data were available in other countries, the addition of (rough) estimates of cannabis consumed by (marginalised) populations of problem drug users increased the estimates from a low 3% in the Netherlands and 5% in the Czech Republic, up to 25% in England & Wales, and 35% in Sweden, which is a huge variation.

Given the possible impact of different survey modes (as well as contextual effects) and country specific (cultural and policy-related) factors, it seems unlikely that a simple single correction factor for underreporting yields accurate estimates in all countries.

However, there are more possible sources of estimation error that may afflict figures on cannabis consumption. Imagine the true amount of cannabis put in a unit is 1.5 times the amount assessed with the photo card method, or the highest amount per unit was not set at 0.4 gram but 0.5 gram. Table 5.32 shows that the first situation would logically have a great impact. Table 5.33 shows that increasing the highest dose per unit to 0.5 gram has only small effects on the estimates (between 3% and 9% increase), thus excluding misclassification as a relevant factor.

**Table 5.32: Annual amount of cannabis consumed per country if the true amount of cannabis per unit would be 50% higher**

	BG	CZ	IT	NL	PT	SE	E&W
Amount (ton) - lower	3.9	40.8	574.8	66.2	19.1	8.3	144.2
Amount (ton) - upper	7.8	77.0	720.2	104.1	39.5	12.3	331.5
Amount (ton) - average	5.7	50.1	576.5	72.8	26.1	8.7	200.7

*Amounts excluding consumption of cannabis by problem users of heroin, amphetamine or cocaine.*

**Table 5.33: Annual amount of cannabis consumed per country if the maximum amount of cannabis would be increased from 0.4 to 0.5 gram per unit**

	BG	CZ	IT	NL	PT	SE	E&W
Amount (tons) - lower	2.7	28.6	413.3	46.7	13.0	5.9	100.6
Amount (tons) - upper	5.6	56.8	525.8	75.5	27.3	9.1	252.5
Amount (tons) - average	3.9	35.7	410.1	51.6	17.9	6.3	145.2
% Increase <sup>1</sup>	2.6%	6.9%	6.7%	6.4%	2.9%	8.6%	8.5%

*Amounts excluding consumption of cannabis by problem users of heroin, amphetamine or cocaine.*

*1. Increase relative to the average amount if the maximum is 0.4 gram.*

## 5.2.9 Comparison with previous estimates

For four countries included in this study, estimates of cannabis consumption from other studies are available (see table 5.34). Note that the high, average/best and low ranges have been established in different ways. In the current study, the high and low ranges reflect the 95% confidence intervals around the mean of the annual consumption per user group, and the 5% trimmed average for the average estimate. Moreover, the (average/midpoint) estimated consumption for the population of problem drug of heroin, cocaine and/or amphetamine has been added to the average and highest estimate. The year refers to the year of the general population survey as this may be an important determinant of the estimates.

<sup>8</sup> This does not play a role in the indirect estimates for Italy.

In the Dutch study by the National Police Agency, the ranges are based on the variation regarding the annual cannabis consumption per current (last month user), i.e. assumed to be between 76 and 160 gram per year (Landelijke Recherche 2012). If we would select only last month users in the present study we would find an average of 99 grams, ranging from 90 gram to 142 gram. This seems to fit fairly well.

The much higher estimates for England & Wales in prior studies is probably partly related to the strong decrease in the prevalence of cannabis use regardless of methodological differences<sup>9</sup>. Last year prevalence of cannabis use decreased from 10.8% in 2003/2004 to 6.8% in 2010/2011. This is a decrease of 37%. If this decrease is extrapolated to the average amount reported by Pudney et al. (2006), this gives an average amount of 227 tons, which is closer to (albeit still higher) compared to the 168 tons in the current study (Pudney et al. 2006).

In the first drug markets study, Kilmer and Pacula (2009) based their estimates and ranges on several assumptions regarding the number of use days, the number of joints used per day, grams per joint and grams per use day, which were given for two user groups: past month users and past year but not past month users. A direct comparison with the findings in the current study is hampered by differences in user classifications, but apparently some assumptions do not seem to match between studies. For example, Kilmer and Pacula (2009) estimated the amount of cannabis per joint between 0.3 gram (low) and 0.5 gram (high), with 0.4 gram as best estimate (Kilmer and Pacula 2009). In the current study, the highest average doses were reported for intensive users in Sweden and Italy (.27-.28 gram), with an overall average of .25 gram. Lower amounts were reported for the other user groups. For other indicators (e.g. amounts consumed per typical day; see chapter 3), the assumptions for last month users in the former study seem to fit the consumption patterns for regular and intensive users, but not that of chippers and occasional users. The relatively high proportion of last month users who belong to these latter groups (see chapter 5) can also explain why the former estimates tend to be in the higher range. Another factor contributing to different estimates is that the current study allowed the calculation of annual amounts consumed per user on the basis on individual data for the relevant parameters, i.e. multiplying number of use days with number of units and amount of cannabis per unit, after which averages at group level were made. This is different from multiplying overall averages on daily consumption and use days, which may yield higher estimates (see also part I, report 4).

Moreover, Kilmer and Pecula (2009) assumed 20% underreporting of the number of past year users for the best estimate and 39% underreporting for the high estimate (Kilmer and Pacula 2009). This may definitely increase the estimates, and explain part of the higher ranges. Note that in this regard underreporting has been conceived dichotomous (use or no use in the past year) regardless of frequency or amount. As the issue of underreporting has never been addressed well, while it may greatly affect market estimates, it would be recommended as research priority for future research.

Finally, in the former report, backed by other data sources (from Australia, New Zealand and UK), an overall consumption per past year user was reported of 96 gram (Kilmer and Pacula 2009). This is - as expected - higher compared to the overall consumption found in the current study suggesting an annual average consumption between 27 grams in Bulgaria and 68 gram in Portugal (table 5.34). It should be kept in mind, however, that averages per past year users are very rough given the heterogeneity of the population of past year users. For example, figures are fairly high in Portugal because of the relatively high proportion of intensive users, in spite of low overall past year prevalence of cannabis use.

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<sup>9</sup> According to Pudney et al. (2006), England and Wales probably account for 87% of the total cannabis consumed in the United Kingdom, which seems to be a plausible finding given the fact that 87% of the population in the UK resides in England and Wales.

**Table 5.34: Comparison of demand-based estimates of cannabis consumption (tons per year) in this study and other studies**

Country	Estimate in this study <sup>I</sup>		Other estimates		Sources
	Amount (tons)	Year <sup>II</sup>	Amount (tons)	Year	
Bulgaria	2.6 (low) 4.0 (average) 5.5 (high)	2008	15 – 20	2007	Bulgarian National Focal Point
			5.5 (low) 6.3 (average) 7.1 (high)	2007	
Czech Republic	27.2 (low) 35.9 (average) 53.7 (high)	2008	30 (low) 68 (average) 141 (high)	2004	Kilmer and Pacula (2009)
			49 (low) 56 (average) 63 (high)	2005	
The Netherlands	44.1 (low) 49.9 (average) 70.8 (high)	2009	35 (low) 75 <sup>III</sup> (high)	2009	Landelijke Recherche (2012)
			33 (low) 73 (best) 152 (high)	2005	
England & Wales	96.1 (low) 168.4 (average) 249.6 (high)	2010/2011	224 (low) 360 (average) 496 (high)	2003/2004	Pudney et al. 2006
			201 (low) (UK) 450 (best) (UK) 937 (high) (UK)	2005	
			255 (low) (UK) 290 (average) (UK) 325 (high) (UK)	2007/2008	Carpentier et al. (2012)

I. Lowest estimate (as in GPS).

II. Year refers to the year of the general population survey. The average and highest estimate also include the midpoint estimate of cannabis consumption by problem users of heroin, amphetamine, cocaine).

III. Excluding possible undercoverage.

Sources: Carpentier et al. (2012); Kilmer and Pacula (2009); Landelijke Recherche (2012)

**Table 5.35: Amounts (gram) of cannabis consumed annually per last year user\***

	BG	CZ	IT	NL	PT	SE	E&W
Lower	19	24	47	56	50	32	34
Upper	38	45	59	89	103	48	79
Middle/average	27	30	47	62	68	34	48

\*Averages per past year user are very rough given the heterogeneity of the population of past year users.

## 5.3 Conclusions and recommendations

This is the first study that addresses in detail cannabis consumption patterns, availability and estimates of the amounts of cannabis consumed among different types of cannabis users across different European Member States. The core data have been collected by a web survey, which has allowed the recruitment of a large number of cannabis users (almost 4,000) and detailed assessments of use patterns and availability in a relatively short period of time, which would not have been easily possible otherwise. With increasing internet penetration rates of the internet in many European countries, this method may be promising and which is increasingly employed in drug research (e.g. (Bauermeister et al. 2012; Carhart-Harris et al. 2009; Miller and Sonderlund 2010; Stein et al. 2012; Walden and Earleywine 2008). Nonetheless, we should be aware of its drawbacks, notably the lack of a sampling frame and non-probability sampling strategy, which may affect the representativeness of the sample. Web surveys may generally attract younger and more highly educated public compared to those captured in general population surveys. Moreover, respondents were recruited in different ways in different countries. These limitations should be kept in mind when generalizing the data. While crucial variables were analyzed per subgroup (frequency, age and gender), acknowledging that the sample would not be representative on these variables, we could not take into account all relevant (demographic) variables. For example, it might be that higher educated users, even if they consume cannabis daily, might have different consumption patterns compared to (daily) users who are less educated. Moreover, as in many population surveys, ethnic minorities might be underrepresented. Also, differences in urbanicity may affect assessments of use and availability. Nonetheless, the reported 'universal' (consumption) patterns across countries with varied economic, social, and cultural norms, suggest that the findings may have a high degree of validity.

### ***Some key findings and insights***

- This study clearly showed that in all countries, the amount of cannabis consumed per day increases with increasing frequency (use days), although there is wide variability between users.
- The profiling of users showed that the largest group of the past year users comes on account of the infrequent using population (chippers), who take cannabis less than monthly. Even among past month cannabis users, who are usually considered to be regular users, infrequent use is common.
- The smallest group of intensive users is responsible for the largest part of the total amount of cannabis consumed in all countries.
- Some prior estimates on cannabis consumption tended to be too high, probably because the assumed share of 'high consumption users' was too high, and the assumed amounts of cannabis per unit were higher compared to those assessed in the current study.
- In spite of the overall patterns across user groups, there is appreciable variability between countries in consumption patterns, which seem to argue for country-specific assumptions and estimates.

### ***Recommendations for further research***

- Generally, past month use is considered as reflecting more regular use as compared to those who used in the past year but not in the past month. One of the insights of this study, however, is that people who have consumed cannabis in the past month represent a heterogeneous group of users, including a majority of incidental or 'occasion' user. Multiplying past month frequencies by twelve inherently overestimates annual frequencies. To obtain better insight into the dynamics of cannabis use it would be useful in population surveys not only to ask for frequency in the past month or 30 days but also in the past year or 12 months.
- The amount of cannabis consumed per unit has been investigated for the first time in a comparable way in different EU Member States. While the employed picture card method seemed to provide a consistent pattern across user groups and countries, we have insufficient information on the validity of this method. As the amount per unit is a crucial variable for making reliable market estimates, it is highly recommended to carry out a cross-country validation study, in which different types of cannabis and units are manipulated. Ideally, such a study should result in an improved and feasible method for estimating amounts to be implemented in (population) surveys.
- Further to this, it would be recommended to include questions in population surveys not only on the frequency of cannabis use but also the number of units per typical use day, the type of cannabis and, whenever a feasible method has been established (see later), the amounts per unit.
- In the current study respondents could indicate the number of units only in whole numbers, while in fact people may take less than one joint, especially the less frequent users who predominantly get their cannabis from others. More precise estimates could be obtained by allowing numbers of units with one decimal or at least halve units.
- The issue of sharing and how it affects market estimates has not yet been resolved. It was an unexpected finding that such a high proportion of users indicated to have shared their cannabis unit during the last occasion. For chippers and

occasional users, this is consistent with the fact that they much more often get their cannabis from others instead of buying it themselves. Even if we would attempt to correct for sharing by these user groups, this would probably not make much of a difference, because of the low share in the market. However, it may make a difference especially for the intensive users, although sensitivity analyses did not yield strong differences in consumption patterns between those who shared and those who did not. Nonetheless, it would be recommended in future research to ask respondents explicitly how much units on a typical day they consume themselves, excluding numbers of parts of units that are shared.

- There is still insufficient knowledge of the degree of underreporting of cannabis use in population surveys, how it might be associated with the survey methodology and/or differ between countries and across different user groups. This issue is an important target for further research, as underreporting may be a relevant source of estimation uncertainty.

## 6 References

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## Annex 1: Additional tables

Table A.1: Type of marihuana usually consumed\*

	Domestically produced marihuana/skunk		Imported marihuana/skunk		No preference		I don't know	
	N	%	N	%	N	%	N	%
<b>Bulgaria</b>	62	31.2%	13	6.5%	48	24.1%	76	38.2%
<b>Czech Republic</b>	310	62.1%	24	4.8%	106	21.2%	59	11.8%
<b>Italy</b>	325	33.1%	149	15.2%	277	28.2%	230	23.4%
<b>Netherlands</b>	482	49.4%	26	2.7%	228	23.4%	240	24.6%
<b>Portugal</b>	47	36.2%	11	8.5%	16	12.3%	56	43.1%
<b>Sweden</b>	277	38.8%	115	16.1%	130	18.2%	192	26.9%
<b>England &amp; Wales</b>	110	41.5%	25	9.4%	35	13.2%	95	35.8%
<b>Total</b>	1,613	42.9%	363	9.6%	840	22.3%	948	25.2%

\* Row percentages sum to 100

Table A.2: Type of hash usually consumed\*

	Domestically produced hash		Imported hash		No preference		I don't know	
	N	%	N	%	N	%	N	%
<b>Bulgaria</b>	4	12.5%	8	25.0%	10	31.3%	10	31.3%
<b>Czech Republic</b>	106	43.4%	61	25.0%	35	14.3%	42	17.2%
<b>Italy</b>	72	9.0%	285	35.7%	214	26.8%	228	28.5%
<b>Netherlands</b>	164	22.4%	184	25.1%	155	21.1%	230	31.4%
<b>Portugal</b>	3	2.7%	46	41.1%	12	10.7%	51	45.5%
<b>Sweden</b>	29	5.1%	233	40.9%	134	23.5%	174	30.5%
<b>England &amp; Wales</b>	18	18.0%	39	39.0%	10	10.0%	33	33.0%
<b>Total</b>	396	15.3%	856	33.1%	570	22.0%	768	29.7%

\* Row percentages sum to 100.

Table A.3: Mean and median number of joints smoked on a typical use day by 6-level user group and country

		Chipper	Occasional user	Regular user1	Regular user2	Almost daily user	Daily user
Bulgaria	Mean	1.24	1.48	1.74	2.43	4.35	3.33
	Median	1.00	1.00	1.97	2.00	3.00	3.50
	N	81	23	37	20	14	6
Czech Republic	Mean	1.61	1.51	1.68	2.47	3.42	3.88
	Median	1.00	1.00	1.96	2.00	2.99	3.00
	N	96	60	55	28	45	18
Italy	Mean	1.38	1.69	2.48	2.98	3.22	4.88
	Median	1.00	1.00	2.00	2.77	2.67	4.24
	N	178	138	160	152	182	108
Netherlands	Mean	1.19	1.57	2.28	2.73	3.32	4.76
	Median	1.00	1.00	2.00	2.04	2.95	4.00
	N	336	190	140	88	125	100
Portugal	Mean	1.48	2.52	2.27	3.28	3.51	4.16
	Median	1.00	2.00	2.03	3.00	2.47	4.00
	N	44	18	16	16	29	11
Sweden	Mean	1.50	2.28	3.07	3.67	4.13	4.68
	Median	1.00	2.00	3.00	3.00	3.00	4.96
	N	163	127	111	68	58	20
United Kingdom	Mean	1.46	1.57	2.53	2.51	4.54	6.68
	Median	1.00	1.00	2.00	2.00	3.11	5.00
	N	64	41	35	16	28	15
All countries	Mean	1.36	1.77	2.42	2.98	3.50	4.79
	Median	1.00	1.50	2.00	2.77	3.00	4.00
	N	962	597	554	388	481	278

Table A.4: Mean and median amount of cannabis usually consumed per joint by 6-level user group and country

		Chipper	Occasional user	Regular user1	Regular user2	Almost daily user	Daily user
Bulgaria	Mean	.125	.191	.138	.180	.152	.333
	Median	.100	.200	.148	.150	.175	.349
	N	74	21	36	20	14	6
Czech Republic	Mean	.151	.200	.184	.213	.238	.277
	Median	.150	.200	.195	.199	.245	.271
	N	93	58	53	26	45	18
Italy	Mean	.132	.165	.220	.242	.249	.276
	Median	.100	.150	.215	.250	.250	.292
	N	168	135	157	149	176	107
Netherlands	Mean	.162	.180	.190	.226	.240	.256
	Median	.150	.150	.200	.242	.250	.251
	N	316	185	133	84	121	95
Portugal	Mean	.111	.174	.133	.222	.188	.165
	Median	.100	.200	.147	.248	.195	.159
	N	43	17	16	16	27	10
Sweden	Mean	.166	.189	.217	.231	.280	.314
	Median	.150	.191	.228	.246	.300	.399
	N	159	124	109	65	58	18
United Kingdom	Mean	.135	.169	.174	.150	.177	.278
	Median	.113	.150	.150	.150	.150	.300
	N	59	39	34	16	25	15
All countries	Mean	.149	.180	.197	.226	.239	.269
	Median	.150	.150	.200	.242	.250	.287
	N	912	579	538	376	466	269

Table A.5: Mean and median amounts of cannabis consumed per joint if the maximum dose is set at 0.4 gram (left) or 0.5 gram (right)

		Maximum dose set at 0.4 gram		Maximum dose set at 0.5 gram	
		Mean	Median	Mean	Median
Bulgaria	Chipper	.125	.100	.128	.100
	Occasional	.191	.200	.196	.200
	Regular	.153	.150	.157	.150
	Intensive	.206	.200	.221	.200
Czech Republic	Chipper	.151	.150	.154	.150
	Occasional	.200	.200	.212	.200
	Regular	.194	.199	.202	.199
	Intensive	.249	.250	.268	.250
Italy	Chipper	.132	.100	.135	.100
	Occasional	.165	.150	.172	.150
	Regular	.231	.244	.247	.244
	Intensive	.259	.262	.278	.262
Netherlands	Chipper	.162	.150	.165	.150
	Occasional	.180	.150	.187	.150
	Regular	.204	.200	.212	.200
	Intensive	.247	.250	.269	.250
Portugal	Chipper	.111	.100	.113	.100
	Occasional	.174	.200	.174	.200
	Regular	.177	.163	.182	.180
	Intensive	.182	.167	.185	.167
Sweden	Chipper	.166	.150	.172	.150
	Occasional	.189	.191	.196	.191
	Regular	.222	.238	.235	.240
	Intensive	.288	.300	.325	.300
England & Wales	Chipper	.135	.113	.135	.113
	Occasional	.169	.150	.176	.150
	Regular	.166	.150	.173	.150
	Intensive	.215	.200	.232	.200
All countries	Chipper	.149	.150	.152	.150
	Occasional	.180	.150	.187	.150
	Regular	.209	.200	.221	.200
	Intensive	.250	.250	.271	.250

Table A.6: Differences in the mean and median annual amount of cannabis consumed for the all types of units and for only joints\*

		Chipper	Occasional	Regular	Intensive
Bulgaria	Mean	0.0	0.7	0.0	12.6
	Median	-0.1	0.0	0.0	36.6
Czech Republic	Mean	0.1	1.2	16.1	47.2
	Median	0.2	0.4	2.2	0.0
Italy	Mean	0.0	-0.1	-0.5	20.0
	Median	0.0	-0.7	0.0	11.6
Netherlands	Mean	0.1	-0.2	-1.2	10.3
	Median	0.0	0.0	-0.5	0.0
Portugal	Mean	0.0	0.0	0.0	-4.6
	Median	0.0	0.0	0.0	0.0
Sweden	Mean	0.0	1.0	-4.5	15.9
	Median	0.0	-0.1	-2.0	-10.0
England & Wales	Mean	0.0	0.5	9.4	-47.6
	Median	-0.1	-0.3	6.0	-1.2
All countries	Mean	0.0	0.6	0.4	15.1
	Median	0.0	-0.2	0.0	4.5

\* Positive values indicate higher amounts for the total units compared to joints.

Table A.7: Mean and median amount (gram) of cannabis consumed by user group and gender

		Chipper		Occasional		Regular		Intensive	
		Male	Female	Male	Female	Male	Female	Male	Female
Bulgaria	Mean	.6	.8	4.6	5.6	54.5	27.2	304.1	197.7
	Median	.4	.6	3.9	5.4	33.8	18.6	278.9	130.2
	N	38	43	13	10	40	17	14	6
Czech Republic	Mean	1.5	1.0	10.7	6.7	63.2	37.7	304.8	172.8
	Median	.9	.6	7.1	4.5	35.6	26.0	256.5	188.0
	N	40	56	35	25	57	26	54	9
Italy	Mean	1.4	.7	8.6	6.0	110.1	93.7	356.6	321.7
	Median	.8	.3	5.4	3.6	68.5	60.9	268.5	204.2
	N	100	78	101	37	258	54	254	36
Netherlands	Mean	1.0	.8	7.6	8.6	82.9	53.5	369.3	279.7
	Median	.6	.6	5.3	3.9	52.7	29.0	268.2	194.1
	N	203	133	137	53	167	61	164	61
Portugal	Mean	.6	1.4	12.3	8.3	115.5	72.2	166.9	449.6
	Median	.4	.5	9.3	7.8	57.3	34.3	130.2	439.7
	N	23	21	12	6	17	15	33	7
Sweden	Mean	1.4	.8	12.7	12.3	114.6	109.6	400.0	363.6
	Median	.8	.5	7.1	7.4	65.9	86.3	303.1	329.3
	N	125	38	115	12	165	14	71	7
England & Wales	Mean	1.3	.9	9.4	3.6	68.7	32.3	490.5	481.9
	Median	.5	.6	6.2	2.3	34.5	19.3	333.2	194.7
	N	24	40	28	13	36	15	37	6
All countries	Mean	1.2	.9	9.6	7.4	96.6	63.4	356.2	302.9
	Median	.7	.5	6.2	4.4	54.3	35.7	268.5	195.3
	N	553	409	441	156	740	202	627	132

Bulgaria (gender  $P=.025$ ; gender x user group  $P=.083$ ); Czech Republic : gender ( $P=.006$ ); gender x user group  $P=.025$ ); Italy (gender  $P=.441$ ; gender x user group  $P=.903$ ), Netherlands (gender  $P=.030$ ; gender x user group  $P=.065$ ); Portugal (gender  $P=.007$ ; gender x user group  $P=.0001$ ); Sweden (gender  $P=.661$ ; gender x user group  $P=.962$ ); England & Wales (gender  $P=.814$ , gender x user group  $P=.993$ ).

Table A.8: Mean amount (gram) of cannabis consumed per typical use day by user and country

	Chipper	Occasional	Regular	Intensive
Bulgaria	.18	.28	.31	.87
Czech Republic	.28	.36	.47	1.04
Italy	.21	.29	.67	1.11
Netherlands	.21	.29	.52	1.06
Portugal	.19	.42	.54	.64
Sweden	.26	.48	.77	1.28
England & Wales	.22	.29	.52	1.31
Total	.22	.35	.60	1.10

Table A.9: Mean scores for each of the 6 CAST items by user group

	Chipper	Occasional	Regular	Intensive
Using alone	.44	.91	1.60	2.34
Using before midday	.66	1.59	2.30	3.02
Memory problems	.54	.97	1.18	1.26
Told to reduce or stop	.27	.53	.91	1.33
Tried to reduce or stop without success	.12	.22	.42	.59
(Social) problems because of use	.20	.32	.52	.60

\*Differences between groups were significant for all items at  $P=.0001$ .

Table A.10: Proportion of users by CAST scores\*

CAST scores		Chipper	Occasional	Regular	Intensive
<b>Bulgaria</b>	0 to 6	86%	65%	65%	17%
	7 to 11	11%	25%	31%	67%
	≥ 12	3%	10%	4%	17%
<b>Czech Republic</b>	0 to 6	91%	81%	57%	25%
	7 to 11	8%	18%	34%	53%
	≥ 12	1%	1%	9%	21%
<b>Italy</b>	0 to 6	91%	83%	53%	37%
	7 to 11	8%	14%	39%	50%
	≥ 12	1%	3%	8%	13%
<b>Netherlands</b>	0 to 6	92%	78%	45%	16%
	7 to 11	6%	16%	44%	43%
	≥ 12	2%	6%	11%	41%
<b>Portugal</b>	0 to 6	93%	88%	52%	29%
	7 to 11	2%	12%	34%	43%
	≥ 12	4%	0%	14%	29%
<b>Sweden</b>	0 to 6	89%	67%	38%	20%
	7 to 11	9%	30%	52%	52%
	≥ 12	2%	3%	10%	29%
<b>England &amp; Wales</b>	0 to 6	95%	73%	46%	19%
	7 to 11	5%	18%	44%	64%
	≥ 12	0%	8%	10%	17%
<b>All countries</b>	0 to 6	91%	76%	49%	26%
	7 to 11	7%	20%	42%	50%
	≥ 12	2%	4%	9%	24%

\* Differences between groups were significant for all countries at  $P=0.0001$ .

Table A.12: Days of the week on which cannabis is usually consumed by user group\*

	Chipper	Occasional	Regular	Intensive
<b>Bulgaria</b>				
Only on weekends	38%	23%	3%	0%
More often on weekends than on weekdays	25%	42%	49%	14%
Just as often on weekends as on weekdays	30%	31%	46%	73%
More often on weekdays than on weekends	4%	0%	2%	14%
Only on weekdays	4%	4%	0%	0%
<b>Czech Republic</b>				
Only on weekends	40%	22%	9%	1%
More often on weekends than on weekdays	38%	39%	40%	27%
Just as often on weekends as on weekdays	15%	32%	42%	65%
More often on weekdays than on weekends	3%	5%	8%	6%
Only on weekdays	3%	3%	1%	1%
<b>Italy</b>				
Only on weekends	34%	20%	3%	0%
More often on weekends than on weekdays	26%	38%	33%	13%

Just as often on weekends as on weekdays	31%	36%	58%	83%
More often on weekdays than on weekends	5%	5%	5%	4%
Only on weekdays	4%	1%	1%	0%
<b>Netherlands</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>
Only on weekends	70%	47%	11%	2%
More often on weekends than on weekdays	15%	32%	44%	23%
Just as often on weekends as on weekdays	10%	14%	36%	70%
More often on weekdays than on weekends	2%	4%	8%	5%
Only on weekdays	3%	2%	2%	0%
<b>Portugal</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>
Only on weekends	41%	21%	9%	0%
More often on weekends than on weekdays	22%	47%	38%	36%
Just as often on weekends as on weekdays	27%	21%	34%	62%
More often on weekdays than on weekends	4%	11%	19%	2%
Only on weekdays	6%	0%	0%	0%
<b>Sweden</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>
Only on weekends	53%	31%	7%	2%
More often on weekends than on weekdays	31%	44%	44%	15%
Just as often on weekends as on weekdays	13%	22%	44%	79%
More often on weekdays than on weekends	3%	2%	5%	4%
Only on weekdays	0%	1%	0%	0%
<b>England &amp; Wales</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>
Only on weekends	44%	15%	6%	3%
More often on weekends than on weekdays	26%	58%	45%	24%
Just as often on weekends as on weekdays	25%	21%	46%	70%
More often on weekdays than on weekends	3%	6%	0%	3%
Only on weekdays	3%	0%	3%	0%
<b>Total</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>
Only on weekends	52%	31%	7%	1%
More often on weekends than on weekdays	24%	40%	40%	20%
Just as often on weekends as on weekdays	18%	24%	46%	75%
More often on weekdays than on weekends	3%	4%	6%	5%
Only on weekdays	3%	2%	1%	0%

\* Categories sum to 100% within user groups.

Table A.13: Time of the day on which cannabis is usually consumed by user group\*

<b>Bulgaria</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .001</b>
All day	4%	4%	7%	27%	
At night	18%	8%	8%	5%	
In the evening	45%	35%	41%	27%	
In the afternoon	1%	0%	12%	0%	
In the morning	0%	0%	2%	0%	
No specific time	32%	54%	31%	41%	
<b>Czech Republic</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .000</b>
All day	1%	2%	12%	37%	
At night	21%	9%	4%	1%	
In the evening	53%	56%	38%	25%	
In the afternoon	9%	13%	15%	14%	
In the morning	0%	1%	1%	0%	
No specific time	17%	19%	29%	22%	
<b>Italy</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .000</b>
All day	2%	3%	12%	26%	
At night	19%	13%	11%	8%	
In the evening	51%	65%	48%	38%	
In the afternoon	4%	2%	4%	1%	
In the morning	1%	0%	1%	0%	
No specific time	23%	17%	25%	27%	
<b>Netherlands</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .000</b>
All day	1%	0%	4%	26%	
At night	17%	16%	6%	1%	
In the evening	61%	69%	64%	53%	
In the afternoon	3%	2%	4%	3%	
In the morning	0%	0%	0%	0%	
No specific time	18%	13%	23%	18%	
<b>Portugal</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .055</b>
All day	0%	0%	9%	19%	
At night	80%	63%	66%	50%	
In the evening	4%	5%	6%	5%	
In the afternoon	2%	0%	0%	2%	
In the morning	0%	5%	0%	0%	
No specific time	14%	26%	19%	24%	
<b>Sweden</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .000</b>
All day	2%	1%	7%	21%	
At night	15%	8%	4%	1%	
In the evening	60%	60%	59%	45%	
In the afternoon	5%	8%	6%	5%	
In the morning	0%	1%	0%	1%	
No specific time	18%	22%	23%	28%	
<b>England &amp; Wales</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P= .000</b>
All day	0%	0%	6%	23%	
At night	29%	34%	20%	7%	
In the evening	48%	47%	37%	34%	
In the afternoon	1%	8%	7%	1%	
In the morning	0%	0%	0%	0%	
No specific time	22%	11%	31%	34%	

All countries	Chipper	Occasional	Regular	Intensive	P= .000
All day	1%	1%	8%	26%	
At night	21%	15%	10%	6%	
In the evening	54%	60%	50%	39%	
In the afternoon	4%	5%	6%	4%	
In the morning	0%	1%	1%	0%	
No specific time	20%	19%	25%	25%	

\* Categories sum to 100% within user groups

**Table A.14: Location where cannabis is usually consumed\***

Bulgaria	Chipper	Occasional	Regular	Intensive	P=.434
At my own home	19%	14%	26%	33%	
At someone else's home	15%	33%	16%	19%	
At a private party	14%	10%	2%	0%	
At school, college or university	1%	0%	2%	0%	
On the street or in a park	38%	19%	37%	24%	
At a pub/bar	1%	0%	0%	0%	
At another place of entertainment	1%	5%	2%	5%	
At a music concert or festival	1%	5%	0%	0%	
Other	9%	14%	16%	19%	
Czech Republic	Chipper	Occasional	Regular	Intensive	P=.000
At my own home	15%	18%	29%	40%	
At someone else's home	14%	14%	9%	1%	
At a private party	10%	8%	5%	0%	
At school, college or university	0%	1%	2%	1%	
On the street or in a park	23%	18%	30%	39%	
At a pub/bar	12%	14%	10%	6%	
At another place of entertainment (e.g. disco, night club)	4%	8%	2%	2%	
At a music concert or festival	8%	5%	2%	1%	
Tea house	1%	0%	1%	0%	
Other	1%	12%	9%	11%	
Italy	Chipper	Occasional	Regular	Intensive	P=.000
At my own home	15%	31%	51%	65%	
At someone else's home	27%	28%	18%	8%	
At a private party	16%	4%	0%	0%	
At school, college or university	1%	4%	0%	2%	
On the street or in a park	22%	23%	23%	15%	
At a pub/bar	1%	4%	0%	2%	
At another place of entertainment (e.g. disco, night club)	2%	1%	1%		
At a music concert or festival	1%	1%	0%	0%	
Other	14%	4%	6%	9%	
The Netherlands	Chipper	Occasional	Regular	Intensive	P=.000
At my own home	24%	34%	52%	65%	
At someone else's home	30%	27%	22%	11%	
At a private party	9%	6%	0%	0%	
At school, college or university	0%	0%	1%	1%	
On the street or in a park	12%	16%	14%	12%	
At a pub/bar	1%	3%	1%	0%	

At another place of entertainment (e.g. disco, night club)	4%	4%	1%	0%	
At a music concert or festival	5%	2%	0%	0%	
In a coffee shop	5%	3%	5	6%	
Other	10%	7%	3%	5%	
<b>Portugal</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P=.000</b>
At my own home	11%	28%	53%	74%	
At someone else's home	35%	6%	3%	11%	
At a private party	11%	0%	0%	0%	
At school, college or university	15%	28%	23%	5%	
On the street or in a park	13%	28%	10%	3%	
At a pub/bar	0%	6%	7%	0%	
At another place of entertainment (e.g. disco, night club)	4%	6%	0%	0%	
At a music concert or festival	11%	0%	0%	5%	
Smartshops and other	0%	0%	3%	3%	
<b>Sweden</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P=.000</b>
At my own home	33%	62%	67%	82%	
At someone else's home	32%	20%	11%	4%	
At a private party	14%	2%	1%	0%	
At school, college or university	0%	0%	0%	1%	
On the street or in a park	11%	9%	13%	8%	
At a pub/bar	1%	0%	0%	0%	
At another place of entertainment (e.g. disco, night club)	1%	0%	0%	0%	
At a music concert or festival	3%	0%	0%	0%	
Other	6%	7%	9%	4%	
<b>England &amp; Wales</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P=.000</b>
At my own home	38%	59%	77%	80%	
At someone else's home	27%	16%	13%	9%	
At a private party	20%	6%	0%	0%	
At school, college or university	2%	2%	0%	0%	
On the street or in a park	6%	10%	5%	2%	
At a pub/bar	2%	0%	0%	2%	
At a music concert or festival	6%	2%	2%	0%	
Other	0%	4%	5%	8%	
<b>All countries</b>	<b>Chipper</b>	<b>Occasional</b>	<b>Regular</b>	<b>Intensive</b>	<b>P=.000</b>
At my own home	23%	40%	52%	64%	
At someone else's home	27%	23%	15%	8%	
At a private party	12%	5%	1%	0%	
At school, college or university	1%	2%	1%	1%	
On the street or in a park	16%	16%	19%	15%	
At a pub/bar	2%	3%	2%	2%	
At another place of entertainment (e.g. disco, night club)	3%	3%	1%	0%	
At a music concert or festival	4%	2%	0%	1%	
Other**	10%	7%	8%	9%	

\* Categories sum to 100% within user groups. Two categories (at a seller's home and at the workplace) are excluded as they were virtually not mentioned by the respondents.

\*\* Smart shops and other locations in Portugal; tea house and other locations in the Czech Republic; Coffee shops and other locations in the Netherlands; other locations in Bulgaria, Italy, Sweden and England & Wales.

Table A.15: Mean and median number of cannabis purchases in the past month\*

		Chipper	Occasional	Regular	Intensive	P=.
<b>Bulgaria</b>	<b>Mean</b>	<b>2.9</b>	<b>1.0</b>	<b>4.7</b>	<b>15.6</b>	<b>.000</b>
	Median	2.0	1.0	4.0	18.0	
	N	8	3	26	10	
<b>Czech Republic</b>	<b>Mean</b>	<b>1.3</b>	<b>3.0</b>	<b>5.1</b>	<b>10.7</b>	<b>.000</b>
	Median	1.0	3.0	4.0	8.0	
	N	6	12	46	57	
<b>Italy</b>	<b>Mean</b>	<b>2.2</b>	<b>2.3</b>	<b>4.6</b>	<b>7.7</b>	<b>.000</b>
	Median	1.0	2.0	4.0	4.0	
	N	13	44	186	189	
<b>Netherlands</b>	<b>Mean</b>	<b>1.8</b>	<b>2.4</b>	<b>6.1</b>	<b>11.4</b>	<b>.000</b>
	Median	1.0	2.0	4.0	8.0	
	N	80	95	161	169	
<b>Portugal</b>	<b>Mean</b>	<b>1.0</b>	<b>2.3</b>	<b>3.1</b>	<b>6.0</b>	<b>.186</b>
	Median	1.0	2.0	2.0	4.0	
	N	3	3	16	20	
<b>Sweden</b>	<b>Mean</b>	<b>1.7</b>	<b>1.6</b>	<b>3.7</b>	<b>6.3</b>	<b>.000</b>
	Median	1.0	1.0	2.0	4.0	
	N	34	68	135	63	
<b>England &amp; Wales</b>	<b>Mean</b>	<b>1.3</b>	<b>2.0</b>	<b>3.8</b>	<b>6.1</b>	<b>.004</b>
	Median	1.0	1.0	4.0	4.0	
	N	6	22	34	48	
<b>All countries</b>	<b>Mean</b>	<b>1.8</b>	<b>2.2</b>	<b>4.8</b>	<b>8.9</b>	<b>.000</b>
	Median	1.0	2.0	4.0	4.0	
	N	150	247	604	556	

\* Among those who had bought cannabis at least once in the past month.

**Table A.16: Amount (gram) of cannabis consumed in the past 30 days estimated with two methods. For all types of units together\***

		Amount of cannabis (gram) based on number of use days and daily amount*	Amount of cannabis (gram) based on money spent and price per gram	Correlations (Pearson's r)
<b>BG</b>	<b>Mean</b>	<b>7.02</b>	<b>4.79</b>	.25 (ns)
	Median	2.40	2.50	
	Minimum	.05	.00	
	Maximum	45.00	37.50	
	<i>N</i>	45	45	
<b>CZ</b>	<b>Mean</b>	<b>15.04</b>	<b>7.65</b>	.31 (P=.001)
	Median	5.76	4.00	
	Minimum	.10	.11	
	Maximum	98.59	100.00	
	<i>N</i>	106	106	
<b>CZ*</b> <b>only joints</b>	<b>Mean</b>	<b>11.42</b>	<b>8.21</b>	.43 (P=.001)
	Median	3.20	4.00	
	Minimum	.20	.11	
	Maximum	64.46	100.00	
	<i>N</i>	55	55	
<b>IT</b>	<b>Mean</b>	<b>15.45</b>	<b>18.51</b>	.24 (P=.000)
	Median	9.18	7.00	
	Minimum	.05	.13	
	Maximum	126.00	560.00	
	<i>N</i>	346	346	
<b>NL</b>	<b>Mean</b>	<b>10.84</b>	<b>10.22</b>	.55 (P=.000)
	Median	3.75	5.00	
	Minimum	.03	.13	
	Maximum	120.00	137.81	
	<i>N</i>	401	401	
<b>PT</b>	<b>Mean</b>	<b>10.50</b>	<b>12.44</b>	.51 (P=.001)
	Median	5.15	7.00	
	Minimum	.05	.25	
	Maximum	52.98	107.19	
	<i>N</i>	37	37	
<b>SE</b>	<b>Mean</b>	<b>9.75</b>	<b>12.50</b>	.23 (P=.000)
	Median	3.19	5.00	
	Minimum	.03	.04	
	Maximum	129.69	420.00	
	<i>N</i>	286	286	
<b>UK</b>	<b>Mean</b>	<b>10.36</b>	<b>8.27</b>	.48 (P=.000)
	Median	3.81	5.49	
	Minimum	.10	.50	
	Maximum	75.00	40.83	
	<i>N</i>	86	86	

\* For the Czech Republic data for joints only have been additionally included. Cases selected for use >0 days and spending >0 Euro in the past month, excluding cases with more than €125 per transaction.

# Report 2

## Amphetamine, ecstasy and cocaine: typology of users, availability and consumption estimates

Tom Frijns and Margriet van Laar

### Abstract

To explore the European drug market from the demand side, we conducted web surveys in seven selected EU Member States (Bulgaria, Czech Republic, Italy, Netherlands, Portugal, Sweden and the United Kingdom) among last year users of (meth)amphetamine, ecstasy and cocaine. These users provided us with information on quantitative and qualitative aspects of their drug use such as their frequency of use and usual locations of purchase and use, thus offering us a window on patterns of drug use and availability. On the basis of past year use frequency, we divided users of each drug into three user type groups of infrequent (less than 11 use days), occasional (11-50 use days) and frequent (51-365 use days) users. We present findings per Member State as a whole and, wherever sample size allows, separately per user type. Our typology shows that infrequent users comprise the largest group for each drug and that the amount consumed on a typical use day increases with increasing frequency of use. We also estimated total annual consumption of (meth)amphetamine in the Czech Republic, the Netherlands and Sweden, and of ecstasy and cocaine in the Netherlands on the basis of the user type distinction. To this end, we calculated mean individual annual consumption within each user type group and combined these figures with absolute numbers of users of each type derived from general and targeted population survey data to arrive at estimates of total annual consumption. Individual annual consumption was higher among occasional than infrequent users and was highest among frequent users. In terms of total annual consumption, the smallest group of frequent users is responsible for the largest part of the total estimated amounts of each drug consumed. We discuss and compare our estimates to those from previous drug market research.

## 1 Introduction

In this report we will start with a brief summary of the latest figures on amphetamine, ecstasy and cocaine use, focusing on the Member States participating in this study (chapter 2). In chapter 3 we explain how we have defined different user groups in the present study. The remainder of that chapter and chapter 4 describe the findings of the web survey conducted in the seven Member States with regard to characteristics of users, especially their consumption patterns, and the availability of the three substances to different user groups. For cocaine, chapter 3 and 4 will deal specifically with cocaine powder due to very limited numbers of crack users in the web survey (a total of only 90 in all seven Member States). This was expected beforehand, since crack users generally belong to the population of marginalized drug users who are not likely to be captured in (population and web) surveys. In chapter 5 we will integrate existing data on the prevalence of amphetamine, ecstasy and cocaine use and web survey data on consumption patterns in order to estimate the total amount of each drug consumed annually per user group. We will also complement these estimates for cocaine and amphetamine with data on the use of (crack) cocaine and amphetamine from the face-to-face interviews. Finally, please note that while our surveys focused on amphetamine in most sample Member States, the Czech survey examined methamphetamine. We will use the term (meth)amphetamine throughout our text when talking about the combined sample Member States, and will occasionally use the term amphetamines when we do not differentiate between these two substances.

## 2 Prevalence of use in the population

In this paragraph we will present figures on use and use patterns of (meth)amphetamine, ecstasy and cocaine in the 7 sample Member States and compare our samples from these countries to these figures from previous research. As reported in report 1 on cannabis, figures on the prevalence of amphetamine, ecstasy and cocaine use for Bulgaria, the Netherlands, Portugal,

Sweden and England & Wales are based on the most recent population surveys. For the Czech Republic, figures from the 2008 survey have been used instead of those from the more recent surveys in 2009 and 2010 (see chapter 4), as the sample sizes of the latter surveys were much lower compared to 2008 (n=1,487 and 1,749 against 4,200) (Mravcik et al. 2011). Moreover, in contrast to the 2008 survey, the two most recent surveys did not assess (or report) data on frequency of use in the past month. Also note that in the Czech Republic, methamphetamine (pervitin) is used instead of amphetamine.

In Italy, figures from the 2008 survey have been given, but the response rate was fairly low (32%), posing questions on the representativeness of the data. Therefore, for making annual consumption estimates, figures from indirect methods will be used to estimate the size of the Italian population using amphetamine, ecstasy and cocaine. Also note that in England & Wales figures refer to age group 16-59 years.

Table 2.1 shows the proportion of last year and last month use prevalence for all three drugs in each of the seven Member States (EMCDDA 2012c). Last year users have used at least once in the last year (or 12 months), while part of these users have also used at least once in the past month (or 30 days).

The data in table 1 show that among our sample Member States, (meth)amphetamine is most prevalent in the Czech Republic and England & Wales. Ecstasy use is also relatively high in these countries, together with the Netherlands, while cocaine use is most prevalent in Italy and England & Wales. Finally, ecstasy use seems to be virtually nonexistent in Sweden.

**Table 2.1: Prevalence of (meth)amphetamine, ecstasy and cocaine use in the general population per Member State**

Country	Year	Age range	Sample size	Amphetamine		Ecstasy		Cocaine	
				Last year	Last month	Last year	Last month	Last year	Last month
<b>Bulgaria</b>	2008	15–64	5,139	0.9	0.2	0.7	0.5	0.7	0.2
<b>Czech Republic</b>	2008	15–64	4,500	1.7	0.7	3.7	1.2	0.7	0.4
<b>Italy</b>	2008	15–64	10,940	0.4	0.1	0.7	0.2	2.1	0.7
<b>Netherlands</b>	2009	15–64	5,779	0.4	0.2	1.4	0.4	1.2	0.5
<b>Portugal</b>	2007	15–64	12,202	0.9	0.2	0.4	0.2	0.6	0.3
<b>Sweden</b>	2008	15–64	22,095	0.8	0.3	0.1	0.0	0.5	0.1
<b>England &amp; Wales</b>	2010/2011	16–59	27,452	1.1	0.4	1.4	0.4	2.2	0.8

Source: EMCDDA, *Statistical Bulletin 2012*.

Table 2.2 shows the prevalence rates from table 2.1 converted to the last month prevalence among last year users to allow for comparison with our samples from the current study, which – due to our inclusion criteria – consist exclusively of last year users. It is immediately clear that the last month prevalences for (meth)amphetamine are higher in our study than derived from EMCDDA data. With the exception of Bulgaria, this is also the case for the last month prevalence of ecstasy use. Last month prevalences of cocaine use from our study and the EMCDDA data are a bit closer together, and differences are less consistent, that is, for some countries last month prevalence is higher in our study and for some countries it is lower than in the EMCDDA data. These findings suggest that, especially for (meth)amphetamine and ecstasy, our strategies of recruiting drug users (see the Introduction to part I) are likely to draw relatively high numbers of past month users.

**Table 2.2: Last month prevalence of (meth)amphetamine, ecstasy and cocaine use among last year users in the general population and the current study per Member State**

Country	Amphetamine		Ecstasy		Cocaine	
	EMCDDA	This study	EMCDDA	This study	EMCDDA	This study
Bulgaria	22.2	50.7	71.4	42.5	28.6	25.0
Czech Republic	41.2	53.8	32.4	40.2	57.1	32.8
Italy	25.0	37.5	28.6	45.6	33.3	40.8
Netherlands	50.0	67.4	28.6	65.2	41.6	57.0
Portugal	22.2	60.0	50.0	69.2	50.0	46.4
Sweden	37.5	40.4	0.0	33.8	20.0	34.6
England & Wales	36.4	62.5	28.6	46.0	36.4	34.1

Source: EMCDDA, *Statistical Bulletin 2012*.

## 2.1 Trends in use

In its 2012 report on the stimulant market, the EMCDDA concluded that Europe is facing an increasingly complex stimulant market, where consumers are confronted with a wide variety of substances (EMCDDA 2012a). While amphetamines, ecstasy and cocaine continue to be the main players on the stimulant scene, they are now competing with a growing number of emerging synthetic drugs. Some relevant highlights from this report and from the national reports of the sample Member States concerning amphetamines, ecstasy and cocaine are summarized below.

### **Amphetamines**

Use of amphetamines remains overall lower than that of cocaine in Europe. Around 13 million Europeans (15–64 years) have tried amphetamines in their lifetime, around 2 million in the last year. Latest trend data show last-year use of amphetamines among young adults (15–34 years) to be overall stable or declining. Although amphetamine is more commonly used, methamphetamine use now appears to be spreading. Availability has risen in the north of Europe, where it has partially been replacing amphetamine as the stimulant drug of choice.

### **Ecstasy**

Around 11.5 million Europeans (15–64 years) have tried 'ecstasy' in their lifetime, around 2 million in the last year. MDMA — the best-known member of the 'ecstasy' group of drugs — seems to be making a comeback following a shortage of MDMA in recent years when tablets sold as 'ecstasy' often contained other substances. While the contents of tablets sold as 'ecstasy' remain diverse, powders and tablets containing high doses of MDMA appear to be becoming more common.

### **Cocaine**

Over the last decade, cocaine has established itself as the most commonly used illicit stimulant drug in Europe, although most users are found in a small number of western EU countries. Around 15.5 million Europeans (15–64 years) have tried cocaine in their lifetime, around 4 million having used it in the last year. While cocaine use remains a major part of the stimulant drug problem, its popularity and image as a 'high-status drug' may be declining. While some countries still report rising cocaine consumption (e.g. Bulgaria), several high-prevalence countries including Italy and the UK report some decline in last-year cocaine use among young adults (15–34 years). Potential users may now be more aware of the negative consequences that can accompany cocaine consumption. Note that in population surveys, users of cocaine are predominantly (integrated) cocaine powders users who snort the drug, while socially marginalized problem users usually smoke 'crack' (or cocaine base) or inject cocaine powder (EMCDDA 2012b; Prinzleve et al. 2004). The latter group may also or mainly include former or current heroin users. Crack use is not widespread in Europe. It has been reported to be mainly an urban phenomenon, in a limited number of cities, although in the Netherlands it is common among problem hard drug users in general, not only in cities.

Low cocaine purity may also be causing some users to switch to other stimulants. Of the 23 countries providing trend data on cocaine purity, 20 reported a decline between 2005 and 2010. The EMCDDA index of average cocaine purity in the EU fell by 22 % in this period. Falling numbers of cocaine seizures and quantities of cocaine seized in Europe, and declining numbers of drug users seeking treatment for cocaine problems also suggest that its popularity may be waning.

## 2.2 Frequency of use (general population)

The EMCDDA model questionnaire for population surveys includes questions on the number of use days in the past 30 days among past year users. For cannabis these data have been reported repeatedly for a selection of countries. For other substances with much lower prevalence rates of use, data on frequencies have not been reported, which is most likely due to the very low number of absolute cases of last month use on which such a distribution is based, and the accordingly high level of uncertainty about the true values. Nonetheless, we have frequency data for two sample Member States, the Czech Republic and Netherlands, which will be presented as 'proxy' frequency measures.

Table 2.3 shows the distribution of frequency of use among last month users of amphetamine, ecstasy and cocaine in the Netherlands (Van Rooij et al. 2011).

**Table 2.3: Frequency of ecstasy, amphetamine and cocaine use among last month users in the general population of 15-64 years in the Netherlands (2009)**

	Frequency	N	%
<b>Ecstasy (LMP=0.4%)</b>	(Almost) daily	3	11%
	Several times/week	0	
	At least once a week	3	12%
	Less than once a week	19	77%
	Total	25	100%
<b>Amphetamine (LMP=0.2%)</b>	(Almost) daily	4	28%
	Several times/week	0	
	At least once a week	2	16%
	Less than once a week	7	56%
	Total	13	100%
<b>Cocaine (LMP=0.5%)</b>	(Almost) daily	2	5%
	Several times/week	1	5%
	At least once a week	5	16%
	Less than once a week	22	74%
	Total	30	100%

LMP= last month prevalence.

Source: Statistics Netherlands.

Table 2.4 shows the distribution of frequency of use among users of methamphetamine, ecstasy and cocaine in the Czech Republic.

**Table 2.4: Frequency of ecstasy, methamphetamine and cocaine use in the general population of 15-64 years in the Czech Republic (2008)**

	Frequency	% of population	% of last month users
<b>Methamphetamine</b>	Never used	95.70	
	Used but not in the last year	2.66	
	Last year but not last month	0.92	
	Last month	0.73	100% (n=33)
	Last month but not last week / „less than once a week in the last 30 days“	0.22	30%
	Once a week or more	0.19	26%
	Several times per week	0.22	30%
	Every day or almost every day	0.10	14%
<b>Ecstasy</b>	Never used	90.41	
	Used but not in the last year	5.96	
	Last year but not last month	2.46	
	Last month	1.17	100% (n=53)
	Last month but not last week / „less than once a week in the last 30 days“	0.69	59%
	Once a week or more	0.38	32%
	Several times per week	0.08	7%
	Every day or almost every day	0.02	2%
<b>Cocaine</b>	Never used	97.97	
	Used but not in the last year	1.29	
	Last year but not last month	0.38	
	Last month	0.36	100% (n=16)
	Last month but not last week / „less than once a week in the last 30 days“	0.17	47%
	Once a week or more	0.15	42%
	Several times per week	0.04	11%
	Every day or almost every day	0.00	0%

**Source:** *General population survey on psychoactive substance use and related attitudes (Běláčková 2008).*

Frequency data based on the 2003 Household Survey in Italy suggest that among past-year cocaine users, 78% used up to once in a month, 13% used 2-4 times in a month, 6% used 2-3 times in a week, and 4% used 4 times or more in a week. A 2009 Spanish general population survey, using frequency of use measures, estimated 140,525 intensive users of cocaine, defined as those who were over the age of 20 and had used cocaine on at least 30 days in the last year or at least 10 days in the last month (125,981), or those who were 20 or under and had used cocaine 10 or more days in the last year and at least one day in the last month (14,544). This would suggest that about 16.5% of last year users of cocaine are intensive users. A city study in Oslo, Norway, also based on a frequency of use measure in a set of four different surveys (among the general population, prison inmates and injecting drug users), identified some 12,000 last year users of cocaine. Of these cocaine users, 15% were identified as problem users (defined as using the drug more than once a week), 35% as recreational users (limited use, not specified further) and just over 50% as experimental users (only one to four times during the last 12 months).

The research presented in this paragraph suggests that the majority of last year users of (meth)amphetamine, ecstasy and cocaine as sampled through population surveys are not intensive users, in terms of frequency of use. It must be, noted, however, that while daily use may not be the norm, use of especially stimulants may occur in binges, during which huge amounts may be consumed within short time periods lasting up to a few days.

## 2.3 Data on prevalence and frequency of use in other (targeted) populations

Amphetamines and ecstasy are associated with attending nightclubs and dance events (EMCDDA, 2012a). Targeted studies provide a view on 'recreational' use of these stimulant drugs by young adults attending a range of different nightlife venues. Information on last year prevalence of ecstasy use among young people attending dance and nightlife settings in 2010/11 is available for two countries: the Czech Republic (43%) and the Netherlands (Amsterdam, 33%). Ecstasy use was more common than amphetamines use in the two samples.

Table 5 shows results from a survey in 2008/2009 which examined substance use among visitors at large scale parties and among clubbers and disco-goers in the Netherlands (Van der Poel et al. 2010). Respondents of 15-35 years were recruited 'on the spot' and asked to answer questions on their substance use in the past month, and to complete a longer questionnaire (on paper or through internet) the day after going out. A total of 920 visitors of parties and 2,044 and visitors of clubs and discos completed the longer questionnaire. The response rate was fairly low (19% for both settings), but this is not uncommon for research in this type of setting. Visitors of parties were on average older than visitors of clubs (24 and 22 years, respectively). While the prevalence of drug use was higher among visitors of large-scale parties compared to clubs, the frequency distribution among past month users was more or less the same. Table 3 shows the combined frequency of use of amphetamine, ecstasy and cocaine among visitors from both settings combined, divided into past year (but not past month) users and past month users.

These data show that also in this relatively 'high risk' sample, the large majority of respondents was an infrequent user and/or limited their use to special occasions. This pattern is supported by more recent qualitative and quantitative studies in the nightlife scene in Amsterdam (Benschop et al. 2011; Nabben et al. 2012). For example, among last year users of ecstasy recruited in pubs, no one was a (near) daily user, 1% used a few days per week, 4% used only in the weekend, 79% now and then or only at special occasions, and 16% used seldom/hardly ever. For last year users of cocaine nobody used (near) daily or a few times per week, 15% used only in weekends, 56% used now and then/only at special occasions and 27% used seldom. For amphetamine, these proportions were 0% (daily or near daily), 8% (several times per week), 8% (only during weekends), 50% now and then/at special occasions and 33% (seldom).

**Table 2.5: Frequency of use among past month users and past year/not past month users of ecstasy, amphetamine and cocaine among visitors of parties and festivals in the Netherlands (15-35 years)**

		Past month users		Past year – not past month users	
		n	%	n	%
<b>Ecstasy</b>	(Almost) daily	2	0.6%	0	0%
	Several times/week	1	0.3%	0	0%
	Only in weekend	35	9.6%	0	0%
	Only at special occasions	247	68.0%	84	42.6%
	Seldom	78	21.5%	113	57.4%
	Total	363	100%	197	100%
<b>Amphetamine</b>	(Almost) daily	5	4.0%	3	3.2%
	Several times/week	6	4.8%	0	0%
	Only in weekend	23	18.4%	3	3.3%
	Only at special occasions	62	49.6%	26	28.6%
	Seldom	29	23.2%	59	64.8%
	Total	125	100%	91	100%
<b>Cocaine</b>	(Almost) daily	5	2.5%	1	0.6%
	Several times/week	6	3.1%	0	0%
	Only in weekend	32	16.5%	3	1.9%
	Only at special occasions	104	53.6%	44	27.7%
	Seldom	47	24.2%	111	69.8%
	Total	194	100%	159	100%

Source: Van der Poel et al. 2010; National report The Netherlands 2010.

The 2009 Belgian Partywise Study in different nightlife settings in the Flemish Community (Rosiers 2010) provides data similar to those from the Dutch study by Van der Poel and colleagues (2010). In this study, questionnaires were completed by ca. 650 respondents (mainly between 15-30 years old) who were selected randomly at a variety of venues. Table 2.6 presents the findings from this study on the frequency of use for amphetamine, ecstasy and cocaine in Flemish nightlife settings.

**Table 2.6: Frequency of use of amphetamine, ecstasy and cocaine among visitors of clubs, parties and festivals in Flanders (n=607; mean age=22.2 years)**

	Frequency	% of target population	% of last year users
<b>Amphetamine</b>	Never used	81.4	
	Used but not in the past year	13.0	
	Used in the past year	5.7	100%
	Once a month or less	3.7	64.9%
	Several times a month	0.8	14.0%
	Once a week	0.5	8.8%
	Several times a week	0.5	8.8%
	Daily	0.2	3.5%
<b>Ecstasy</b>	Never used	74.1	
	Used but not in the past year	15.6	
	Used in the past year	10.2	100%
	Once a month or less	7.1	69.6%
	Several times a month	2.0	19.6%
	Once a week	0.8	7.8%
	Several times a week	0.3	2.9%
	Daily	0.0	0.0%
<b>Cocaine</b>	Never used	76.6	
	Used but not in the last year	10.9	
	Used in the past year	12.5	100%
	Once a month or less	7.0	56.0%
	Several times a month	3.2	25.6%
	Once a week	1.5	12%
	Several times a week	0.5	4.0%
	Daily	0.3	2.4%

Source: Rosiers 2010; National Report Belgium 2011.

A study on cocaine use in nine European cities collected data among three subgroups: users in addiction treatment (n=632), socially marginalized users not in treatment (n=615), and socially integrated users (n=608) (Prinzleve et al. 2004). Mean number of use days in the last 30 days for cocaine powder and crack cocaine were respectively 11.2 and 5.5 days for users in treatment, 13.9 and 7.9 days for marginalized users and 7.0 and 0.2 days for integrated users. There are no reports of the amounts consumed per typical use day for these different populations, Note also that the selection criterion for inclusion in the study was use of cocaine at least once in the past month, so relatively infrequent users have not been included.

## 3 Drug use and classifications or typologies of users

### 3.1 Definition of user types

As with cannabis, we classified in this study users of (meth)amphetamine, ecstasy and cocaine on the basis of the number of use days in the past 12 months (annual frequency). We, however, could not match the division into four user type groups because in particular the numbers of (highly) frequent users (especially those using near daily or daily) were too small. There are two explanations for this. First, with the exception of the Netherlands, the overall sample sizes in our web survey for (meth)amphetamine, ecstasy and cocaine users were far smaller than the ones for cannabis. With increasing frequency of use the number of users per group (category) size decreases (see figures 3.1 to 3.3). This resulted in especially small groups of the more frequent user types. Second, as population surveys yield few to no daily or near daily users of these drugs, daily

or near daily use of these drugs may be much rarer than it is for cannabis. In fact, for ecstasy there may be hardly any daily users at all (see for example Sterk et al. 2006). Therefore, we opted to combine the categories of regular and intensive users into a single category that we labelled frequent users.

This resulted in a differentiation between the following three main groups of user types:

- **Infrequent users** = people using on less than 11 days in the past year (≈ 'less than once a month')
- **Occasional users** = people using on 11-50 days (≈ 'less than once a week but at least once a month')
- **Frequent users** = people using cannabis on 51 to more than 350 days (≈ 'once a week or more').

Only the Dutch samples consisted of sufficient respondents per user type across the three drugs to provide reliable figures for these three user types. Of the other Member States, the Czech Republic and Sweden provided sufficient respondents in the three user types for (meth)amphetamine, but not for ecstasy and cocaine. We therefore decided to differentiate between the three user types only for those drugs in the selected Member States where we had sufficient numbers of respondents (20 or more) in each user type group (i.e., the Netherlands for all three drugs and the Czech Republic and Sweden for (meth)amphetamine). For the other drugs in the selected Member States, we will report only on the total sample per drug, not differentiating between different user types.<sup>1</sup>

As with cannabis, the number of use days is not equally distributed over the different groups. With its combination of regular and intensive users, especially the frequency range for the category 'frequent users' is quite wide (51 - >350 days in the past 12 months) and may be heterogeneous, although conceptually this group can be seen as those who consume at least weekly.

Using the three category classification (infrequent, occasional and frequent), 55% of the respondents in the total (meth)amphetamine sample could be classified as infrequent user, 26% as occasional user and 19% as frequent user (figure and table 3.1). The average number of use days in the past 12 months within these categories was 4.3, 25 and 172, respectively. Table 3.1 shows that this distribution varied across the Member States, but that a pattern of decreasing category size with increasing frequency category could be found in all countries. This means that the proportion of infrequent users was highest while the proportion of frequent users was lowest in all countries.

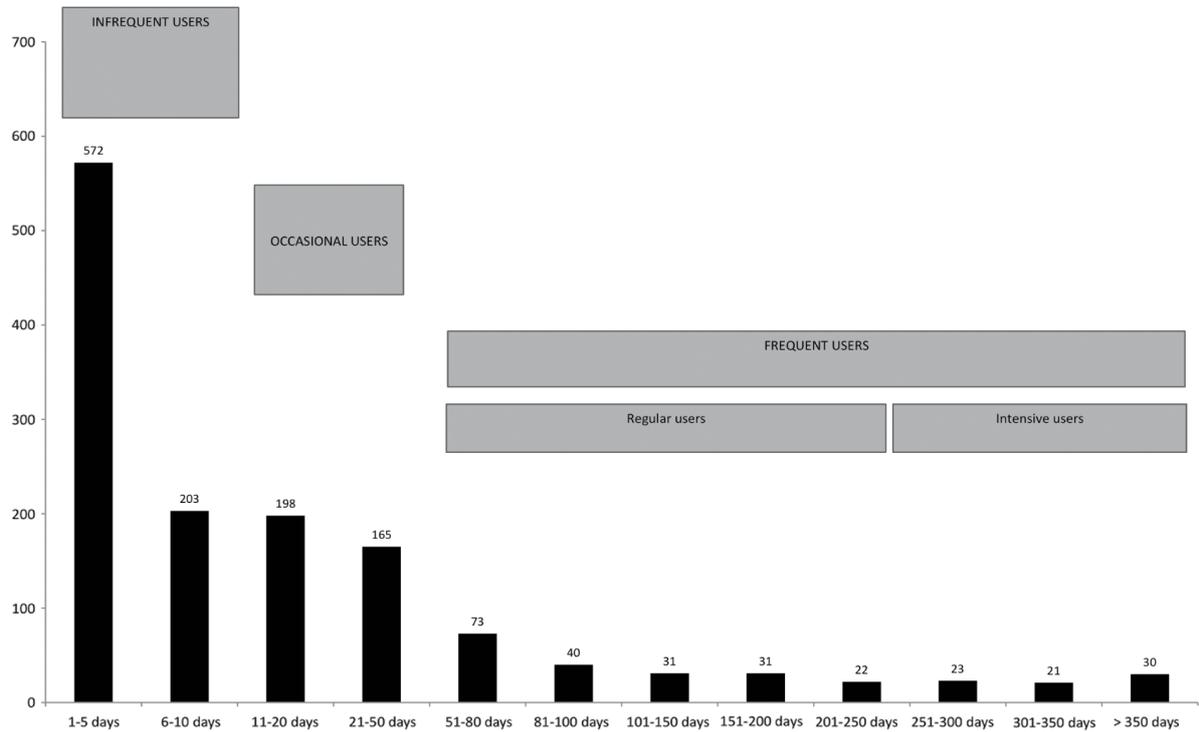
In the total ecstasy sample, 67% of the respondents could be classified as infrequent user, 29% as occasional user and 5% as frequent user (figure and table 3.2). This picture supports our assumption that frequent or regular use of ecstasy is rather unusual. The average number of use days within these categories was 4.7, 22, and 133, respectively. Table 3.2 shows that these proportions varied across countries, but the proportion of infrequent users was highest while the proportion of frequent users was lowest in all countries.

In the total cocaine sample, 69% of the respondents could be classified as infrequent user, 21% as occasional user and 10% as frequent user (figure and table 3.3). The average number of use days within these categories was 4.1, 25, and 128, respectively. Again, the distribution varied across Member States, but the proportion of infrequent users was highest while the proportion of frequent users was lowest in all countries (see table 3.3).

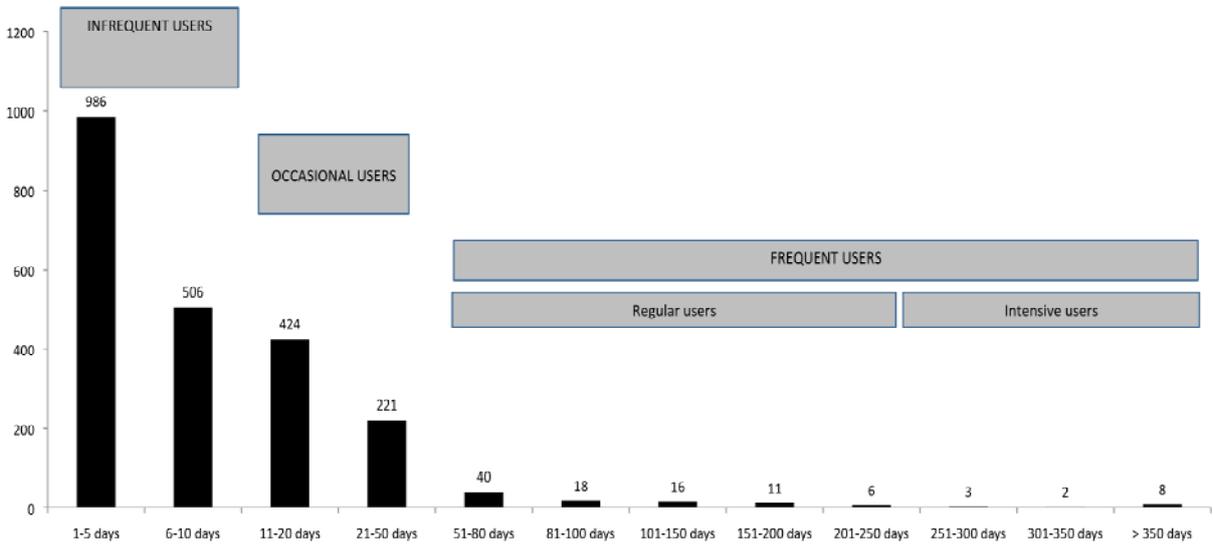
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<sup>1</sup> In the few instances where we do report on (sub)groups containing less than 20 cases, descriptive statistics will be placed between brackets.

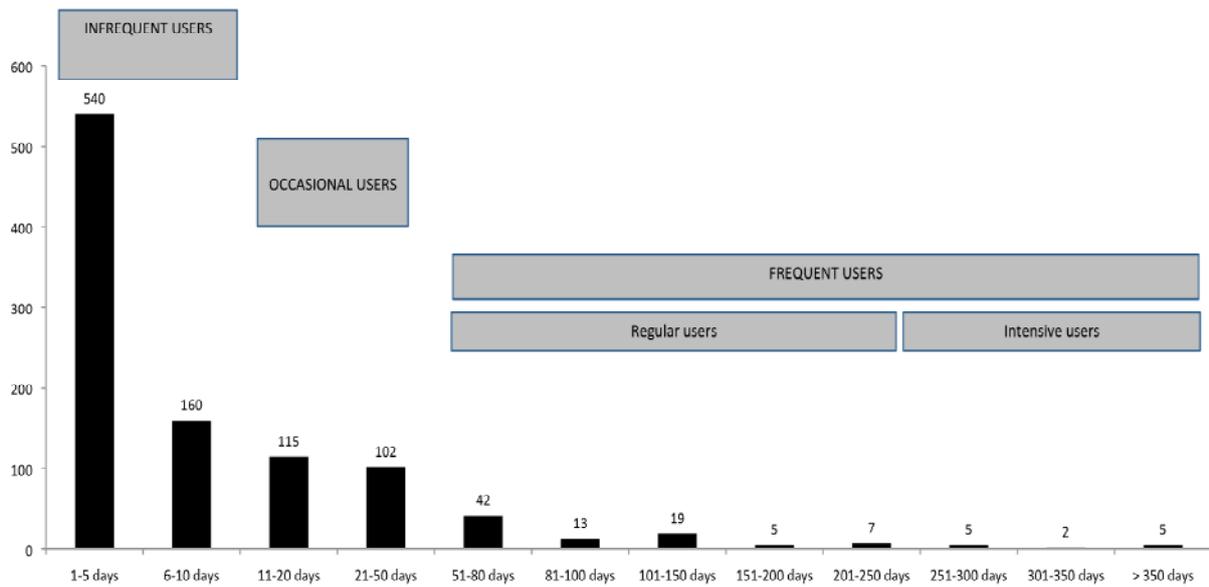
**Figure 3.1:** Number of respondents in the total (meth)amphetamine sample per frequency category (= number of days used in the past 12 months)



**Figure 3.2:** Number of respondents in the total ecstasy sample per frequency category (= number of days used in the past 12 months)



**Figure 3.3:** Number of respondents in the total cocaine sample per frequency category (= number of days used in the past 12 months)



**Table 3.1:** Numbers and proportions of (meth)amphetamine users by user group and country

		Infrequent	Occasional	Frequent	Total
<b>Bulgaria</b>	Number	43	17	15	75
	%	57%	23%	20%	100%
<b>Czech Republic</b>	Number	72	37	34	143
	%	50%	26%	24%	100%
<b>Italy</b>	Number	49	8	7	64
	%	77%	13%	11%	100%
<b>Netherlands</b>	Number	450	263	182	895
	%	50%	29%	20%	100%
<b>Portugal</b>	Number	13	1	1	15
	%	87%	7%	7%	100%
<b>Sweden</b>	Number	134	30	29	193
	%	69%	16%	15%	100%
<b>England &amp; Wales</b>	Number	14	7	3	24
	%	58%	29%	13%	100%
<b>All countries</b>	Number	775	363	271	1,409
	%	55%	26%	19%	100%

Table 3.2: Numbers and proportions of ecstasy users by user group and country

		Infrequent	Occasional	Frequent	Total
Bulgaria	Number	28	11	1	40
	%	70%	28%	3%	100%
Czech Republic	Number	104	21	7	132
	%	79%	16%	5%	100%
Italy	Number	51	11	6	68
	%	75%	16%	9%	100%
Netherlands	Number	1,111	579	87	1,777
	%	63%	33%	5%	100%
Portugal	Number	11	1	1	13
	%	85%	8%	8%	100%
Sweden	Number	137	9	2	148
	%	93%	6%	1%	100%
England & Wales	Number	50	13	0	63
	%	79%	21%	0%	100%
All countries	Number	1,492	645	104	2,241
	%	67%	29%	5%	100%

Table 3.3: Numbers and proportions of cocaine users by user group and country

		Infrequent	Occasional	Frequent	Total
Bulgaria	Number	13	4	3	20
	%	65%	20%	15%	100%
Czech Republic	Number	54	8	5	67
	%	81%	12%	8%	100%
Italy	Number	69	20	9	98
	%	70%	20%	9%	100%
Netherlands	Number	427	159	68	654
	%	65%	24%	10%	100%
Portugal	Number	17	6	5	28
	%	61%	21%	18%	100%
Sweden	Number	83	13	8	104
	%	80%	13%	8%	100%
England & Wales	Number	37	7	0	44
	%	84%	16%	0%	100%
All countries	Number	700	217	98	1,015
	%	69%	21%	10%	100%

In the next sections, user characteristics, use patterns and circumstances of use for each of the three drugs will be described on the basis of the total samples per sample Member State and user types where possible. We will examine whether there are differences between Member States and – where the data allow – between user types. We will – where the data allow - also examine whether there are differences between user groups in the total samples and whether these differences are consistent across countries. Note that data for all seven Member States combined are not weighted, so that countries with relatively large samples (in particular the Netherlands, but also Sweden, the Czech Republic and Italy) will contribute most to the overall averages. To deal with this overrepresentation of Dutch users in the total sample and the small numbers of (certain types of) users in some other Member States, we conducted many of our analyses while controlling for Dutch sample versus the combined other Member State's samples (instead of controlling separately for the Member States). This means that we include a dichotomous variable - coding each case as coming from the sample from the Netherlands or one of the other Member States' samples – as a factor in the analyses. If inclusion of this factor changes the results, this tells us something about whether a finding is present across countries or is solely driven by the large Dutch sample. For example, if a difference between groups is not present in the total sample but pops up when controlling for this factor, then the difference likely exists in the combined other Member States

but not in the Netherlands. Conversely, if a difference between groups exists in the total sample but disappears when controlling for this factor, then the difference likely exists in the Netherlands but not in the combined other Member States.

## 3.2 Demographics

### 3.2.1 Gender

#### **Amphetamine**

Table 3.4 shows the percentages of males and females per sample Member State. In total, 68% of all (meth)amphetamine users were male, but proportions varied significantly across countries, ranging from 49% in Bulgaria to 81% in Sweden. Table 3.5 shows the percentages of males per user group in the Czech Republic, the Netherlands and Sweden. There were no significant gender differences between user groups, but only a marginally higher proportion of males among infrequent compared to occasional users in the Czech Republic.

**Table 3.4: Gender distribution of amphetamine users per Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	77	150	64	913	15	202	26	1,447
Male	49%	71%	70%	66%	[67%]	81%	54%	68%
Female	51%	29%	30%	34%	[33%]	19%	46%	32%

**Table 3.5: Percentage of males among amphetamine user groups by Member State**

	Infrequent	Occasional	Frequent	Total	P
Czech Republic	79% <sup>a</sup>	57% <sup>b</sup>	65% <sup>a,b</sup>	71%	.040
Netherlands	68%	62%	64%	66%	.255
Sweden	84%	83%	66%	81%	.076

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

#### **Ecstasy**

Table 3.6 shows the percentages of males and females among ecstasy users per sample Member State. In total, 69% of all ecstasy users were male, but proportions varied significantly across countries, ranging from 55% in Bulgaria to 89% in Sweden. There were no gender differences between user groups in the percentage of males in the Netherlands (P=.850).

**Table 3.6: Gender distribution of ecstasy users per Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	40	137	69	1,814	13	151	64	2,288
Male	55%	71%	74%	68%	[77%]	89%	64%	69%
Female	45%	29%	26%	32%	[23%]	11%	36%	31%

#### **Cocaine**

Table 3.6 shows the percentages of males and females among cocaine users per sample Member State. In total, 73% of all cocaine users were male, but proportions varied significantly across countries, ranging from 53% in England & Wales to 83% in Sweden. Again, there were no gender differences between user groups in the percentage of males in the Netherlands (P=.432).

**Table 3.7: Gender distribution of cocaine users per Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	23	70	112	695	30	113	49	1,092
Male	52%	73%	79%	73%	73%	83%	53%	73%
Female	48%	27%	21%	27%	27%	17%	47%	27%

### 3.2.2 Age

#### **Amphetamine**

Table 3.8 shows descriptive statistics for age groups per sample Member State. The majority of the respondents were in their early and mid twenties. The large majority of respondents fell in age group 15-34 years (91%, ranging from 87% in Sweden to 99% in Bulgaria). The low numbers of cases in the age group 35-64 years does not allow further analyses of use patterns when differentiating between two age groups, one of 15-34 and the other one of 35-64 years. We therefore chose to differentiate between the age groups 15-24 and 25-64 years. Table 3.8 gives the proportion of users in the age groups 15-24 and 25-64 years. Overall about six in ten respondents were between 15 and 24 years, while about four in ten respondents were aged between 25 and 64 years. The overall mean age in age group 15-24 years was 20.9 years (median 21) and in age group 25-64 years it was 31.4 years (median 29).

Table 3.9 shows descriptive statistics for age groups per user type in Czech Republic, the Netherlands and Sweden and in the total sample from all seven sample Member States. Overall, no differences between user types in mean age were found, even when controlling for differences between the seven sample Member States and between the Dutch sample and a combined sample of the other six Member States. There were also no age differences between user groups in the Czech Republic, the Netherlands and Sweden, in terms of mean age and proportions of younger and older users. The only exception is a slightly higher mean age of frequent users compared with infrequent users in Sweden.

**Table 3.8: Age distribution of amphetamine users by Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	77	150	64	913	15	202	26	1,447
Age (yrs) – mean	23.1	23.8	23.3	25.3	[24.5]	26.3	27.5	25.1
Age (yrs)- median	22	23	23	23	[24]	23	26	23
%15-24 years	70%	63%	69%	59%	[60%]	55%	38%	60%
% 25-64 years	30%	37%	31%	41%	[40%]	45%	62%	40%

**Table 3.9: Age distribution of amphetamine users by user group and Member State**

	Infrequent	Occasional	Frequent	P
<b>Czech Republic</b>				
Age – mean	23.1	23.4	25.2	.086
Age- median	22	22	24	
%15-24 years	69%	65%	53%	.253
% 25-64 years	31%	35%	47%	
<b>Netherlands</b>				
Age – mean	25.7	25.2	24.6	.180
Age- median	23	23	23	
%15-24 years	58%	60%	63%	.525
% 25-64 years	42%	40%	37%	
<b>Sweden</b>				
Age – mean	25.5 <sup>a</sup>	26.8 <sup>a,b</sup>	30.1 <sup>b</sup>	.030
Age- median	23	23	27	
%15-24 years	57%	60%	41%	.247
% 25-64 years	43%	40%	59%	
<b>All countries</b>				
Age – mean	25.1	25.1	25.1	.999 / .363 <sup>1</sup> / .746 <sup>2</sup>
Age- median	23	23	23	
%15-24 years	60%	60%	60%	.997
% 25-64 years	40%	40%	40%	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

<sup>1</sup> P-value correspond to ANOVA controlling for Member State.

<sup>2</sup> P-value correspond to ANOVA controlling for Dutch sample.

### Ecstasy

Table 3.10 shows descriptive statistics for age groups per sample Member State. As with (meth)amphetamine, the majority of the respondents were in their early and mid twenties. The large majority of respondents fell in age group 15-34 years (88%, ranging from 87% in the Netherlands to 100% in Bulgaria). The low numbers of cases in the age group 35-64 years does again not allow further analyses of use patterns when differentiating between the age groups of 15-34 and 35-64 years. Also here we therefore chose to differentiate between the age groups 15-24 and 25-64 years. Table 3.10 gives the proportion of users in age group 15-24 and 25-64 years. Overall about six in ten respondents were between 15 and 24 years, while about four in ten respondents were aged between 25 and 64 years. The overall mean age in age group 15-24 years was 20.8 years (median 21) and in age group 25-64 years it was 32.4 years (median 30).

Table 3.11 shows descriptive statistics for age groups per user type in the Netherlands and in the total sample (of all seven sample Member States). Overall, there were no significant differences between user types in mean age, also when controlling for differences among Member States and between Dutch and non-Dutch samples. No significant differences in the proportions of younger and older users between user groups were observed, although overall there was a slightly higher proportion of younger users in the frequent user group and this difference was significant at  $p < .05$ .

**Table 3.10: Age distribution of ecstasy users by Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	40	137	69	1,814	13	151	64	2,288
Age (yrs) – mean	23.6	23.9	24.3	25.7	[23.8]	25.2	26.4	25.5
Age (yrs)- median	24	23	22	23	[24]	24	26	23
%15-24 years	63%	62%	65%	60%	[69%]	58%	39%	59%
% 25-64 years	38%	38%	35%	40%	[31%]	42%	61%	41%

**Table 3.11: Age distribution of ecstasy users by user group for NL and total**

	Infrequent	Occasional	Frequent	P
<b>Netherlands</b>				
Age – mean	25.5	26.1	24.5	.145
Age- median	23	23	21	
% 15-24 years	59%	60%	73%	.065
% 25-64 years	41%	40%	27%	
<b>All countries</b>				
Age – mean	25.4	26.1	24.2	.047/ .253 <sup>1</sup> / .133 <sup>2</sup>
Age- median	23	23	21	
% 15-24 years	59% <sup>a</sup>	59% <sup>a</sup>	74% <sup>b</sup>	.024
% 25-64 years	41%	41%	26%	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

<sup>1</sup> P-value correspond to ANOVA controlling for Member State.

<sup>2</sup> P-value correspond to ANOVA controlling for Dutch sample.

### Cocaine

Table 3.12 shows again descriptive statistics for age groups per sample Member State. The majority of the respondents were also here in their mid twenties. The large majority of respondents fell in age group 15-34 years (89%, ranging from 70% in Portugal to 100% in Bulgaria). As with (meth)amphetamines and ecstasy the low numbers of cocaine users in the age group 35-64 years does again not allow further analyses of use patterns when differentiating between the age groups of 15-34 and 35-64 years. Also here we therefore chose to differentiate between the age groups 15-24 and 25-64 years. Therefore we decided again to differentiate between the age groups 15-24 and 25-64 years. Table 3.12 therefore gives the proportion of users in age group 15-24 and 25-64 years. Overall about half of the respondents were between 15 and 24 years, and the other half were aged between 25 and 64 years. The overall mean age in age group 15-24 years was 21.3 years (median 21) and in age group 25-64 years it was 31.1 years (median 29).

Table 3.13 shows descriptive statistics for age groups per user type in the Netherlands and in the total sample. Overall again, no differences between user types in mean age were found, both with and without controlling for differences between Member States. Only when controlling for the Dutch sample we discovered a difference: occasional users were older than infrequent users. However, as no difference between user groups was apparent in the Netherlands, this finding implies that such a difference exists in the combined other Member States. In other words, the absence of an overall difference was likely caused by the large share of the Dutch sample – in which no difference was present - in the total sample, but controlling for Dutch versus non-Dutch sample brought out a difference in the other Member States that was previously obscured by the larger contribution of the Dutch sample to the total. Unfortunately, we are unable to investigate this further because of insufficient sample sizes. No differences in the proportions of younger and older users between user groups were observed, neither in the total sample nor in the Netherlands.

**Table 3.12: Age distribution of cocaine users by Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	23	70	112	695	30	113	49	1,092
Age (yrs) – mean	22.9	26.3	27.7	25.2	32.1	27.2	28.4	26.0
Age (yrs)- median	23	25	25	24	30	26	26	24
% 15-24 years	70%	49%	50%	56%	27%	42%	35%	52%
% 25-64 years	30%	51%	50%	44%	73%	58%	65%	48%

**Table 3.13: Age distribution by cocaine user group for NL and total**

	Infrequent	Occasional	Frequent	P
<b>Netherlands</b>				
Age – mean	24.9	25.8	25.9	.158
Age- median	23	24	26	
% 15-24 years	58%	53%	49%	.259
% 25-64 years	42%	47%	51%	
<b>All countries</b>				
Age – mean	25.7	26.9	26.3	.055 / .093 <sup>1</sup> / .003 <sup>2</sup>
Age- median	24	25	25	
% 15-24 years	53%	48%	50%	.380
% 25-64 years	47%	52%	50%	

<sup>1</sup> P-value correspond to ANOVA controlling for Member State.

<sup>2</sup> P-value correspond to ANOVA controlling for Dutch sample.

### 3.3 Characteristics of use

In the following paragraphs we will describe for each of the Member States and types of users the following aspects of drug use:

- Main location of use
- Route of administration
- Amount consumed on a typical day
- Estimate of annual consumption.

#### 3.3.1 Main location of use

##### **Amphetamine**

Table 3.25 shows for all sample Member States (except Portugal because the sample was too small) where respondents usually consumed their (meth)amphetamine. The distribution of locations of use varied across the Member States ( $p < .001$ ). Nevertheless, there is an overall pattern of substantial numbers of users across the Member States using at home or when going out ('places of entertainment', concert or festival). There were also differences between the different types of users in the Czech republic ( $P = .026$ ), the Netherlands ( $p < .001$ ) and Sweden ( $P = .002$ ): the percentage of users who used at home was higher among frequent than infrequent users in all three Member States. In the Netherlands the percentage of users who used at a place of entertainment, concert or festival was higher among infrequent and occasional users than among frequent users.

**Table 3.25: Location where (meth)amphetamine is usually consumed by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	65	125	56	799	172	22	1,239
At my own home	9%	27%	5%	16%	37%	18%	19%
At seller's home	0%	2%	4%	1%	1%	0%	1%
At someone else's home	8%	10%	14%	8%	16%	5%	10%
At a private party	17%	9%	5%	5%	20%	5%	8%
At my workplace	2%	0%	2%	1%	1%	0%	1%
At school, college or university	3%	1%	2%	0%	2%	0%	1%
On the street or in a park	5%	6%	5%	2%	2%	0%	3%
At a pub/bar	6%	8%	2%	2%	1%	9%	3%
Other place of entertainment	35%	17%	38%	25%	12%	50%	24%
At a music concert or festival	6%	14%	14%	36%	1%	14%	26%
Other	9%	6%	9%	4%	8%	0%	5%

### Ecstasy

Table 3.26 shows for all Member States where respondents usually consumed their ecstasy. Also for ecstasy the distribution of locations of use varied across the Member States ( $p < .001$ ). Across the Member States, places of entertainment (other than a pub or bar) and concerts and festivals were consistently popular among users. There were also differences between user groups in the Netherlands ( $p < .001$ ): the percentage of users who used at home was higher among frequent users than among infrequent users and the percentage of users who used at someone else's home was higher among frequent users than among the other two user types.

**Table 3.26: Location where ecstasy is usually consumed by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	39	112	52	1678	125	62	2,068
At my own home	5%	4%	4%	5%	16%	10%	6%
At seller's home	0%	0%	0%	0%	0%	0%	0%
At someone else's home	3%	3%	6%	4%	15%	5%	5%
At a private party	15%	4%	12%	3%	15%	18%	5%
At my workplace	0%	0%	0%	0%	1%	0%	0%
At school, college or university	0%	1%	0%	0%	0%	2%	0%
On the street or in a park	0%	2%	2%	1%	2%	2%	1%
At a pub/bar	5%	1%	6%	0%	0%	2%	1%
Other place of entertainment	56%	39%	42%	33%	26%	40%	34%
At a music concert or festival	13%	42%	19%	51%	16%	21%	46%
Other	3%	4%	10%	2%	10%	2%	3%

### Cocaine

Table 3.27 shows for all Member States where respondents usually consumed their cocaine. Again, the distribution of locations of use varied across the Member States. Substantial numbers of users in the Czech Republic, the Netherlands, Portugal and Sweden reported using at places of entertainment. In Italy, using at someone else's home was mentioned most frequently, while using at one's own home was mentioned most frequently in England & Wales. Use at private parties was mentioned frequently in all countries except for the Netherlands. There were differences between user types in the Netherlands ( $P = .027$ ): the percentage of users who used at home was again higher among frequent users than among infrequent users.

**Table 3.27: Location where cocaine is usually consumed by Member State**

	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	62	82	601	24	94	42	905
At my own home	11%	18%	17%	13%	21%	24%	17%
At seller's home	2%	0%	0%	0%	0%	0%	0%
At someone else's home	5%	27%	18%	13%	12%	7%	17%
At a private party	23%	15%	8%	29%	26%	21%	12%
At my workplace	0%	1%	1%	0%	2%	0%	1%
At school, college or university	0%	0%	0%	0%	0%	0%	0%
On the street or in a park	2%	12%	2%	0%	4%	0%	3%
At a pub/bar	5%	6%	12%	13%	6%	21%	11%
Other place of entertainment	34%	12%	22%	29%	21%	19%	22%
At a music concert or festival	15%	1%	15%	4%	2%	0%	11%
Other	5%	7%	4%	0%	5%	7%	5%

### 3.3.2 Route of administration

For (meth)amphetamine and cocaine, we asked respondents how they usually consumed these drugs. We did not ask ecstasy users this question because ecstasy is virtually always ingested orally in tablet form. For cocaine, 98% of the total sample indicated that they snorted their cocaine and only a handful of users indicated injecting or other routes of administration. We

expected this outcome as injecting is rare among socially integrated cocaine users and studies like our web survey are unlikely to catch more marginalized users (EMCDDA, 2012a) (see report 2, chapter 1)

For (meth)amphetamine, the picture is more diverse. We presented six answer categories to (meth)amphetamine users regarding the usual route of administration (see table 3.14). Respondents could indicate multiple routes. Table 3.14 shows that overall the majority of the (meth)amphetamine users - 74% of the total sample – consumed their (meth)amphetamine by snorting. Thirty percent stated that they swallowed amphetamines. Other routes of administration were mentioned by not more than 6% of the respondents. Forty percent of those indicating other routes of administration used amphetamine dissolved in a beverage. Overall, the proportions of snorting and swallowing – though significantly different from each other - were significantly higher than those of all other categories. In the total sample smoking and injecting were more common among frequent users than among the other two user types. Snorting was more common among occasional users. The latter finding, however, may be due to a combination of a higher proportion of snorting among infrequent users in the Netherlands and a lower proportion of snorting among frequent users in Sweden.

There were also differences between the sample Member States in route of administration. For the two most common routes of administration we found the following differences. Swallowing was less common in Bulgaria and the Czech Republic (as is to be expected with methamphetamine) than in the other sample Member States, and less common in the Netherlands than in Italy and Sweden. Snorting was more common in Bulgaria than in the other sample Member States, and less common in Italy and England & Wales than in the other sample Member States.

**Table 3.14: Most common routes of administration of (meth)amphetamine by user group**

	Infrequent	Occasional	Frequent	Total	P
Swallowing	248 (32%)	105 (29%)	70 (26%)	423 (30%)	.141
Dissolving	51 (7%)	11 (3%)	10 (4%)	72 (5%)	.020
Smoking	18 (2%) <sup>a</sup>	6 (2%) <sup>a</sup>	20 (7%) <sup>b</sup>	44 (3%)	.000
Snorting	544 (70%) <sup>a</sup>	294 (81%) <sup>b</sup>	201 (74%) <sup>a</sup>	1,039 (74%)	.001
Injecting	21 (3%) <sup>a</sup>	12 (3%) <sup>a</sup>	33 (12%) <sup>b</sup>	66 (5%)	.000
Other	45 (6%)	15 (4%)	19 (7%)	79 (6%)	.278

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant. Categories do not sum to 100% within user groups because multiple routes could be indicated.

### 3.3.3 Amount consumed on a typical day

For the estimation of the total amount consumed we needed to obtain an estimate of the amount in grams consumed on a use day. For cocaine, we therefore asked respondents to indicate how many grams of cocaine powder they consumed on a typical use day or on the last day of use. For amphetamine and ecstasy things were more complicated. As indicated above, amphetamine is sometimes consumed as pills and ecstasy is primarily consumed as pills. Consequently we expected that many users would find it difficult to estimate the amount used in grams. Hence we assumed that it might be easier for them to indicate the number of pills they use. For that reason, amphetamine and ecstasy users could indicate their consumption in both grams and/or pills.

Respondents indicated the amount in grams and number of pills they consumed on 'the last consumption day' and on a 'typical consumption day'. As with cannabis, for our further analyses we used the questions on 'typical consumption' as we assumed that the answers to these questions better reflect the 'average' situation of users. Nonetheless, measures referring to last and typical use day were strongly correlated for amphetamine ( $r=.79$ ,  $p<.001$  and  $r=.76$ ,  $p<.001$  for grams and pills, respectively), for ecstasy ( $r=.89$ ,  $p<.001$  and  $r=.73$ ,  $p<.001$  for grams and pills, respectively) and cocaine ( $r=.74$ ,  $p<.001$ ).

With regard to the number of pills, respondents of the amphetamine and ecstasy questionnaire could answer in whole numbers ranging from one to '20 or more'. However, for our analysis we capped the number of pills at a maximum of 12 because higher numbers are assumed to be unlikely. For instance, even among those categorized as heavy ecstasy users, the median largest amount of pills they had taken during a binge was 7 (Sterk et al. 2006). This capping resulted in a small loss of cases (for the total sample  $n=8$  for amphetamine and  $n=7$  for ecstasy), while more than 95% of respondents indicating the amount they used in pills stated a number of pills well below this cut-off point (i.e., 7 or lower for amphetamine and 5 or lower for ecstasy).

In case respondents chose for stating the amount consumed in grams they could choose one of 13 options: 50 mg or less; 100 mg (1/10 gram); 125 mg (1/8 gram); 250 mg (1/4 gram); 500 mg (1/2 gram); 1 gram; 1.5 gram; 2 gram; 3 gram; 4 gram; 5 gram; 6 gram; more than 6 gram. Also here we decided to exclude the respondents indicating an amount of more than 6 gram from the analysis because we assumed this amount was rather unlikely. Only nine respondents of the total sample filling in the amphetamine questionnaire ticked this option. Well over 95% of those indicating the amount of amphetamine in grams listed an amount of 3 grams or less per typical use day. Note that we will use these amounts in grams as reported by respondents in this report to estimate consumption and that all estimates are thus in raw grams unadjusted for purity.

### **Amphetamine**

For amphetamine, a large majority of 1,104 participants indicated the amount they use in grams and 268 in pills, with 870 users indicating only grams, 34 only pills and 234 indicating both grams and pills.

Overall, there was a clear connection between route of administration (involving pills, powder or both) and reporting in grams, pills or both ( $\chi^2=190.3$ ,  $p<.001$ ). Reporting in grams only was most frequent among those using only powder (86%), followed by those using both powder and pills (65%), and was least common among those using only pills (40%). Reporting in pills or in both pills and grams, on the other hand, showed the opposite pattern. These options were most frequently chosen by those using only pills (respectively 12% and 48%), followed by those using both pills and powder (5% and 31%), and were least common among those using only powder (1% and 13%).

Among the respondents indicating quantities in both grams and pills, the reported amount of grams and number of pills were weakly correlated ( $r=.28$ ,  $p<.001$ ). However, closer inspection revealed a stronger correlation among those consuming only pills ( $r=.50$ ,  $n=75$ ,  $p<.001$ ), a weaker but significant correlation among those consuming by other routes of administration (e.g., snorting) ( $r=.27$ ,  $n=95$ ,  $P=.009$ ), and no significant correlation among those consuming both by swallowing pills and by other routes ( $r=.16$ ,  $n=63$ ,  $P=.215$ ). These findings suggest that those indicating only one route of administration are reporting their consumption in both number of pills and grams, that is, they are reporting one and the same amount twice (i.e. they are converting pills to grams or vice versa), while those that indicate consuming both by swallowing pills and by other routes are reporting two different amounts. While the number of pills reported did not vary significantly across groups, the reported amount consumed in grams did ( $F=7.32$ ,  $P=.001$ ): it was highest among those reporting both swallowing pills and other routes of administration. As it is unlikely that the size of pills differs between groups, this suggests that the latter group reports an amount of grams that combines their consumed amounts of pills and powder. This means, those who consume both by swallowing pills and other routes are separately reporting the number of pills they consume on a typical day and the total amount of pills and powder they consume in grams.

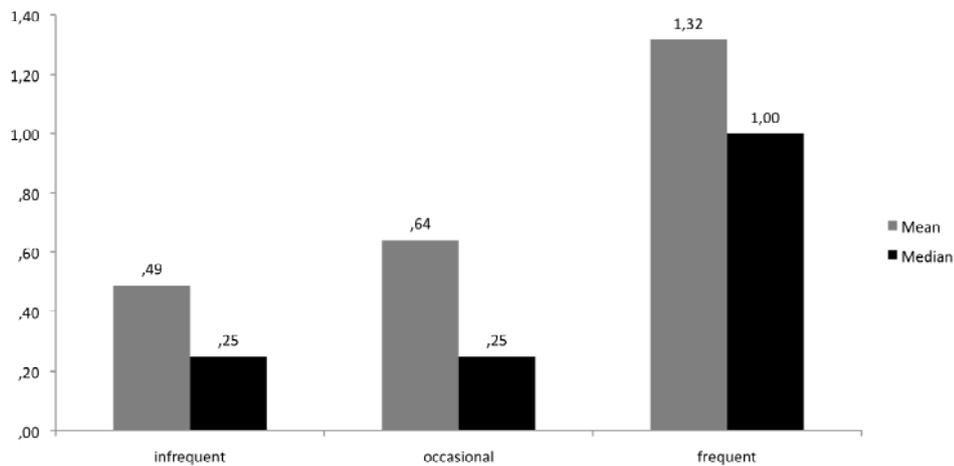
In terms of total consumption on a typical use day, we will therefore assume that all amounts reported in grams are total amounts consumed on a typical use day and use these figures where available. Because the numbers of respondents using only pills but reporting the quantity used in both pills and grams were too low to estimate mean weight per pill, we could not convert the consumption of those reporting only pills into grams. Because the numbers of respondents reporting their consumption only in pills were low ( $n=34$  in the total sample), we decided not to include these in the consumption estimates. We will, however, show the mean numbers of pills consumed by user type and for the total sample for those consuming pills in the Netherlands (the numbers of respondents in the other member states were insufficient for reporting).

Table 3.15 shows the amount of (meth)amphetamine in grams consumed on a typical use day per Member State.

**Table 3.15: Grams of (meth)amphetamine consumed on a typical consumption day by Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
Mean	.539	.408	.579	.757	[.540]	.766	[.736]	.704
Median	.250	.188	.250	.250	[.375]	.500	[.250]	.250
N	56	110	39	727	10	146	16	1,104

Overall, as we also found for cannabis use, the amount of (meth)amphetamine consumed per typical use day increased with increasing frequency of use ( $r=.33$ ,  $p<.001$ ). Figure 3.4 and table 3.16 show that for all countries combined, the mean amount in grams increased from .49 among infrequent users to 1.32 among frequent users.

**Figure 3.4: Amount of (meth)amphetamine in grams consumed on a typical consumption day per user group**

Statistical analyses shows that these overall differences between user types are significant. This overall pattern was found in the Czech Republic, the Netherlands and Sweden, although not all user groups differed significantly from each other in all of these countries (see table 3.16). Although differences existed between countries, there was no interaction effect between user type and Member State, indicating that the general pattern was not different between countries. However, it is clear that the daily doses in the Czech Republic are much lower (about half) than those reported in the Netherlands and Sweden. This may be associated with differences in type and potency (Zabransky 2007). Methamphetamine is more potent than amphetamine and the average purity in the Czech Republic is also quite high, due to the local production. Although no differences were found between infrequent and occasional users, these doses are fairly consistent with those assumed in the first EU drugs market study for the US in 2006: daily doses were assumed to range from 0.25 gram (low) to 0.7 gram (high) (Kilmer and Pacula 2009).

**Table 3.16: Grams of (meth)amphetamine consumed on a typical consumption day per user group and Member State**

		Infrequent	Occasional	Frequent	P
<b>Czech Republic</b>	<b>Mean</b>	.31 <sup>a</sup>	.30 <sup>a</sup>	.66 <sup>b</sup>	.006
	Median	.13	.13	.50	
	N	47	31	32	
<b>Netherlands</b>	<b>Mean</b>	.50 <sup>a</sup>	.67 <sup>a</sup>	1.49 <sup>b</sup>	.000
	Median	.13	.25	1.25	
	N	344	233	150	
<b>Sweden</b>	<b>Mean</b>	.59 <sup>a</sup>	.90 <sup>a,b</sup>	1.24 <sup>b</sup>	.000
	Median	.50	1.00	1.00	
	N	93	26	27	
<b>All countries</b>	<b>Mean</b>	.49 <sup>a</sup>	.64 <sup>b</sup>	1.32 <sup>c</sup>	.000 / .000 <sup>1</sup> / .000 <sup>2</sup>
	Median	.25	.25	1.00	
	N	561	315	228	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

<sup>1</sup> P-value correspond to ANOVA controlling for Member State.

<sup>2</sup> P-value correspond to ANOVA controlling for Dutch sample.

Table 3.17 shows the amount of amphetamine in number of pills consumed on a typical use day for the Netherlands. The mean amount in number of pills increased from 1.95 among infrequent users to 2.89 among frequent users, and our analysis showed that frequent users used more pills on a typical use day than occasional or infrequent users, but that the two latter groups did not differ from each other.

**Table 3.17: Amount of amphetamine in number of pills consumed on a typical consumption day in the Netherlands per user group**

	Total	Infrequent	Occasional	Frequent	P
Mean	2.13	1.95 <sup>a</sup>	2.11 <sup>a</sup>	2.89 <sup>b</sup>	.016
Median	2	2	2	3	
N	134	78	37	19	

### Ecstasy

For ecstasy, 1,945 participants indicated their use amount in pills and 1,512 indicated this in grams, with 565 users indicating only pills, 132 only grams, and 1,380 indicating both grams and pills. Among those indicating both grams and pills, these measures were correlated ( $r=.36$ ,  $p<.001$ ). This finding suggests that (at least a good portion of) these respondents are reporting their consumption in both number of pills and grams, that is, they are reporting one and the same amount twice. Because of this and because ecstasy is most commonly consumed in the form of pills (e.g., Sterk et al. 2007), we will assume that all amounts reported in number of pills are total amounts consumed on a typical day and use these values as estimates of total consumption on a typical day where available. For respondents reporting only grams, we assume that they consume ecstasy (MDMA) in powdered form and will show their consumption in grams.

Table 3.18 shows the mean and median number of ecstasy pills consumed on a typical use day per sample Member State. An earlier study among American young adult ecstasy users (18-25) found a median of 2 pills typically taken at a time (Sterk et al. 2007), which matches our figure for the Netherlands and England & Wales.

**Table 3.18: Amount of ecstasy in number of pills consumed on a typical consumption day by Member State**

	BG	CZ	IT	NL	PT*	SE	E&W	Total
Mean	1.32	1.39	1.23	2.19	[1.64]	1.89	1.99	2.10
Median	1.00	1.00	1.00	2.00	1.00	1.50	2.00	2.00
N	36	99	26	1,648	7	92	37	1,945

\* Figures for Portugal are given between brackets; due to the low number of cases, data are not considered reliable.

Table 3.19 and figure 3.5 show the mean and median number of ecstasy pills consumed on a typical use day. Overall and in the Netherlands separately, the amount of ecstasy consumed in pills increased significantly from infrequent users to frequent users. Overall, the amount of ecstasy consumed per typical use day increased with increasing frequency of use in terms of 12-month frequency of use ( $r=.27$ ,  $p<.001$ ).

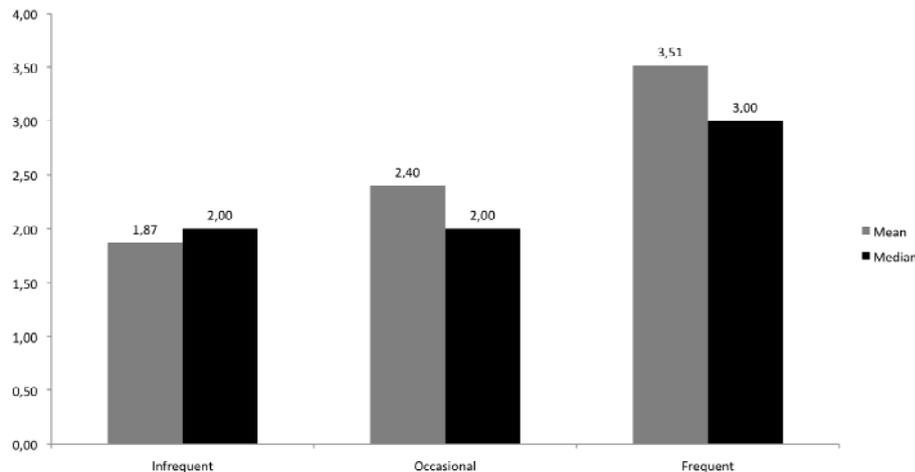
**Table 3.19: Number of ecstasy pills consumed on a typical consumption day per user group for the Netherlands and all Member States combined**

		Infrequent	Occasional	Frequent	P
Netherlands	Mean	1.95 <sup>a</sup>	2.43 <sup>b</sup>	3.56 <sup>c</sup>	.000
	Median	2.00	2.00	3.00	
	N	1,018	553	77	
All countries except NL	Mean	1.51 <sup>a</sup>	1.93 <sup>a,b</sup>	2.83 <sup>b</sup>	.007
	Median	1.00	2.00	2.00	
	N	247	44	6	
All countries	Mean	1.87 <sup>a</sup>	2.40 <sup>b</sup>	3.51 <sup>c</sup>	.000 / .000 <sup>1</sup> / .000 <sup>2</sup>
	Median	2,00	2,00	3,00	
	N	1,265	597	83	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant; where p-value is absent, differences were not tested due to insufficient cell sizes.

<sup>1</sup> P-value correspond to ANOVA controlling for Member State.

<sup>2</sup> P-value correspond to ANOVA controlling for Dutch sample.

**Figure 3.5: Amount of ecstasy pills consumed on a typical consumption day per user group**

In a study among American young adult users (Sterk et al. 2007) a distinction was made between moderate users (use on less than 10 of the past 90 days; 52.5%) and heavy users (use on 10 or more of the past 90 days). The former group reported a median number of pills of 1 while this was 3 among the latter group.

Averages for the Netherlands seem to be fairly high, especially for the infrequent users, which might be related to the fact that many respondents were recruited through a website for visitors of large scale parties and festivals (Partyflock), which are probably associated with more intensive use compared to other settings, although music preference or type of music may also play a major role (Van der Poel et al. 2010). Another explanation might be that answer categories in the current web survey did not allow decimals and (especially) infrequent users may consume less than one pill at a time.

In a qualitative study in 2011 on the nightlife scene in Amsterdam, it has been reported that most ecstasy users take one to two pills per time, with some exceptions to four or five pills. In the survey in 2008/2009 among club and party visitors described in §1.2, 6% of the last year users took less than half a pill of ecstasy per occasion, 33% took half to one pill, 43% took 1 to two pills, 15% took 3-5 pills and 3% said to consume more than 5 pills per occasion. If average amounts are computed from these data by frequency of use, the estimated number of pills consumed per occasion among last year ecstasy users is 1.37 for those who indicated using seldom, 1.87 among those who indicated using occasionally or once in a while, and 2.68 for those who indicated using once a week or more. Note that these categories do not exactly match the typology in the current study, which contains a lesser number of users who use seldom/very infrequently.

As mentioned above, 6% of last year users in this 2008/2009 survey indicated taking less than half a pill of ecstasy per occasion and 33% took half to one pill. If we assume a similar distribution among those indicating that they use 1 pill in our current study (where indicating less than 1 pill was not possible), our estimated numbers of pills consumed on a typical consumption day drop slightly to 1.84, 2.36, and 3.51 for infrequent, occasional and frequent users, respectively.

Table 3.20 shows the amount of ecstasy in grams consumed by those reporting their consumption only in grams, on a typical use day per sample Member State. The numbers of respondents reporting their consumption only in grams were too small to further split into user groups.

In the Netherlands, data from the DIMS project which monitors the content of drug samples handed in by (recreational) drug users to test services at addiction carer services, shows that the mean weight of 5,473 ecstasy pills was 279 mg (median 280 mg). However, variation was wide (140 and 600 mg). using the mean or median, this means that the users below would on average consume about 3 pills per use day, which points at a selective sample of frequent users.

**Table 3.20: Grams of ecstasy consumed on a typical consumption day by Member State**

	IT	NL	SE	E&W
Mean	.49	.85	.25	.24
Median	.25	.25	.25	.25
N	28	26	31	25

## Cocaine

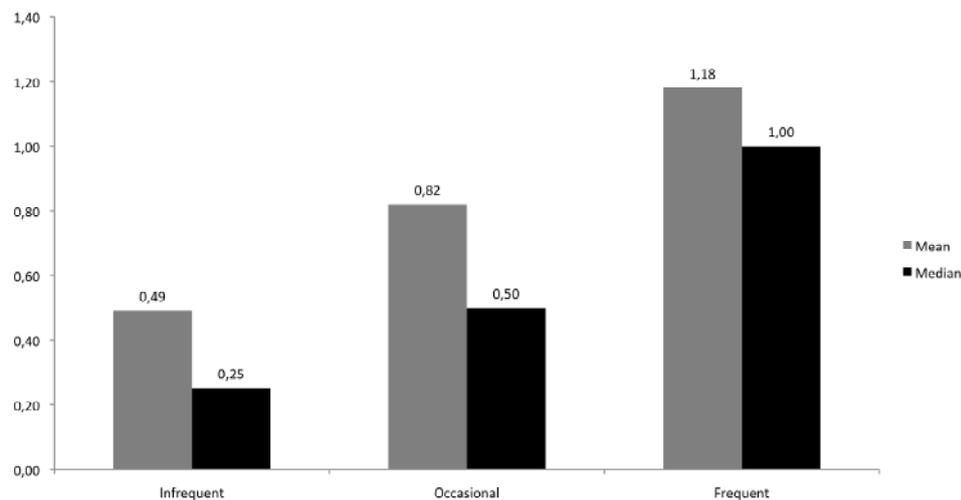
Table 3.21 shows the mean and median amounts of cocaine consumed on a typical consumption day per Member State.

**Table 3.21: Grams of cocaine consumed on a typical consumption day by Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
Mean	[.85]	.42	.50	.67	.50	.71	.43	.63
Median	.63	.25	.25	.50	.50	.50	.25	.50
N	12	55	82	601	23	86	37	896

Figure 3.6 and table 3.22 shows the mean and median amounts of cocaine consumed on a typical use day per user type. Overall, also for cocaine the amount consumed per typical use day increased with increasing frequency of use, both in terms of 12-month frequency of use ( $r=.23$ ,  $p<.001$ ) and user group (see table 3.22). When excluding the Netherlands from the total sample, the pattern remained the same but the difference between occasional and frequent users was no longer statistically significant. Figure 3.6 shows that for all countries combined, the mean number of grams progressively increased from 0.49 among infrequent users to 1.18 among frequent users. Median values are consistently lower than the mean values, indicating that the distribution is skewed to the right and that a minority of users were thus using relatively high amounts of cocaine.

**Figure 3.6: Amount of cocaine in grams consumed on a typical consumption day per user group**



**Table 3.22: Grams of cocaine consumed on a typical consumption day per user group and Member State**

		Infrequent	Occasional	Frequent	P
Netherlands	Mean	.52 <sup>a</sup>	.80 <sup>b</sup>	1.28 <sup>c</sup>	.000
	Median	.50	.50	1.00	
	N	384	152	65	
All countries except NL	Mean	.43 <sup>a</sup>	.88 <sup>b</sup>	.94 <sup>b</sup>	.000
	Median	.25	1.00	.50	
	N	219	51	25	
All countries	Mean	.49 <sup>a</sup>	.82 <sup>b</sup>	1.18 <sup>c</sup>	.000 / .000 <sup>1</sup> / .000 <sup>2</sup>
	Median	.25	.50	1.00	
	N	603	203	90	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

<sup>1</sup> P-value correspond to ANOVA controlling for Member State.

<sup>2</sup> P-value correspond to ANOVA controlling for Dutch sample.

### 3.3.4 Estimated individual annual consumption

Because the user types we have distinguished differ in both frequency of use and amount consumed on a typical use day, we expect annual consumption to differ even more between these groups as it is a multiplication of these two variables. Estimating mean total annual amounts of (meth)amphetamine, ecstasy and cocaine consumed therefore only makes sense when this is done per user type. Therefore, we will only make these estimates for Member States where we have sufficient numbers of respondents to estimate consumption per user type. We will estimate the annual consumption per user type by multiplying the typical daily amounts with the number of use days. We will report both the means and 5% trimmed means, which exclude the extreme cases and outliers (the 2.5% of the respondents with the highest amounts and 2.5% of respondents with the lowest amounts). We will use the latter in chapter 5 to calculate estimates of total annual consumption per Member State, as they are expected to give the most representative estimates. Note that differences in the number of use days within user types will affect our estimates, but since we do not know how representative our samples are we will assume that they reflect actual distributions of the number of use days within user types. Finally, note that all consumption estimates in grams concern raw grams unadjusted for purity.

#### Amphetamine

Table 3.23 shows the estimated annual consumption of (meth)amphetamine per user by user type for the Czech Republic, the Netherlands and Sweden. As expected, consumption increased with increasing frequency of use, both in terms of daily and annual consumption in all three Member States. Although the annual consumption of the average infrequent user is substantially higher than that of the average occasional user, the two do not differ significantly. Both, however, are considerably and significantly lower than the annual consumption of the average frequent user. This is the case in all three Member States.

Table 3.23: Estimated individual annual consumption of (meth)amphetamine (gram) per user group and Member State

		Infrequent	Occasional	Frequent	P
Czech Republic	Mean	1.31 <sup>a</sup>	7.85 <sup>a</sup>	127.85 <sup>b</sup>	.000
	5% Trimmed mean	1.01	5.44	105.51	
	Median	0.40	3.55	60.94	
	N	47	31	32	
Netherlands	Mean	2.49 <sup>a</sup>	17.12 <sup>a</sup>	241.43 <sup>b</sup>	.000
	5% Trimmed mean	1.70	13.48	199.72	
	Median	0.75	7.75	133.38	
	N	344	233	150	
Sweden	Mean	2.38 <sup>a</sup>	23.93 <sup>a</sup>	297.52 <sup>b</sup>	.000
	5% Trimmed mean	2.04	22.45	276.07	
	Median	1.50	15.50	188.25	
	N	93	26	27	

Note: Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

#### Ecstasy

Table 3.24 shows the estimated annual consumption of ecstasy per user by user type for the Netherlands. Again, as expected, consumption increased with increasing frequency of use, both in terms of daily and annual consumption. The estimated annual consumption increases from infrequent users to frequent users.

Table 3.24: Estimated individual annual consumption of ecstasy (pills) per user group in the Netherlands

		Infrequent	Occasional	Frequent	P
Netherlands	Mean	10.08 <sup>a</sup>	56.81 <sup>b</sup>	285.19 <sup>c</sup>	.000
	5% Trimmed mean	9.14	50.56	275.31	
	Median	8.0	46.5	196.5	
	N	1,018	553	68	

Note: Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

In the earlier market study low and high estimates of the number of tablets consumed across Europe, Canada and the U.S. of respectively 30 and 154 pills (Kilmer and Pacula 2009).

### Cocaine

Table 3.25 shows the estimated annual consumption of cocaine per user by user type for the Netherlands. In line with expectation, consumption increased with increasing frequency of use, both in terms of daily and annual consumption. The estimated annual consumption increases from infrequent users to frequent users.

**Table 3.25: Estimated individual annual consumption of cocaine (grams) per user group in the Netherlands**

		Infrequent	Occasional	Frequent	P
Netherlands	Mean	2.41 <sup>a</sup>	20.48 <sup>b</sup>	145.30 <sup>c</sup>	.000
	5% Trimmed mean	2.06	18.87	128.92	
	Median	1.50	15.50	98.25	
	N	384	152	65	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

## 3.4 Conclusions

In this chapter we have investigated a number of demographic and substance use related variables. Although the small sample sizes in some of our sample Member States limit our analyses, we found some interesting results.

Although the proportions of males and females in the sample varied across Member States for (meth)amphetamine, ecstasy and cocaine, there were no differences in gender distribution among user types. Similarly, we found no considerable age differences between user types. Given the low numbers of participants in some of the sample Member States, we were unable to investigate gender and age differences thoroughly and can only present reliable figures for a subset of our sample Member States.

For (meth)amphetamine, frequent users differed most strongly from occasional and infrequent users in clearly higher consumption quantities on a typical use day as well as regarding their estimated annual consumption. Frequent users also consumed (meth)amphetamine more often at home and less often at places of entertainment than occasional and infrequent users. For ecstasy and cocaine, consumption also tended to increase with increasing frequency of use, both in terms of use on a typical use day and annual consumption. For both drugs, the percentage of those using at home was again higher among frequent users than the other user type groups. For ecstasy, the percentage of users who used at someone else's home was also higher among frequent users. As expected, for all three drugs the frequent users' estimated annual consumption was much higher than that of occasional and infrequent users.

## 4 Availability

In this chapter we will describe for all seven sample Member States and for the different user types within the sample Member States for which we have sufficiently big sample size the following aspects related to the availability and accessibility of the three drugs, including buying behaviour:

- Way of obtaining drugs
- Usual location of purchase and reasons to buy there
- Ease of obtaining drugs and inability to buy
- Amount usually bought per purchase and price paid for it
- Estimated price per gram/pill
- Buying in the past 30 days: number of times and amount of money spent.

## 4.1 Way of obtaining drugs

### Amphetamine

Table 4.1 shows how respondents usually obtained their (meth)amphetamine per sample Member State while table 4.2 shows this per user type for the Member States with sufficient sample sizes. There was an additional answer category in the Czech Republic – production of methamphetamine by the user – that was ticked by two respondents. The way of obtaining (meth)amphetamine varied significantly across Member States ( $p < .001$ ), the difference being mainly in the proportion of users buying their (meth)amphetamine: this was highest in the Netherlands and lowest in Bulgaria. It also varied across user types in the Netherlands and Sweden, where a higher proportion of infrequent users got it for free.

**Table 4.1: Usual way of obtaining (meth)amphetamine by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	69	130	58	820	181	23	1,281
I buy it	26% <sup>a</sup>	33% <sup>a,b</sup>	26% <sup>a,b</sup>	45% <sup>b</sup>	43% <sup>a,b</sup>	30% <sup>a,b</sup>	41%
People give or share it with me for free	28%	21%	19%	15%	19%	17%	17%
Sometimes I buy it, sometimes I get it for free	46%	44%	55%	40%	38%	52%	42%

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

**Table 4.2: Way of obtaining (meth)amphetamine by user group and Member State**

	Infrequent	Occasional	Frequent	P
Czech Republic				
N (100%)	65	34	33	
I buy it	28%	35%	42%	.085
People give or share it with me for free	31%	21%	3%	
Sometimes I buy it, sometimes I get it	40%	44%	52%	
Netherlands				
N (100%)	411	245	164	
I buy it	39% <sup>a</sup>	49% <sup>a,b</sup>	52% <sup>b</sup>	.000
People give or share it with me for free	23% <sup>a</sup>	6% <sup>b</sup>	7% <sup>b</sup>	
Sometimes I buy it, sometimes I get it	38%	45%	40%	
Sweden				
N (100%)	123	30	28	
I buy it	37%	50%	61%	.009
People give or share it with me for free	26% <sup>a</sup>	3% <sup>b</sup>	7% <sup>a,b</sup>	
Sometimes I buy it, sometimes I get it	37%	47%	32%	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

### Ecstasy

Table 4.3 shows how respondents usually obtained their ecstasy per sample Member State while table 4.4 shows this per user type for the Netherlands. The way of obtaining ecstasy varied again significantly across Member States ( $p < .001$ ): the proportion of users who buy their ecstasy was highest in the Netherlands and lowest in Bulgaria. It also varied across user types in the Netherlands, where a higher proportion of occasional users compared with the other user types buy their ecstasy and a lower proportion gets it for free.

**Table 4.3: Way of obtaining ecstasy by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	39	119	56	1,703	133	63	2,113
I buy it	33% <sup>a</sup>	49% <sup>a,b</sup>	46% <sup>a,b</sup>	60% <sup>b</sup>	61% <sup>b,c,d</sup>	40% <sup>a,d</sup>	58%
People give or share it with me for free	5%	15%	7%	9%	14%	10%	9%
Sometimes I buy it, sometimes I get it	62% <sup>a</sup>	36% <sup>a,b</sup>	46% <sup>a,b</sup>	32% <sup>b</sup>	25% <sup>b,c</sup>	51% <sup>a</sup>	33%

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

**Table 4.4: Way of obtaining ecstasy by user group for the Netherlands**

	Infrequent	Occasional	Frequent	P
N (100%)	1,055	564	84	
I buy it	57% <sup>a</sup>	66% <sup>b</sup>	52% <sup>a</sup>	.000
People give or share it with me for free	11% <sup>a</sup>	4% <sup>b</sup>	13% <sup>a</sup>	
Sometimes I buy it, sometimes I get it	32%	30%	35%	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

### Cocaine

Table 4.5 shows how respondents usually obtained their cocaine per sample Member State while table 4.6 shows this per user type for the Netherlands. Once again, the way of obtaining cocaine varied significantly across Member States ( $p < .001$ ). It also varied across user types in the Netherlands, where the proportion of users buying their cocaine was lower among infrequent users while the proportion of users getting their cocaine for free was higher among infrequent users than among occasional and frequent users.

**Table 4.5: Way of obtaining cocaine by Member State**

	CZ	IT	NL	PT	SE	E&W	Total
N (100%)	64	84	620	26	100	43	937
I buy it	28% <sup>a,b</sup>	24% <sup>a</sup>	45% <sup>b</sup>	35% <sup>a,b</sup>	39% <sup>a,b</sup>	28% <sup>a,b</sup>	40%
People give or share it with me for free	36% <sup>a</sup>	30% <sup>a,b</sup>	19% <sup>b</sup>	38% <sup>a,b</sup>	29% <sup>a,b</sup>	42% <sup>a</sup>	23%
Sometimes I buy it, sometimes I get it	36%	46%	37%	27%	32%	30%	37%

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

**Table 4.6: Way of obtaining cocaine by user group for the Netherlands**

	Infrequent	Occasional	Frequent	P
N (100%)	399	154	67	
I buy it	38% <sup>a</sup>	58% <sup>b</sup>	54% <sup>b</sup>	.000
People give or share it with me for free	25% <sup>a</sup>	6% <sup>b</sup>	6% <sup>b</sup>	
Sometimes I buy it, sometimes I get it	37%	35%	40%	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

## 4.2 Usual location of purchase and reasons to buy there

### *Amphetamine*

For those respondents who buy their (meth)amphetamine, table 4.7 shows the locations of purchase. The distribution of the locations of purchase varied across the sample Member States ( $p < .001$ ). The seller's home was the most frequently mentioned location of purchase in the Czech Republic (42%), the Netherlands and Sweden, while their own or someone else's home were most frequently mentioned in England & Wales. On the street or in a park was most frequently mentioned in Bulgaria, and Italian respondents mentioned a place of entertainment most often. A remarkable finding is that respectively 15% and 13% of Italian and Swedish amphetamine users buy it at school, college or university, while these locations are virtually unmentioned in the other sample Member States. This difference may have to do with differences in recruitment strategies, as both Member States included university populations as targets. Differences between user types were only significant in the Netherlands ( $P = .014$ ), where the proportion of users who purchase at the seller's home is higher among frequent than among infrequent users.

**Table 4.7: Usual locations for purchasing (meth)amphetamine by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	43	90	41	652	134	19	979
At a pub/bar	5%	10%	0%	1%	1%	0%	2%
At a private party	9%	3%	5%	2%	6%	11%	3%
At a music concert or festival	2%	3%	12%	3%	0%	0%	3%
At other place of entertainment	12%	6%	34%	6%	1%	11%	6%
On the street or in a park	21%	12%	22%	11%	14%	11%	13%
At a public transport station	0%	1%	0%	1%	0%	5%	1%
At a community centre, youth club association	0%	0%	0%	0%	1%	0%	0%
At seller's home	14%	42%	10%	30%	34%	11%	29%
At my own home	0%	2%	2%	5%	4%	16%	4%
At someone else's home	14%	10%	0%	29%	16%	16%	23%
At a smart shop	0%	1%	0%	0%	8%	0%	2%
Through the Internet	0%	2%	0%	1%	1%	0%	1%
At my workplace	2%	1%	0%	0%	1%	0%	0%
At school, college or university	0%	1%	15%	1%	13%	0%	3%
Other	21%	4%	0%	11%	0%	21%	9%

### *Reasons for buying at a specific location*

Respondents who buy their (meth)amphetamine were asked what the main reason was for buying at that specific location. Table 4.8 summarizes these reasons for each Member State. The reasons for buying varied across the sample Member States. Personal contacts were most frequently mentioned in all countries, with proportions varying from 44% in the Czech Republic and Italy to 74% in England and Wales. Risk of police detection was mentioned more frequently in Italy and Sweden than in the other Member States. There were no differences between user types in any of the Member States.

**Table 4.8: Main reason for buying at a specific location by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	46	95	45	676	143	19	1,024
Local availability	20%	15%	16%	13%	18%	16%	14%
Price	7%	7%	4%	6%	6%	0%	6%
Opening hour	0%	3%	0%	1%	1%	5%	1%
Personal contacts	50%	44%	44%	56%	45%	74%	53%
Habits	11%	12%	11%	9%	3%	0%	9%
Risk of police detection	9%	6%	18%	4	15%	0%	6%
Other	4%	13%	7%	11%	11%	5%	11%

### Ecstasy

For those who buy their ecstasy, table 4.9 shows the locations of purchase. Location of purchase varied again across the sample Member State. The seller's home was mentioned most frequently in all Member States except for Bulgaria, where places of entertainment and private parties were most popular. Similar to the findings for (meth)amphetamine, respectively 17% and 16% of Italian and Swedish ecstasy users buy it at school, college or university, while these locations are hardly mentioned in the other Member States. Differences between user types were marginally significant in the Netherlands ( $P=.030$ ), where a higher proportion of frequent users buy on the street or in a park compared to infrequent users.

**Table 4.9: Usual locations for purchasing ecstasy by Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	34	89	47	1,455	97	52	1,774
At a pub/bar	3%	1%	2%	1%	1%	2%	1%
At a private party	15%	1%	2%	2%	6%	12%	3%
At a music concert or festival	3%	21%	6%	4%	4%	6%	5%
At other place of entertainment	29%	24%	21%	6%	11%	13%	9%
On the street or in a park	12%	2%	17%	12%	9%	10%	11%
At a public transport station	0%	0%	0%	1%	0%	0%	1%
At a community centre, youth club association	6%	0%	0%	0%	0%	0%	0%
At seller's home	12%	34%	28%	26%	27%	25%	26%
At my own home	0%	0%	2%	6%	3%	8%	5%
At someone else's home	9%	8%	0%	27%	9%	15%	24%
At a smart shop	0%	0%	4%	0%	10%	2%	1%
Through the Internet	0%	1%	0%	1%	1%	0%	1%
At my workplace	0%	1%	0%	0%	1%	0%	0%
At school, college or university	0%	1%	17%	1%	16%	4%	2%
Other	12%	6%	0%	14%	0%	4%	12%

### Reasons for buying at a specific location

Respondents who usually buy their ecstasy were asked to indicate their main reason for buying at that specific location. Table 4.10 summarizes their responses per sample Member State. Reasons for buying at a specific location varied across the selected Member States ( $p<.001$ ). Similar to the findings for (meth)amphetamine, personal contacts were most frequently mentioned in all countries except for Italy, with proportions varying from 29% in Bulgaria to 63% in the Netherlands. In Italy, personal contacts were second to local availability, while local availability was the second most frequently mentioned reason in all other Member States. Risk of police detection was mentioned more frequently in Bulgaria and Sweden than in the other Member States. There was a marginally significant difference between user types in the Netherlands ( $P=.016$ ): pricing as a reason for buying at a specific location was mentioned by a higher percentage of frequent users compared to infrequent users.

**Table 4.10: Main reason for buying at a specific location by country**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)							
Local availability	26%	13%	31%	11%	26%	24%	13%
Price	9%	3%	6%	4%	2%	4%	4%
Opening hour	3%	0%	2%	0%	0%	0%	0%
Personal contacts	29%	60%	24%	63%	43%	58%	60%
Habits	6%	10%	18%	8%	2%	2%	8%
Risk of police detection	12%	4%	4%	3%	16% <sup>a</sup>	5%	4%
Other	15%	9%	14%	11%	12%	7%	11%

## Cocaine

For those who buy their cocaine, table 4.11 shows the locations of purchase. Location of purchase varied across the sample Member States. Similar to the findings for ecstasy and to a lesser extent those for (meth)amphetamine, the seller's home was mentioned most frequently in all Member States except for the Netherlands, where the street or a park were mentioned slightly more often. Similar to the findings for both (meth)amphetamine and ecstasy, respectively 17% and 20% of Italian and Swedish ecstasy users buy it at school, college or university, while these locations are very uncommon in the other Member States. Differences between user types were significant in the Netherlands ( $P=.006$ ), where buying on the street or in a park is reported by a higher proportion of occasional users compared to infrequent or frequent users.

**Table 4.11: Usual locations for purchasing cocaine by Member State**

	CZ	IT	NL	SE	E&W	Total
N (100%)	33	52	455	65	24	629
At a pub/bar	6%	6%	5%	2%	8%	5%
At a private party	3%	4%	2%	6%	4%	2%
At a music concert or festival	3%	0%	2%	0%	0%	1%
At other place of entertainment	12%	4%	4%	2%	4%	4%
On the street or in a park	3%	29%	25%	25%	8%	23%
At a public transport station	0%	0%	0%	0%	0%	0%
At a community centre, youth club association	3%	0%	0%	0%	0%	0%
At seller's home	48%	37%	19%	31%	25%	23%
At my own home	0%	4%	8%	5%	8%	7%
At someone else's home	9%	0%	23%	6%	25%	19%
At a smart shop	0%	0%	0%	2%	0%	0%
Through the Internet	0%	0%	0%	2%	0%	0%
At my workplace	0%	0%	0%	2%	0%	0%
At school, college or university	0%	17%	0%	20%	0%	3%
Other	12%	0%	12%	0%	17%	10%

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

## Reasons for buying at a specific location

Reasons for buying cocaine at a specific location varied across the sample Member States and are summarized in table 4.12. While personal contacts were most frequently mentioned in almost all countries as a reason for buying at a location for (meth)amphetamine and ecstasy, they were hardly mentioned by cocaine users in any of the countries. Instead, habits were mentioned most frequently as a reason by cocaine users in all countries, ranging from 43% in Sweden to 65% in England & Wales. There were no differences between user types in the Netherlands ( $P=.378$ ).

**Table 4.12: Main reason for buying cocaine at a specific location by country ( $P=.004$ )**

	CZ	IT	NL	SE	E&W	Total
N (100%)	36	54	475	68	25	658
Local availability	14%	6%	8%	9%	0%	8%
Price	8%	24%	18%	24%	28%	19%
Opening hour	6%	11%	4%	3%	0%	5%
Personal contacts	0%	2%	1%	0%	4%	1%
Habits	53%	46%	52%	43%	64%	51%
Risk of police detection	11%	6%	12%	4%	0%	10%
Other	8%	6%	4%	18%	4%	6%

### 4.3 Ease of obtaining drugs and inability to buy

#### Amphetamine

Table 4.13 summarizes respondents' estimates of the time it would take them to obtain the amount of (meth)amphetamine that they usually buy. Although the most frequently mentioned category was either 'less than half an hour' or 'half an hour to an hour' in all sample Member States except for Sweden, the estimates varied across Member States. Most notably, Swedish users reported more frequently longer times than users from the other sample Member States. There were no differences found between user types in the Czech Republic, the Netherlands or Sweden in the estimated time needed to get (meth)amphetamine.

**Table 4.13: Estimated time needed to buy the amount of (meth)amphetamine usually purchased per Member State**

	BG	CZ	IT	NL	SE	Total
N (100%)	44	93	44	660	136	977
Less than half an hour	38.6%	23.7%	34.1%	35.5%	20.6%	32.3%
0,5-1 hour	38.6%	23.7%	27.3%	19.5%	15.4%	20.6%
1-2 hours	6.8%	19.4%	11.4%	13.3%	26.5%	15.4%
Between 2 and 12 hours	9.1%	14.0%	2.3%	10.6%	14.7%	11.1%
Between 12 and 24 hours	2.3%	5.4%	6.8%	7.9%	9.6%	7.6%
More than 24 hours	4.5%	14.0%	18.2%	13.2%	13.2%	13.1%

Figure 4.1 shows the proportions of users indicating that there had been times in the past year when they had been unable to buy (meth)amphetamine despite having enough money. Significant differences were found in inability to buy: the proportion of those to whom this had happened was smaller in the Netherlands than in all other sample Member States except for Italy. No further differences between the sample Member States were observed. Differences between user types were found in the Czech republic ( $P=.044$ ) and the Netherlands ( $p<.001$ ), where a lower proportion of infrequent users than occasional or frequent users had been unable to buy.

**Figure 4.1: Proportion users who indicated that there were times they had cash but were not able to purchase (meth)amphetamine in the past 12 months**

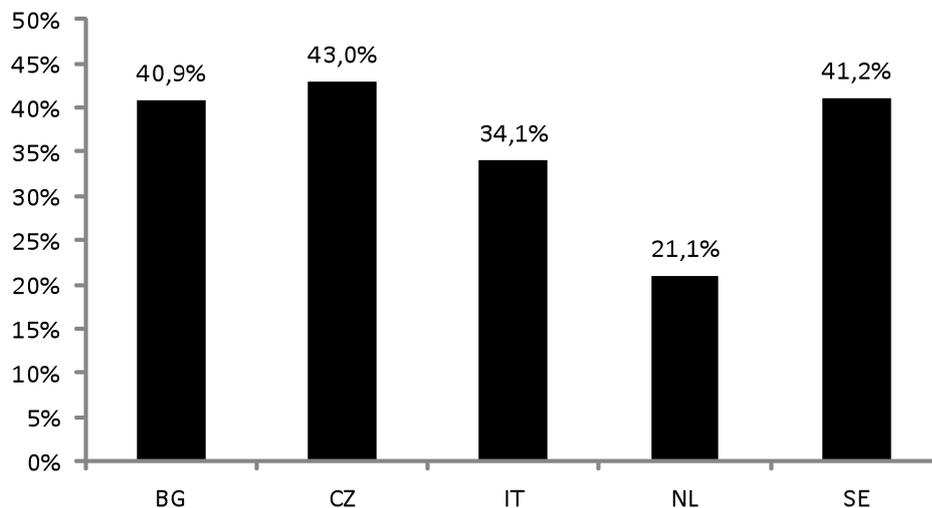


Table 4.14 provides an overview of the reasons given for being unable to purchase (meth)amphetamine. There were no significant differences between the Czech Republic, the Netherlands and Sweden, nor were there differences between user types in these three Member States. Unavailability of the seller and sellers not having any (meth)amphetamine available were the two most frequently mentioned reasons for not being able to buy (meth)amphetamine.

**Table 4.14: Reasons for not being able to buy (meth)amphetamine**

	CZ	NL	SE	P
N (100%)	40	139	56	.100
No sellers were available	32.5%	32.4%	46.4%	
Sellers did not have any	45.0%	35.3%	42.9%	
Sellers did not have the quality I wanted	2.5%	12.9%	7.1%	
Sellers were charging too much	.0%	1.4%	.0%	
Police activity kept me from the sellers	.0%	2.9%	.0%	
Don't know	10.0%	5.8%	3.6%	
Other	10.0%	9.4%	.0%	

### Ecstasy

Table 4.15 summarizes respondents' estimates of the time it would take them to obtain the amount of ecstasy that they usually buy. Across Member States, obtaining ecstasy tended to take more time than obtaining (meth)amphetamine, but estimates varied across Member States. Most notably, the most frequently mentioned time in Sweden was more than 24 hours (37% of the respondents). There were no differences found between user types in the Netherlands regarding the estimated time needed to get ecstasy.

**Table 4.15: Estimated time needed to buy the amount of ecstasy usually purchased per Member State**

	BG	CZ	IT	NL	SE	E&W	Total
N (100%)	33	92	47	1,453	99	55	1,779
Less than half an hour	12%	20%	38%	34%	13%	16%	31%
0,5-1 hour	45%	24%	30%	18%	14%	20%	19%
1-2 hours	12%	12%	9%	11%	13%	18%	11%
Between 2 and 12 hours	12%	11%	0%	11%	12%	16%	11%
Between 12 and 24 hours	3%	8%	2%	8%	10%	11%	8%
More than 24 hours	15%	26%	21%	18%	37%	18%	20%

Figure 4.2 shows the proportions of users indicating that there had been times in the past year when they had been unable to buy ecstasy despite having enough money. Significant differences were found in inability to buy ( $p < .001$ ): the proportion of those to whom this had happened was smaller in the Netherlands than in all other Member States. No further differences between Member States were observed. Differences between user types were found in the Netherlands ( $p < .001$ ), where a lower proportion of infrequent users than occasional or frequent users had been unable to buy.

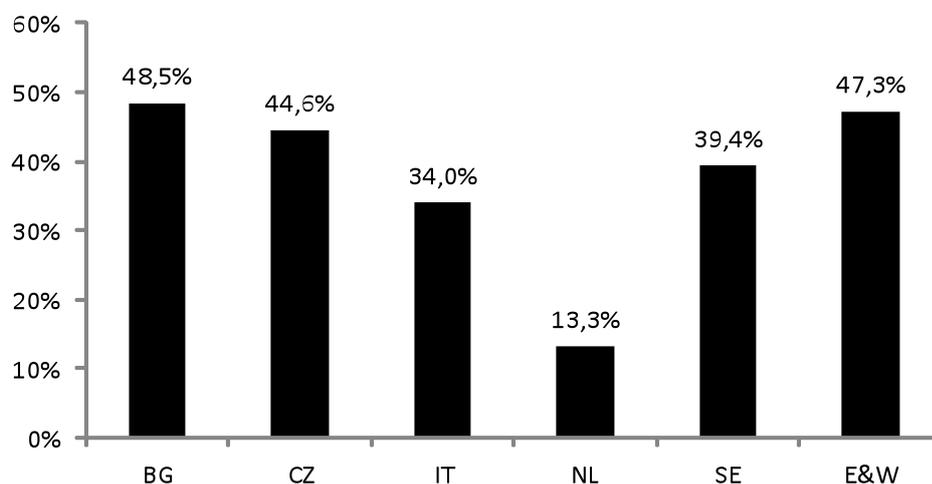
**Figure 4.2: Proportion of users who indicated that there were times they had cash but were not able to purchase ecstasy in the past 12 months**

Table 4.16 provides an overview of the reasons given for being unable to purchase ecstasy. The distribution of these reasons varied between the Czech Republic, the Netherlands and Sweden, although unavailability of the seller and sellers not having any ecstasy available were the two most frequently mentioned reasons for not being able to buy in all three countries. There were no differences between user types.

**Table 4.16: Reasons for not being able to buy ecstasy**

	CZ	NL	SE	P
N (100%)	41	194	39	
No sellers were available	29%	40%	56%	.005
Sellers did not have any	39%	26%	28%	
Sellers did not have the quality I wanted	17%	13%	3%	
Sellers were charging too much	2%	1%	0%	
Police activity kept me from the sellers	0%	1% <sup>a</sup>	8% <sup>b</sup>	
Don't know	10%	8%	5%	
Other	2%	11%	0%	

### **Cocaine**

Table 4.17 summarizes respondents' estimates of the time it would take them to obtain the amount of cocaine that they usually buy. These estimates varied across the sample Member States. Most notably, 26% of Czech users indicated that it would take them more than 24 hours to obtain cocaine and 40% of users from England & Wales indicated needing 1-2 hours. There were differences found between user types in the Netherlands regarding the estimated time needed to get cocaine ( $p < .001$ ): a higher proportion of frequent users compared to the other user types indicated that they could obtain cocaine in less than half hour.

**Table 4.17: Estimated time needed to buy the amount of cocaine usually purchased per Member State**

	CZ	IT	NL	SE	E&W	Total
N (100%)	34	52	456	66	25	633
Less than half an hour	26%	35%	39%	23%	16%	35%
0,5-1 hour	15%	25%	31%	23%	24%	28%
1-2 hours	15%	15%	14%	21% <sup>a</sup>	40%	16%
Between 2 and 12 hours	9%	6%	8%	15%	16%	9%
Between 12 and 24 hours	9%	8%	3%	3%	0%	4%
More than 24 hours	26%	12%	5%	15%	4%	8%

Figure 4.3 shows the proportions of users indicating that there had been times in the past year when they had been unable to buy cocaine despite having enough money. Significant differences were found in inability to buy ( $p < .001$ ): the proportion of those to whom this had happened was smaller in the Netherlands than in all other Member States except for Italy. No further differences between Member States were observed. Differences between user types were found in the Netherlands ( $P = .009$ ), where a lower proportion of infrequent than occasional users had been unable to buy.

**Figure 4.3:** Proportion of users who indicated that there were times they had cash but were not able to purchase cocaine in the past 12 months

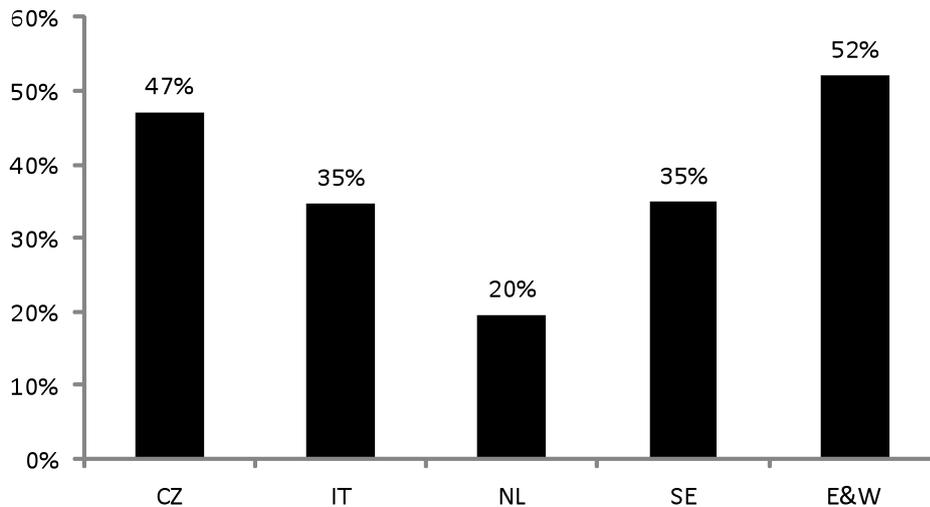


Table 4.18 provides an overview of the reasons given for being unable to purchase cocaine. The distribution of these reasons differed between the Netherlands and Sweden. A higher proportion of Swedish users than Dutch users indicated sellers not having any cocaine available as a reason for being unable to buy it. There were no differences between user types in the Netherlands ( $P=.553$ ).

**Table 4.18:** Reasons for not being able to buy cocaine

	NL	SE	P
N (100%)	88	23	
No sellers were available	47%	43%	.004
Sellers did not have any	11% <sup>a</sup>	43% <sup>b</sup>	
Sellers did not have the quality I wanted	9%	4%	
Sellers were charging too much	3%	0%	
Police activity kept me from the sellers	0%	0%	
Don't know	6%	9%	
<b>Other</b>	<b>24%</b>	<b>0%</b>	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

## 4.4 Amount usually bought per purchase and amount of money paid for it

### **Amphetamine**

We asked respondents to indicate the amount of amphetamine they usually buy in either pills or grams. Because only the Dutch sample contained enough respondents who indicated the amount in pills to obtain a reliable estimate, we will focus in our analysis exclusively on the amount in grams.

Table 4.19 shows the mean and median amount of (meth)amphetamine usually bought per purchase per Member State, while table 4.20 shows these figures per user group in the Czech Republic, the Netherlands and Sweden. The figures for Sweden and the Netherlands are remarkably similar, but those for the Czech Republic are much lower.

**Table 4.19: Mean and median amount of (meth)amphetamine (grams) usually bought per purchase per Member State**

	BG	CZ	IT	NL	SE	Total
<b>Mean</b>	<b>1.66</b>	<b>.82</b>	<b>.93</b>	<b>2.46</b>	<b>2.33</b>	<b>2.19</b>
Median	1.00	.50	.50	1.00	1.00	1.00
N	34	78	28	544	111	795

**Table 4.20: Mean and median amount of (meth)amphetamine (grams) usually bought per purchase per user group**

		Infrequent	Occasional	Frequent	P
<b>Czech Republic</b>	<b>Mean</b>	<b>.97</b>	<b>.50</b>	<b>.90</b>	<b>.343</b>
	Median	.50	.25	1.00	
	N	31	21	26	
<b>Netherlands</b>	<b>Mean</b>	<b>1.63<sup>a</sup></b>	<b>2.55<sup>b</sup></b>	<b>3.95<sup>c</sup></b>	<b>.000</b>
	Median	1.00	2.00	4.00	
	N	240	180	124	
<b>Sweden</b>	<b>Mean</b>	<b>1.61<sup>a</sup></b>	<b>2.71<sup>a,b</sup></b>	<b>4.14<sup>b</sup></b>	<b>.000</b>
	Median	1.00	2.00	5.00	
	N	68	20	23	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

Respondents were also asked how much they usually paid for this purchase. For non-Euro countries (Bulgaria, Czech Republic, Sweden and England & Wales) the national currencies were converted to Euro's using currency exchange rates of March 31 2012, the period in which the survey was implemented (retrieved from [www.xe.com](http://www.xe.com)).

Tables 4.21 and 4.22 show the amount of money spent per purchase per Member State and per user type, respectively. The amount of (meth)amphetamine bought and the amount of money paid were correlated across countries ( $r=.48$  in the total sample). Frequent users tended to spend more per purchase than less frequent users, but differences between user types were only significant for the Netherlands. The figures presented in tables 4.21 and 4.22 are meaningless by themselves because they pertain to purchases of varying sizes, but will be used to calculate the price per gram in the next paragraph.

**Table 4.21: Mean and median amount paid (Euro) per purchase per Member State**

	BG	CZ	IT	NL	SE	Total
<b>Mean</b>	<b>12.3</b>	<b>23.7</b>	<b>23.4</b>	<b>27.9</b>	<b>41.8</b>	<b>28.5</b>
Median	10.2	20.0	20.0	10.0	27.5	15.0
N	38	80	39	568	119	844

**Table 4.22: Mean and median amount paid (Euro) per purchase per user group**

		Infrequent	Occasional	Frequent	P
<b>Czech Republic</b>	<b>Mean</b>	<b>22.2</b>	<b>19.1</b>	<b>29.3</b>	<b>.093</b>
	Median	20.0	12.0	24.0	
	N	32	22	26	
<b>Netherlands</b>	<b>Mean</b>	<b>20.6<sup>a</sup></b>	<b>22.0<sup>a</sup></b>	<b>52.6<sup>b</sup></b>	<b>.000</b>
	Median	10.0	10.0	25.0	
	N	260	187	121	
<b>Sweden</b>	<b>Mean</b>	<b>36.1</b>	<b>45.0</b>	<b>58.3</b>	<b>.109</b>
	Median	27.5	27.5	33.0	
	N	75	22	22	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

## Ecstasy

As with amphetamine, users were asked to indicate the amount of ecstasy they usually buy in either pills or grams. Because again only the Dutch sample contained enough respondents who indicated the amount in grams to obtain a reliable estimate, we will focus exclusively on the amount in pills.

Table 4.23 shows the mean and median amount of ecstasy usually bought per purchase per Member State, and table 4.24 shows these figures per user group in the Netherlands. The number of pills bought per purchase is highest among occasional users, but note that only the difference between infrequent and occasional users is statistically significant.

**Table 4.23: Mean and median amount of ecstasy usually bought per purchase per Member State**

		BG	CZ	IT	NL	SE	E&W
Pills	Mean	2.0	3.9	[3.3]	9.4	4.1	5.2
	Median	2.0	3.0	2.0	5.0	2.0	4.0
	N	25	72	13	1,210	54	28

**Table 4.24: Mean and median amount of ecstasy (pills) usually bought per purchase per user group in the Netherlands**

	Infrequent	Occasional	Frequent	P
Mean	7.6 <sup>a</sup>	12.4 <sup>b</sup>	8.7 <sup>a,b</sup>	.000
Median	5.0	10.0	5.0	
N	740	422	48	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

Tables 4.25 and 4.26 show the amount of money spent per purchase per sample Member State and per user type, respectively. Number of ecstasy pills bought and amount of money paid were correlated across countries ( $r=.73$  in the total sample). The figures presented in tables 4.25 and 4.26 are meaningless by themselves because they pertain to purchases of varying sizes, but will be used to calculate the price per pill in the next paragraph.

**Table 4.25: Mean and median amount paid (Euro) per purchase per Member State**

	BG	CZ	IT	NL	SE	E&W	Total
Mean	10.1	11.4	26.1	42.2	46.0	30.4	39.3
Median	5.1	8.0	25.0	20.0	27.5	30.0	20.0
N	28	86	44	1,280	86	51	1,575

**Table 4.26: Mean and median amount paid (Euro) per purchase per user group in the Netherlands**

	Infrequent	Occasional	Frequent	P
Mean	33.2 <sup>a</sup>	55.6 <sup>b</sup>	59.6 <sup>b</sup>	.000
Median	20.0	25.0	20.0	
N	775	447	58	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

## Cocaine

Table 4.27 shows the mean and median amount of cocaine usually bought per purchase per Member State, and table 4.28 shows these figures per user type in the Netherlands. Note that the median amount of cocaine bought per purchase is 1 gram in all countries. The median is also 1 for all user type groups, but the mean among frequent users is slightly higher at 1.5 grams than the gram usually bought by occasional and infrequent users.

**Table 4.27: Mean and median amount of cocaine usually bought per purchase per Member State**

		BG	CZ	IT	NL	PT	SE	E&W	Total
Grams	Mean	[1.7]	1.1	0.8	1.0	[1.0]	1.7	1.1	1.1
	Median	[1.5]	1.0	1.0	1.0	[1.0]	1.0	1.0	1.0
	N	9	29	37	411	14	49	23	572

**Table 4.28: Mean and median amount of cocaine usually bought per purchase per user group in the Netherlands**

	Infrequent	Occasional	Frequent	P
Mean	0.9 <sup>a</sup>	1.1 <sup>a</sup>	1.5 <sup>b</sup>	.000
Median	1.0	1.0	1.0	
N	243	122	46	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

Tables 4.29 and 4.30 show the amount of money spent per purchase per member State and per user group, respectively. The amount of cocaine bought and amount of money paid were correlated across countries ( $r=.57$  in the total sample). The figures presented in tables 4.29 and 4.30 are meaningless by themselves because they pertain to purchases of varying sizes, but will be used to calculate the price per gram in the next paragraph.

**Table 4.29 Mean and median amount paid (Euro) per purchase per Member State**

	BG	CZ	IT	NL	PT	SE	E&W	Total
Mean	65.8	62.8	61.3	46.7	41.1	120.7	55.3	56.2
Median	63.8	80.0	50.0	45.0	47.5	88.0	60.0	50.0
N	10	32	44	411	14	56	23	590

**Table 4.30: Mean and median amount paid (Euro) per purchase per user group in the Netherlands**

	Infrequent	Occasional	Frequent	P
Mean	44.6 <sup>a</sup>	46.2 <sup>a</sup>	59.3 <sup>b</sup>	.019
Median	45.0	45.0	50.0	
N	243	121	47	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level.

## 4.5 Estimated price per gram and per pill

**Table 4.31: Price per gram (meth)amphetamine from different sources at retail level**

Country	EMCDDA			This study		
	N	Mean	Median	N	Mean	Median
Bulgaria	27	11.0	10.0	29	12.6	10.2
Czech Republic*	491	51.4	39.5	70	41.1	40.0
Italy	:	16.7	:	21	38.3	30.0
Netherlands	969	6.0	6.0	467	11.1	6.3
Portugal	:	:	:	7	[30.0]	[30.0]
Sweden	42	26.6	26.2	99	23.8	22.0
England & Wales	:	11.7	:	21	38.3	30.0

Table 4.32 shows the price per ecstasy pill as reported by the EMCDDA and as estimated in the current study. For Bulgaria, the Netherlands and Sweden, these two estimates match quite nicely. For the Czech Republic, our estimate is somewhat lower than that reported by the EMCDDA, especially the median. Note, however, that EMCDDA figures are based on police data.

For England & Wales, our estimated mean is higher than that reported by the EMCDDA, but our median matches the mean reported by the EMCDDA. For Italy and Portugal, our samples are too small to allow for comparisons.

**Table 4.32: Price per ecstasy pill from different sources at retail level**

Country	EMCDDA			This study		
	N	Mean	Median	N	Mean	Median
Bulgaria	26	6.5	6.0	24	5.2	5.1
Czech Republic	34	7.8	7.9	68	4.5	2.7
Italy	:	16.6	:	13	[10.7]	[7.5]
Netherlands	1,994	4.0	3.5	1,170	4.1	3.8
Portugal*	:	3.7	:	2	[3.0]	[3.0]
Sweden	42	12.2	12.6	53	11.9	11.0
England & Wales	:	3.5	:	28	7.2	3.6

\*Ecstasy data may not be representative of the retail level of the market.

Table 4.33 shows the price of cocaine per gram as reported by the EMCDDA and as estimated in the current study. For Italy and the Netherlands, these two estimates match quite nicely. For Sweden, our estimate is considerably lower than that reported by the EMCDDA. For England & Wales, our estimate is somewhat higher than that reported by the EMCDDA. For Bulgaria, the Czech Republic and Portugal, our samples are too small to allow for comparisons.

**Table 4.33: Price per gram cocaine from different sources at retail level**

Country	EMCDDA			This study		
	N	Mean	Median	N	Mean	Median
Bulgaria	23	60.0	60.0	9	[41.9]	[51.0]
Czech Republic	14	79.1	79.1	19	[54.1]	[50.0]
Italy	:	69.2	:	27	72.8	75.0
Netherlands	979	45.0	50.0	369	45.5	50.0
Portugal*	:	46.0	:	13	[44.8]	[50.0]
Sweden	42	94.8	94.3	33	69.8	77.0
England & Wales	:	46.7	:	22	54.4	60.0

\*Cocaine data may not be representative of the retail level of the market.

## 4.6 Buying in the past 30 days: number of times and amount of money spent

In general, there should be a link between the frequency with which one uses a drug and the buying of this same drug in terms of frequency and/or size of purchases and amount of money spent. Because our user typology is based on the frequency of use in the past 12 months, we can expect differences in buying behaviour in the past 30 days between user types. We decided to examine our data concerning the past 30 days only for the sample Member States where we have sufficient numbers in all three user types (i.e., the Netherlands for all three drugs and the Czech Republic and Sweden for (meth)amphetamine).

### **Amphetamine**

Figures 4.4a, b and c present the number of times that respondents had purchased (meth)amphetamine in the last 30 days. As the figure illustrates, the number of purchases of (meth)amphetamine varied significantly across user types in the Czech Republic ( $P=.001$ ), the Netherlands ( $p<.001$ ) and Sweden ( $p<.001$ ). In each of the three Member States, increasing use frequency was linked with increasing number of purchases.

As can be seen in table 4.34, the mean amount of money spent in the past 30 days was higher among frequent users than among occasional and infrequent users in the Czech Republic, the Netherlands and Sweden.

Thus, both the number of times that (meth)amphetamine was purchased and the amount of money spent on (meth)amphetamine in the past 30 days showed a pattern of increase from infrequent to frequent users.

Figure 4.4a: Number of purchases of methamphetamine in the past 30 days by user group for the Czech Republic

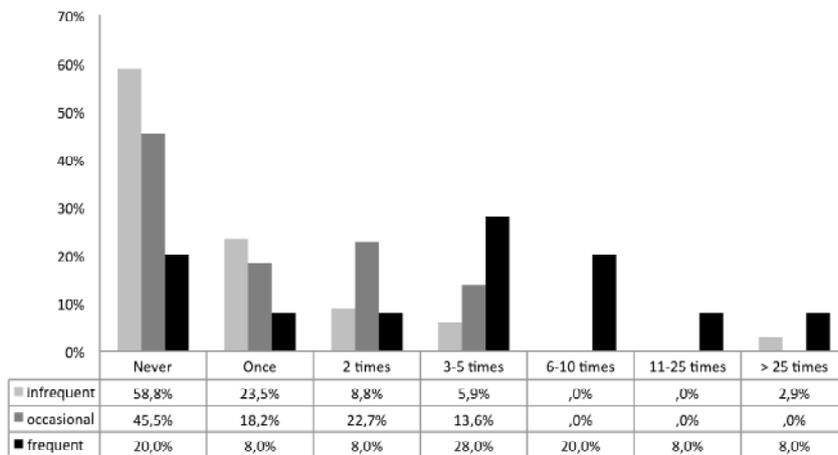


Figure 4.4b: Number of purchases of amphetamine in the past 30 days by user group for the Netherlands

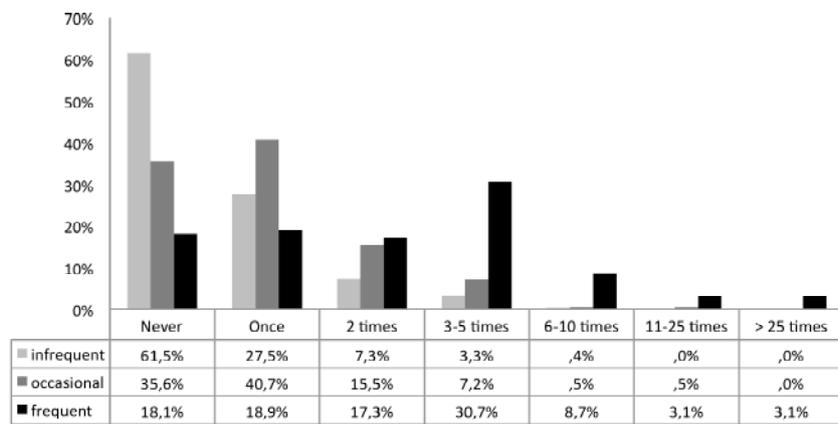
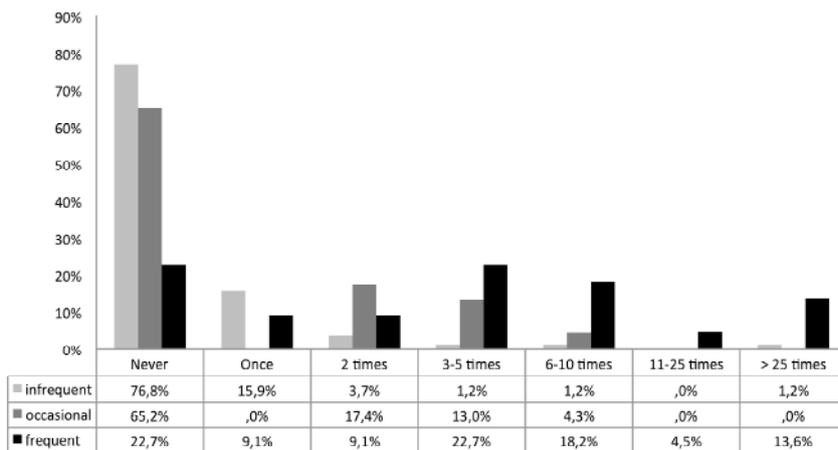


Figure 4.4c: Number of purchases of amphetamine in the past 30 days by user group for Sweden



**Table 4.34: Mean and median amount of money (Euro) spent on (meth)amphetamine in the past 30 days by user group and Member State**

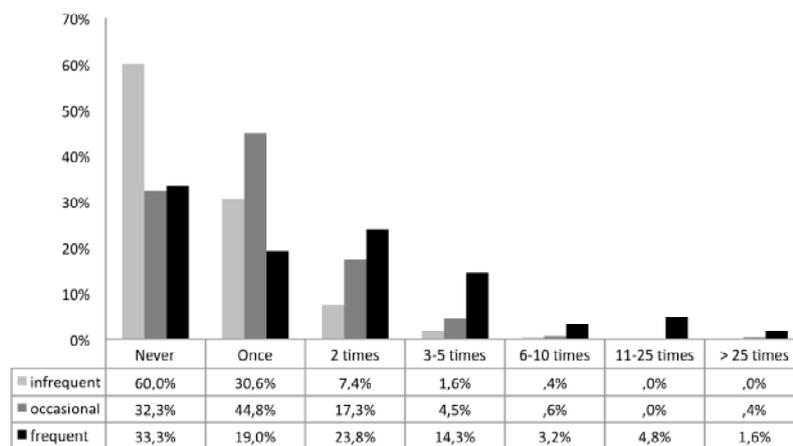
		Infrequent	Occasional	Frequent	Total	P
Czech Republic	Mean	13.6 <sup>a</sup>	18.2 <sup>a</sup>	78.9 <sup>b</sup>	31.8	.000
	Median	2.0	6.0	60.0	8.0	
	N	30	22	18	70	
Netherlands	Mean	31.2 <sup>a</sup>	22.4 <sup>a</sup>	90.8 <sup>b</sup>	45.5	.000
	Median	10.0	15.0	50.0	20.0	
	N	107	123	97	327	
Sweden	Mean	20.2 <sup>a</sup>	35.3 <sup>a</sup>	168.3 <sup>b</sup>	47.5	.000
	Median	11.0	11.0	38.5	11.0	
	N	82	24	21	127	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

### Ecstasy

Figure 4.5 presents the number of times that users from the different user types in the Netherlands had purchased ecstasy in the last 30 days. As the figure illustrates, the number of purchases of ecstasy varied significantly across user type groups ( $p < .001$ ) and increasing use frequency was linked with increasing number of purchases. Similarly, the mean amount of money spent in the past 30 days was bigger among frequent users than among occasional and infrequent users in the Netherlands (see table 4.35).

Thus, both the number of times that ecstasy was purchased and the amount of money spent on ecstasy in the past 30 days showed a pattern of increase from infrequent to frequent users.

**Figure 4.5: Number of purchases of ecstasy in the past 30 days by user group in the Netherlands****Table 4.35: Amount of money (Euro) spent on ecstasy in the past 30 days by user group in the Netherlands**

	Infrequent	Occasional	Frequent	Total	P
Mean	37.1 <sup>a</sup>	45.4 <sup>a</sup>	104.9 <sup>b</sup>	45.3	.000
Median	15.0	25.0	62.5	20.0	
N	306	300	42	648	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

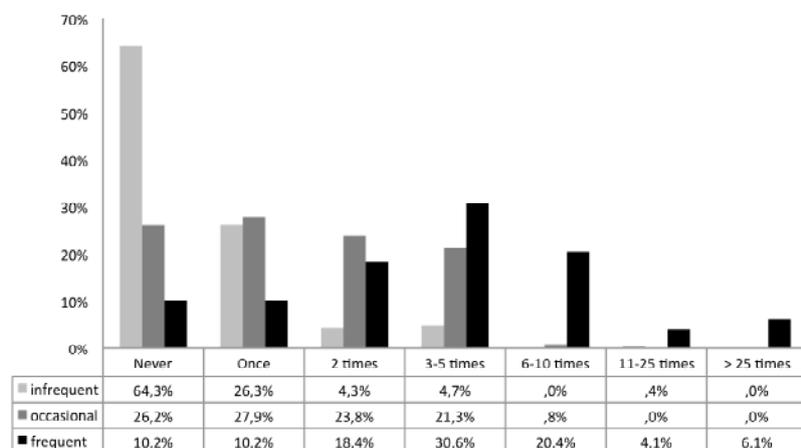
### Cocaine

Figure 4.6 presents the number of times that users from the different user groups in the Netherlands had purchased cocaine in the last 30 days. As the figure illustrates, the number of purchases of cocaine varied significantly across user type groups ( $p < .001$ ) and increasing use frequency was again linked with increasing number of purchases. Similarly, the mean amount of

money spent in the past 30 days increased from infrequent to occasional users and from occasional to frequent users in the Netherlands ( $p < .001$ , see table 4.36).

Thus, both the number of times that cocaine was purchased and the amount of money spent on cocaine in the past 30 days showed a pattern of increase from infrequent to frequent users.

**Figure 4.6:** Number of purchases of cocaine in the past 30 days by user group in the Netherlands



**Table 4.36:** Amount of money (Euro) spent on cocaine in the past 30 days by user group

	Infrequent	Occasional	Frequent	Total	P
Mean	58.3 <sup>a</sup>	94.7 <sup>b</sup>	195.8 <sup>c</sup>	97.7	.000
Median	40.0	50.0	187.5	50.0	
N	93	90	40	223	

**Note:** Figures marked with different subscripts (a, b etc.) denote subsets of categories whose proportions differ significantly from each other at the .05 level; in rows without markings no differences are significant.

## 4.7 Conclusions

We found some similarities as well as differences between the sample Member States concerning the selected availability indicators. Similar to the findings on user characteristics and consumption patterns, there are differences between user types regarding the availability indicators.

### **Way of obtaining drug**

There were few differences between the sample Member States in the way users obtain (meth)amphetamine, ecstasy and cocaine. For (meth)amphetamine and ecstasy, the proportion of users buying the drugs was highest in the Netherlands and lowest in Bulgaria. For cocaine, the proportion of users buying was highest in the Netherlands and lowest in Italy. In general, the proportion of users who buy their (meth)amphetamine was highest among frequent users and lowest among infrequent users. For ecstasy, the proportion of users who buy was higher among occasional users than among the other two user types and for cocaine it was lower among infrequent users than among the other two user types.

### **Locations of purchase**

The usual location of purchase varied somewhat across Member States for all three drugs. For all three drugs, buying at school, college or university was highest in Italy and Sweden. Buying at the seller's home was highest in the Czech Republic, while buying at someone else's home was highest in the Netherlands. Buying cocaine on the street or in a park was high in Italy, the Netherlands and Sweden (25 to 29%). Differences between user types were found in the Netherlands, where purchasing (meth)amphetamine at the seller's home was more common among frequent than among infrequent users, purchasing ecstasy on the street or in a park was more common among frequent than infrequent users, and buying cocaine on the street or in a park occurred more frequently among occasional than among frequent or infrequent users.

**Reasons to buy at a specific location**

Personal contacts played a role in all seven sample Member States for buying (meth)amphetamine and ecstasy (44-74% of (meth)amphetamine users; 24-63% of ecstasy users). Among cocaine users, habit was the most mentioned reason to buy at a specific location (43-64%).

**Time to obtain drug**

The distribution of estimated time needed to obtain (meth)amphetamine, ecstasy and cocaine varied across the seven sample Member States, but there were no major differences between Member States between (meth)amphetamine and ecstasy. In all seven Member States, the proportion of (meth)amphetamine users estimating they would be able to buy their usual amount 'within half an hour' was highest, followed by 'half an hour to an hour'. For ecstasy, the highest proportion varied between 'less than half an hour' and 'half an hour to an hour', and these two categories scored the highest in all seven Member States. For cocaine, higher proportions of users indicated longer times needed to obtain it. Most notably, a quarter (26%) of users from the Czech Republic indicated that it would take them more than 24 hours, and in England & Wales, 40% of users indicated that it would take 1-2 hours. Overall, obtaining cocaine tended to take longer than obtaining (meth)amphetamine or ecstasy. There were no differences between user types in the time needed to obtain (meth)amphetamine or ecstasy, but Dutch frequent users needed less time to obtain cocaine than occasional or infrequent users.

**Inability to buy**

The proportion of users who now and then were unable to buy (meth)amphetamine in the past 12 months was lower in the Netherlands (21%) than in the other six sample Member States (41-43%) except for Italy (34%). Differences between user types in inability to buy were observed in the Czech Republic and the Netherlands, where a lower proportion of infrequent users had been unable to buy compared to occasional and frequent users. The reasons for being unable to buy did not vary across the Czech Republic, the Netherlands and Sweden, nor were there differences between user types in reasons given. In all countries the main reasons for not being able to buy (meth)amphetamine were that no sellers were available or sellers did not have (meth)amphetamine. The proportion of users who was now and then unable to buy ecstasy in the past 12 months was lower in the Netherlands (13%) than in the other Member States (34-49%). As with amphetamine, a lower proportion of Dutch infrequent users had been unable to buy ecstasy compared to occasional or frequent users. The reasons for being unable to buy varied across the Czech Republic, the Netherlands and Sweden; unavailability of sellers was mentioned most often in Sweden and least often in the Czech Republic. There were no differences between user types in reasons for being unable to buy.

Also for cocaine the proportion of users who was now and then unable to buy the drug in the past 12 months was lower in the Netherlands (20%) than in the other Member States (35-52%) except for Italy (35%). Similar to amphetamine and ecstasy, a lower proportion of Dutch infrequent users had been unable to buy cocaine compared to occasional or frequent users. Reasons for inability to buy differed between the Netherlands and Sweden; a higher proportion of Swedes indicated unavailability of seller as a reason. Finally, there were no differences between user groups in reasons for being unable to buy.

**Amounts bought and prices**

In the Netherlands and Sweden, the amount of amphetamine usually purchased increased from infrequent to frequent users. Accordingly, in the total sample, prices and amounts of amphetamine bought per purchase were significantly correlated. In the Czech Republic, neither the amount usually bought nor the price paid for it varied between user types.

**Money spent on drugs**

For all three drugs, the number of purchases increased with increasing use frequency. In the past 30 days, frequent users spent more money on (meth)amphetamine than occasional and infrequent users in the Czech Republic, the Netherlands and Sweden. Dutch frequent users of ecstasy also spent more money on ecstasy than occasional and infrequent users. Finally, among Dutch cocaine users, the amount of money spent on cocaine increased from infrequent to occasional users and from occasional to frequent users. Thus, especially frequent users stand out regarding the amount of money they spent on their drugs and thus contribute most to the total expenditure on drugs.

## 5 Estimating annual consumption

Estimates on the annual consumption of (meth)amphetamine, ecstasy and cocaine will be much more fragmented and fraught with uncertainty compared to those for cannabis for several reasons. To make these estimates, figures on the amounts of (meth)amphetamine, ecstasy and cocaine consumed annually per user type, as presented in chapter 3.3.4, should be multiplied with the number of users per user type. Therefore, total consumption can only be estimated for those Member States that provide sufficient cases per user type group to warrant estimates of annual consumption. This appeared to be the case only in the Czech Republic, the Netherlands and Sweden for (meth)amphetamine, and for ecstasy and cocaine (powder) in the Netherlands.

A further drawback is the general lack of reliable data on the frequency of use (number of use days) of these substances in the general population. As mentioned in chapter 2.2 this is due to the overall low absolute number of last month users of (meth)amphetamine, cocaine and ecstasy, which may make any further differentiation into frequency categories unreliable. For example, in the Netherlands, the number of last month amphetamine users in the 2009 survey was 13, and there are no frequency data at all for Sweden. Nonetheless, we will use the limited population data available and add data from other sources as well.

Moreover, it is likely that this web survey as well as population surveys largely captured fairly integrated users, while excluding most marginalized problem users. In the Czech Republic and Sweden, indirect estimates are available on the size of populations of problem users of (meth)amphetamine users (EMCDDA 2012b). Moreover, limited data on use patterns among these users have been collected in the face-to-face interviews, which will be taken into account in the estimates as well. In the Netherlands, amphetamine use is relatively uncommon among populations of problem hard drug users, where heroin and crack cocaine dominate the scene.

The data reported in this paragraph refer to 'raw' grams or pills, uncorrected for purity.

Table 5.1 shows the population size for the three eligible Member States. By multiplying the population sizes in table 5.1 by the prevalence rates listed in table 2.1, we obtain the numbers of last year and last month users per Member State as listed in table 5.2. We will use these figures for estimating total annual consumption for each drug.

**Table 5.1: Population size by Member State (2011)**

Member State	15-64 years
Czech Republic	7,378,802
Netherlands	11,153,778
Sweden <sup>1</sup>	6,113,365

<sup>1</sup> 16-64 years (6,003,293). Source: Eurostat (2011).

**Table 5.2: Numbers of last year and last month users of (meth)amphetamine, ecstasy and cocaine per Member State**

Member State	(Meth)amphetamine		Ecstasy		Cocaine	
	Last year	Last month	Last year	Last month	Last year	Last month
Czech Republic	125,439	51,652	273,016	88,546	51,652	29,515
Netherlands	44,615	22,308	156,153	44,615	133,845	55,769
Sweden	48,907	18,340	6,113	0	30,567	6,113

In order to estimate the number of users per user type we have to match available prevalence and frequency data from population surveys with the classification of user types in the current study. We will do this by (1) adapting our categories of use in the last 30 days to match those used in general population surveys (see chapter 2), (2) calculating the absolute numbers of users in each category by combining prevalence data with population size data, and (3) applying the distribution of users across user groups obtained in step 1 to the absolute numbers obtained in step 2. This will yield the absolute number of infrequent, occasional and frequent users of a drug in a country. We will multiply these three figures by the corresponding estimated (5% trimmed) mean annual consumption per user from our data to obtain total estimates of annual consumption of each user type group. Finally, we will sum these three estimates and add data on the amounts consumed by problem users (if available), to obtain an estimate of the total annual consumption of a drug in a country.

## 5.1 Amphetamine

### Netherlands

As reported before, the absolute number of last month amphetamine users in the 2009 general population survey was very low (n=13), which make data on the frequency of use, expressed as the number of use days, highly imprecise (table 5.3). It is not likely that over one-quarter of these users would be (almost) daily users while zero users would be in the lower frequency category. Another survey among a (national) non-probability sample of almost 3,000 people attending clubs and parties included a higher number of last month users of amphetamine. The corresponding frequency data (see table 5.3) is more likely to reflect the true distribution, although the frequency categories were not exactly the same (table 5.3) and the sample is to a large extent self-selected. As we have no better data, we will calculate estimates under both frequency distributions.

We have first calculated the distribution of users over user groups in our Dutch web sample on the basis of their use frequency in the past month (table 5.4). This frequency of use has been adapted from our original number of use days in the last 30 days to match the categories used in the (population) surveys as reported in table 5.3.

**Table 5.3: Frequency of amphetamine use among last month users in the general population (16-64 years) and in a survey among visitors of parties (15-35 years)**

Last month users in GPS (2009) (N=13)			Last month users in survey on club and party visitors (2008/2009) (N=125)		
Every day or almost every day	4	28%	(Almost) daily	5	4.0%
Several times per week	0	0%	Several times/week	6	4.8%
Once a week or more	2	16%	Only in weekend	23	18.4%
Last month but not last week / „less than once a week in the last 30 days“	7	56%	Only at special occasions or seldom	91	72.8%

**Table 5.4: Distribution of users over user groups on the basis of their use frequency in the past month**

	No use	Less than once a week	At least once a week	Several times a week	(Almost) daily
Infrequent user	78.8%	44.7%	8.3%	4.5%	2.9%
Occasional user	15.1%	43.2%	20.8%	4.5%	2.9%
Frequent user	6.2%	12.2%	70.8%	90.9%	94.1%

Table 5.5 shows the numbers of amphetamine users per prevalence category derived from table 5.2 and per frequency category derived from the combination of GPS prevalence data, and frequency data from the two surveys in table 5.3, with EUROSTAT population size. It is clear that the distribution of user types is different between both estimates, with the second estimate revealing a higher proportion of infrequent users. As this distribution was based on a higher number of last month users it might seem to provide more reliable data, although the study was not based on a probability sample.

**Table 5.5: Numbers of amphetamine users in the Netherlands (15-64 years)\***

	Number of users Estimate 1**	Number of users Estimate 2**
Last year	44,615	44,615
Last year – not last month	22,308	22,308
Last month	22,307	22,307
• less than once a week	12,492 (56.0%)	16,240 (72.8%)
• at least once a week	3,569 (15.9%)	4,105 (18.4%)
• several times a week	0 (0.0%)	1,071 (4.8%)
• (almost) daily	6,246 (28.0%)	892 (4.0%)

\* Prevalence data from 2009 GPS; population size data from EUROSTAT 2011.

\*\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

Table 5.6 shows the number of amphetamine users in the Netherlands for each of the user categories as defined in the web survey (infrequent, occasional, and frequent users) by applying the proportions given in table 5.4 to the number of users listed table 5.5. The differences in frequency of use distributions had relatively little impact on the distribution of user groups. For both estimates, over half of all last year users were infrequent users, while the one quarter of slightly less was formed by the occasional and frequent user groups.

**Table 5.6: Numbers of last year amphetamine users per user group in the Netherlands (15-64 years)**

	Estimate 1*		Estimate 2**	
	Total	% of all users	Total	% of all users
<b>Infrequent user</b>	23,640	53%	25,253	57%
<b>Occasional user</b>	9,689	22%	11,312	25%
<b>Frequent user</b>	11,311	25%	8,084	18%
<b>Total</b>	<b>44,640***</b>	<b>100%</b>	<b>44,648***</b>	<b>100%</b>

\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey.

\*\* Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

\*\*\* Differences due to rounding of sub-estimates.

Finally, table 5.7 provides the estimates of the total amount of amphetamine consumed per year, per user type group and in total for the Netherlands. We based these estimates on the 5% trimmed mean of the amount of amphetamine consumed per user. These trimmed means per user type group were multiplied by the size of the user type group to arrive at the total amount consumed by each user type group at population level. These totals were then summed to arrive at the final total estimate of the annual consumption of amphetamine in the Netherlands.

**Table 5.7: Amount of amphetamine consumed per user type (gram) and total amount consumed per year (kg) in the Netherlands\***

		Amount per user per year	Amount consumed at population level	Amount consumed at population level
<b>Infrequent user</b>	95% CI - lower bound	1.46	34.5	36.9
	95% CI - upper bound	1.94	45.9	49.0
	<b>5% trimmed mean</b>	<b>1.70</b>	<b>40.2</b>	<b>42.9</b>
<b>Occasional user</b>	95% CI - lower bound	11.52	111.6	130.3
	95% CI - upper bound	15.28	148.0	172.8
	<b>5% trimmed mean</b>	<b>13.40</b>	<b>129.8</b>	<b>151.6</b>
<b>Frequent user</b>	95% CI - lower bound	166.59	1,884.4	1,346.7
	95% CI - upper bound	229.91	2,600.6	1,858.5
	<b>5% trimmed mean</b>	<b>198.25</b>	<b>2,242.5</b>	<b>1,602.6</b>
<b>Total</b>	95% CI - lower bound		2,176.6	1,513.8
	95% CI - upper bound		2,794.5	2,080.3
	<b>5% trimmed mean</b>		<b>2,412.5</b>	<b>1,797.1</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

Because the number of problem drug users who use amphetamine on a regular basis is low in the Netherlands (opiates and crack cocaine are the primary concern), we will not adjust our estimates to account for this group. As expected on the basis of the relative small differences between user group distributions for the two estimates, the resulting differences in total annual consumption were fairly small as well.

The estimates in the current study are within the range reported in the first drugs markets study (between 1.3 and 5.4 ton of raw amphetamine), although they lie more in the lower range. However, the estimates in both studies were based on different assumptions. More specifically, Kilmer and Pacula (2009) assumed – for all countries - a consumption of 0.8 gram per day and 50.4 use days per year for the low estimate, and 1.2 gram per day and 67.8 use days for the high estimate. No distinction was made between heavy and light users or other user groups. The range in use days was based on the 95% confidence intervals around the mean number of use days for past year amphetamine users in the 2005 US population survey.

The amount of amphetamine consumed per use day in our study varied from 0.5 gram for infrequent users to 0.7 gram for occasional users and 1.5 gram for frequent users, which is a wider range but not so extremely different.

Taken the assumptions and data together, Kilmer and Pacula arrived at an average of 40 gram of amphetamine consumed per past year users for the low estimate and 81 grams for the high estimate. In our study, based on the extremes for both estimates, the 'average' user would consume between 34 and 63 grams per year, which is overlapping with the amounts in the first drugs market study, albeit in the lower range.

However, in their final estimate of the amphetamine consumption at country level, Kilmer and Pacula (2009) also corrected for underreporting by increasing the number of users by 20% for the low estimate and by 50% for the high estimate. If we would do the same, our estimates might match better (1,817 – 4,192 kg), although it is difficult to make a comparison because of the different methods applied.

#### Limitations

As our web sample of amphetamine users was recruited to a large extent from social media sources relating to the club and party scene, it is not known whether the findings are representative for the total population of amphetamine users, in spite of their large number (N=895) and analyses within use frequency categories. Moreover, as indicated before, there is much uncertainty with regard to the numbers of users in the population within frequency categories (in many or most EU countries), due to the low number of last month users. It is not known how this problem could be solved easily, except for increasing sample sizes or oversampling of specific age groups with higher prevalence rates. In countries where surveys are conducted with short time intervals (annually or bi-annually), a frequency distribution might be based on aggregated data sets. Finally, there is a general lack of knowledge on underreporting of use. We do not know for example, whether especially heavy users are missed or underreport their (frequency) of use. Increasing consumption estimates with 20% or 50% is probably based on 'the best educated guess', but it would be useful if there would be more studies (cross-country) to support these percentages.

#### Czech Republic

To estimate total annual consumption of methamphetamine in the Czech Republic, we have first calculated the distribution of users over user groups in our Czech web sample on the basis of their use frequency in the past month (table 5.8). This frequency of use has been adapted from our original number of use days in the last 30 days to match the categories used in the (population) surveys as reported in table 2.4.

**Table 5.8: Distribution of methamphetamine users over user groups on the basis of their use frequency in the past month**

	No use	Less than once a week	At least once a week	Several times a week	(Almost) daily
Infrequent user	72.7%	46.2%	0.0%	0.0%	0.0%
Occasional user	18.2%	40.4%	26.7%	0.0%	0.0%
Frequent user	9.1%	13.5%	73.3%	100.0%	100.0%

Table 5.9 shows the numbers of methamphetamine users per prevalence category derived from table 5.2 and per frequency category derived from the combination of GPS prevalence data, and frequency data from table 2.4, with EUROSTAT population size.

**Table 5.9: Numbers of methamphetamine users in the Czech Republic (15-64 years)\***

	Number of users
Last year	125,439
Last year – not last month	73,787
Last month	51,652
• less than once a week	15,496
• at least once a week	13,430
• several times a week	15,496
• (Almost) daily	7,231

\* Prevalence data from 2009 GPS; population size data from EUROSTAT 2011.

Table 5.10 shows the number of methamphetamine users in the Czech Republic for each of the user categories as defined in the web survey (infrequent, occasional, and frequent users) by applying the proportions given in table 5.8 to the number of users listed in table 5.9.

**Table 5.10: Numbers of last year methamphetamine users per user group in the Czech Republic (15-64 years)**

	Estimate	
	Total	% of all users
<b>Infrequent user</b>	60,802	48%
<b>Occasional user</b>	23,275	19%
<b>Frequent user</b>	41,378	33%
<b>Total</b>	125,455	100%

Finally, table 5.11 provides the estimates of the total amount of methamphetamine consumed per year, per user type group and in total for the Czech Republic. We based these estimates on the 5% trimmed mean of the amount of methamphetamine consumed per user. These trimmed means per user type group were multiplied by the size of the user type group to arrive at the total amount consumed by each user type group at population level. These totals were then summed to arrive at the final total estimate of the annual consumption of methamphetamine in the Czech Republic.

**Table 5.11: Amount of methamphetamine consumed per user type (gram) and total amount consumed per year (kg) in the Czech Republic\***

		Amount per user per year	Amount consumed at population level
<b>Infrequent user</b>	95% CI - lower bound	0.69	42.0
	95% CI - upper bound	1.31	79.7
	<b>5% trimmed mean</b>	<b>1.01</b>	<b>61.4</b>
<b>Occasional user</b>	95% CI - lower bound	2.95	68.7
	95% CI - upper bound	7.52	175.0
	<b>5% trimmed mean</b>	<b>5.44</b>	<b>126.6</b>
<b>Frequent user</b>	95% CI - lower bound	63.4	2,623.4
	95% CI - upper bound	139.1	5,755.6
	<b>5% trimmed mean</b>	<b>105.51</b>	<b>4,365.8</b>
<b>Total</b>	95% CI - lower bound		2,734.0
	95% CI - upper bound		6,010.3
	<b>5% trimmed mean</b>		<b>4,553.8</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

#### *Problem methamphetamine users*

Problem users of methamphetamine are grossly underrepresented in population surveys. Therefore, data from other sources, using indirect estimation methods, should be applied to estimate the annual consumption by this user group. Using the treatment multiplier method, the number of problem methamphetamine users in the Czech Republic in 2010 was estimated at between 27, 300 and 29,100 (midpoint 28,200). This was more than double the estimated number of problem opioid users and an increase compared with previous years.

Data on use patterns among problem methamphetamine users in the Czech Republic are available from two sources. The first are the face-to-face interviews in spring 2012 among 29 users, recruited in two cities through drop-in centres, substitution treatment and advertising about the study in a private online discussion board focused on addiction (see part 1 Introduction). The second source is a study in 2004 among regular methamphetamine users recruited also in low threshold facilities (drop-in centres and outreach programmes) (Petros et al., 2005; Vopravil, 2011). Findings on consumption patterns differ widely between both studies.

In the face to face interviews, the average number of use days in the past month was 12 (median 7) and the daily dose typically consumed was 0.38 gram, yielding an average monthly dose of 5 grams. As this population is assumed to represent long term (and fairly intensive) users, this amount is multiplied by 12 to yield an annual estimate of 59.83 gram methamphetamine per

problem user. Note that the amounts consumed annually in this population of problem users in the face to face interviews is much lower compared to that reported for the frequent users in the current web survey (0.38 against 0.66 gram). Possibly, this difference is associated with the fact that most (95%) problem amphetamine users inject their drug, which is a highly 'efficient' route of administration while the users in the web survey mainly snort their drug (78%).

On the other hand, the study in 2004 found an the average dose of 0.3 grams (not necessarily per day) and a mean value of the weekly consumption of 3.53 grams (Petros et al., 2005). Multiplying this estimate with 52 weeks, the annual amount consumed per user is 183.56 grams, about three times more compared to the most recent estimate.

It is hard to say whether the first or second estimate is best. The methamphetamine market may have changed between 2004 and 2012, in that purity might have been reduced recently, which made the drug less attractive to users, and there are signs that pseudoephedrine is now used instead of ephedrine as a precursor. Moreover, the economic crisis may play a role, the age of respondents and their use career (there may be some more elderly and former intensive users who do not use heavily any more in the 2012 sample), and the co-use of buprenorphine in the 2012 sample. All these factors may play a role and there are no clear arguments to interpret the differences between 2004 and 2012 as a change on the market, or a bias in the sample. We will therefore make estimates based on both studies.

Taking the indirect estimates on the number of problem methamphetamine users into account, the estimated annual consumption of this population ranges between 1,633 and 1,741 kg per year for the first estimate and between 5,011 and 5,341 kg per year for the second.

Table 5.12 summarises the estimates for the total population of methamphetamine users, which assumes that overlap between general population samples and problem users estimated by indirect methods is negligible. Moreover, data from two previous studies are added.

In one of these, it was estimated that in 2008, a total of 4.5 tons of methamphetamine was consumed in the Czech Republic (Vopravil, 2011). Moreover, in the first drugs markets study Kilmer and Pacula (2009), arrived at an estimate between 1.9 and 7.8 tons. The assumptions underlying this last estimate have been described in the paragraph before (on the estimate for the Netherlands). Note, however, that in this study prevalence data from the 2004 population survey was used, in which last year prevalence of methamphetamine in the general population was much lower: 0.7% against 1.7% in 2008. Moreover, data on problem users not reached by general population surveys was not explicitly taken into account, although the number of users was increased with 20% (low estimate) or 50% (high estimate). It is clear that the estimate 3 of our study is clearly in the high range, while the other two (estimate 1 and 2) seem to be more in line with those of prior studies, although they are based on different data and assumptions.

**Table 5.12: Estimates of the amount (tons) of methamphetamine consumed per year in the Czech Republic in different studies**

	This study Estimate 1*	This study** Estimate 2	This study*** Estimate 3	Kilmer and Pacula (2009)	Vopravil (2011)
Low estimate	2.7	4.4	7.8	1.9	
High estimate	6.0	7.8	11.4	7.8	
Midpoint/best estimate	4.6	6.2	9.7		4.5

\* Based on GPS data (2008), see table 5.10.

\*\* Based on GPS data (2008) and additional data on problem users (a.o. face to face interviews in 2012).

\*\*\* Based on GPS data (2008) and additional data on problem users (a.o. from a study in 2004 by Petros (2005)).

### Sweden

For Sweden we do not have any data on the use frequency of last month amphetamine users from the general population or from targeted populations. We will therefore use the data from the Netherlands and the Czech Republic as a proxy. While this approach is highly debatable, we are not aware of other studies that are representative for the Swedish population.

We have first calculated the distribution of users over user groups in our Swedish web sample on the basis of their use frequency in the past month (table 5.13). This frequency of use has been adapted from our original number of use days in the last 30 days to match the categories used in the (population) surveys from the Netherlands and the Czech Republic (as reported in tables 2.3 and 2.4).

**Table 5.13: Distribution of amphetamine users over user groups on the basis of their use frequency in the past month**

	no use	less than once a week	at least once a week	several times a week	(Almost) daily
<b>Infrequent user</b>	82.6%	67.3%	40.0%	0.0%	0.0%
<b>Occasional user</b>	13.9%	23.6%	20.0%	0.0%	0.0%
<b>Frequent user</b>	3.5%	9.1%	40.0%	100.0%	100.0%

Table 5.14 shows the numbers of amphetamine users per prevalence category derived from table 5.2 and per frequency category derived from the combination of GPS prevalence data, and frequency data from the Netherlands and the Czech Republic with EUROSTAT population size for Sweden.

**Table 5.14: Numbers of amphetamine users in Sweden (15-64 years)\***

	Number of users estimate 1 (NL)	Number of users estimate 2 (NL)	Number of users estimate 3 (CZ)
Last year	48,907	48,907	48,907
Last year – not last month	30,567	30,567	30,567
Last month	18,340	18,340	18,340
• less than once a week	0,270 (56%)	11,921 (65%)	5,502 (30%)
• at least once a week	2,934 (16%)	4,585 (25%)	4,768 (26%)
• several times a week	0 (0%)	1,100 (6%)	5,502 (30%)
• (Almost) daily	5,135 (28%)	917 (5%)	2,568 (14%)

\* Prevalence data from 2009 GPS; population size data from EUROSTAT 2011.

Table 5.15 shows the number of amphetamine users in Sweden for each of the user categories as defined in the web survey (infrequent, occasional, and frequent users) by applying the proportions given in table 5.14 to the number of users listed in table 5.14.

**Table 5.15: Numbers of last year amphetamine users per user group in Sweden (15-64 years)**

	Estimate 1 (NL)		Estimate 2 (NL)		Estimate 3 (CZ)	
	Total	%	Total	%	Total	%
<b>Infrequent user</b>	33,334	68%	35,105	72%	30,858	63%
<b>Occasional user</b>	7,259	15%	7,979	16%	6,501	13%
<b>Frequent user</b>	8,313	17%	6,006	12%	11,548	24%
<b>Total</b>	<b>48,906</b>	<b>100%</b>	<b>49,090</b>	<b>100%</b>	<b>48,907</b>	<b>100%</b>

Finally, table 5.16 provides the three estimates of the total amount of amphetamine consumed per year, per user type group and in total for Sweden. We based these estimates on the 5% trimmed mean of the amount of amphetamine consumed per user. These trimmed means per user type group were multiplied by the size of the user type group to arrive at the total amount consumed by each user type group at population level. These totals were then summed to arrive at the final total estimate of the annual consumption of amphetamine in Sweden.

**Table 5.16 Amount of amphetamine consumed per user type (gram) and total amount consumed per year (kg) in Sweden\***

			Estimate 1	Estimate 2	Estimate 3
		Amount per user per year	Amount consumed at population level	Amount consumed at population level	Amount consumed at population level
<b>Infrequent user</b>	95% CI - lower bound	1.65	55.0	57.9	50.9
	95% CI - upper bound	2.37	79.0	83.2	73.1
	<b>5% trimmed mean</b>	<b>2.04</b>	<b>68.0</b>	<b>71.6</b>	<b>63.0</b>
<b>Occasional user</b>	95% CI - lower bound	15.01	109.0	119.8	97.6
	95% CI - upper bound	28.76	208.8	229.5	187.0
	<b>5% trimmed mean</b>	<b>22.45</b>	<b>163.0</b>	<b>179.1</b>	<b>145.9</b>
<b>Frequent user</b>	95% CI - lower bound	177.40	1,474.7	1,065.4	2,048.6
	95% CI - upper bound	374.74	3,115.2	2,250.6	4,327.4
	<b>5% trimmed mean</b>	<b>276.07</b>	<b>2,295.0</b>	<b>1,658.0</b>	<b>3,188.0</b>
<b>Total</b>	95% CI - lower bound		1,638.7	1,243.1	2,197.1
	95% CI - upper bound		3,403.0	2,563.2	4,587.5
	<b>5% trimmed mean</b>		<b>2,525.9</b>	<b>1,908.7</b>	<b>3,396.9</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

The estimate based on the population frequency distribution for the Czech Republic is 1.3 to 1.8 times higher compared to the two versions for the Netherlands, which is probably due to the higher proportion of frequent users in the former country. Also remember that methamphetamine is the main type of amphetamines consumed in the Czech Republic.

#### *Problem amphetamine users*

There are no recent estimates on the total number of problem amphetamine users in Sweden. In 2007 the overall size of the population problem drug users was estimated at 29,513. No distinction is made between (primary) users of amphetamine or other substances. The EMCDDA defines problem drug use as intravenous drug use (IDU) or long duration/regular use of opiates, cocaine and/or amphetamines. Ecstasy and cannabis are not included in this category. Amphetamines and opiates dominate in the population of problem drug users in Sweden. In a study among criminal justice populations, the proportions of users with amphetamines, heroin and cocaine as their primary drug was 24%, 7% and 2%, respectively. This yields a ratio of amphetamines to opiates/cocaine of about 3:1, suggesting that some 73% of the population of problem users is a primary amphetamine user, which is 21,544 in absolute numbers. However, looking at treatment data and taking also opiates other than heroin into account (e.g. buprenorphine and analgesics), the ratio would be more 1:1, resulting in a number of 14,757 problem amphetamine users.

Data on consumption patterns in this population have been collected in the face-to-face interviews among respondents recruited at the local needle exchange program and at a private opiate substitution treatment program in Malmö. In addition, two buprenorphine patients ('the seeds'), who recruited respondents through their personal network among active users, who in turn referred other respondents (chain referral). The results revealed a mean number of use days of 23 in the past month (median 27) and an average amount consumed per day of 2.05 gram (median 1.5). In a study on 1,710 amphetamine users in prison, confirmed the number of days in the past month (23 on average; Håkansson 2009). According to experts, the amounts consumed on a typical day are indeed 1.5 – 2 gram, although occasionally during binges amounts as high as 5 gram may occur. Based on an average of 23 days per month and an average of 2 grams per day, the amount of amphetamine consumed annually is estimated at 598 gram per problem user. If we use the median values for the number of use days and daily doses, the amount consumed annually per user is estimated at 465 gram.

With the number of problem amphetamine users ranging between 21,544 and 14,757, the first estimate for the amount consumed at population level per year ranges from 8.8 to 12.9 tons, and the second between 6.9 tons and 10.0 tons.

Adding these data to those of the population survey under the assumption that the overlap between populations in the GPS and problem users estimated indirectly is negligible, we arrive at the lowest possible estimate of 8.1 tons and the highest possible estimate of 17.47 ton, which is quite a huge range and much higher compared to the estimate in the first drugs market study (between 0.47 ton and 1.92 ton) (Kilmer and Pacula 2009). However this estimate was mainly based on a much lower number of amphetamine users in the general population of 11,791 (based on the GPS in 2000, against about 49,000 in our study, based on the 2008 population survey). Moreover, the population of problem users was not specifically included, and our data suggest that they have quite a significant share in the annual amphetamine consumption.

## 5.2 Ecstasy

### *Netherlands*

As with amphetamine, the absolute number of last month ecstasy users in the 2009 general population survey was low (n=25), which make data on the frequency of use, expressed as the number of use days, highly imprecise (table 2.3 and 5.17). We will therefore once again make two separate estimations based on the frequency distributions of (1) the GPS data and (2) data from a (national) non-probability sample of almost 3,000 people attending clubs and parties (table 5.17).

We have first calculated the distribution of users over user groups in our Dutch web sample on the basis of their use frequency in the past month (table 5.18; see also chapter 1.5). This frequency of use has been adapted from our original number of use days in the last 30 days to match the categories used in the (population) surveys as reported in table 5.17.

**Table 5.17: Frequency of ecstasy use among last month users in the general population (16-64 years) and in a survey among visitors of parties (15-35 years)**

Last month users in GPS (2009) (N=25)			Last month users in survey on club and party visitors (2008/2009) (N=125)		
Every day or almost every day	3	11%	(Almost) daily	2	0.6%
Several times per week	0	0%	Several times/week	1	0.3%
Once a week or more	3	12%	Only in weekend	35	9.6%
Last month but not last week / „less than once a week in the last 30 days“	19	77%	Only at special occasions/ seldom	325	89.5%

**Table 5.18: Distribution of last year users over user groups on the basis of their use frequency in the past month**

	No use in past month	Less than once a week	At least once a week	Several times a week	(Almost) daily
<b>Infrequent user</b>	85.6%	52.1%	10.3%	8.3%	14.3%
<b>Occasional user</b>	12.3%	43.6%	41.4%	50.0%	28.6%
<b>Frequent user</b>	2.1%	4.3%	48.3%	41.7%	57.1%

Table 5.19 shows the numbers of ecstasy users per prevalence category derived from table 5.2 and per frequency category derived from the combination of GPS prevalence data, and frequency data from the two surveys in table 5.17, with EURO-STAT population size.

**Table 5.19: Numbers of ecstasy users in the Netherlands (15-64 years)\***

	Number of users Estimate 1**	Number of users Estimate 2**
Last year	156,153	156,153
Last year – not last month	111,538	111,538
Last month	44,615	44,615
• less than once a week	34,354 (77%)	39,930 (89.5%)
• at least once a week	5,354 (12%)	4,283 (9.6%)
• several times a week	0 (0%)	134 (0.3%)
• (Almost) daily	4,908 (11%)	267 (0.6%)

\* Prevalence data from 2009 GPS; population size data from EUROSTAT 2011.

\*\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties (Van der Poel et al. 2010).

Table 5.20 shows the number of ecstasy users in the Netherlands for each of the user categories as defined in the web survey (infrequent, occasional, and frequent users) by applying the proportions given in table 5.18 to the number of users listed table 5.19.

**Table 5.20: Numbers of last year ecstasy users per user group in the Netherlands (15-64 years)**

	Estimate 1*		Estimate 2**	
	Total	% of all users	Total	% of all users
<b>Infrequent user</b>	114,628	73%	116,771	75%
<b>Occasional user</b>	32,318	21%	33,045	21%
<b>Frequent user</b>	9,208	6%	6,336	4%
<b>Total</b>	<b>156,154</b>	<b>100%</b>	<b>156,152</b>	<b>100%</b>

\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey.

\*\* Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties (Van der Poel et al. 2010).

Finally, table 5.21 provides the estimates of the total amount of ecstasy consumed per year, per user type group and in total for the Netherlands. We based these estimates on the 5% trimmed mean of the amount of ecstasy consumed per user. These trimmed means per user type group were multiplied by the size of the user type group to arrive at the total amount consumed by each user type group at population level. These totals were then summed to arrive at the final total estimate of the annual consumption of ecstasy in the Netherlands.

Table 5.21: Amount of ecstasy consumed per user type (pills) and total amount consumed per year (pills\*100,000) in the Netherlands\*

		Amount per user per year	Amount consumed at population level**	Amount consumed at population level***
Infrequent user	95% CI - lower bound	8.73	10.01	10.19
	95% CI - upper bound	9.51	10.90	11.10
	<b>5% trimmed mean</b>	<b>9.14</b>	<b>10.48</b>	<b>10.67</b>
Occasional user	95% CI - lower bound	47.88	15.47	15.82
	95% CI - upper bound	52.98	17.12	17.51
	<b>5% trimmed mean</b>	<b>50.56</b>	<b>16.34</b>	<b>16.71</b>
Frequent user	95% CI - lower bound	233.33	21.48	14.78
	95% CI - upper bound	317.29	29.22	20.10
	<b>5% trimmed mean</b>	<b>275.31</b>	<b>25.35</b>	<b>17.44</b>
Total	95% CI - lower bound		46.97	40.80
	95% CI - upper bound		57.24	48.72
	<b>5% trimmed mean</b>		<b>52.17</b>	<b>44.82</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties (Van der Poel et al. 2010).

Note that the annual consumption among frequent users seems to be unrealistically high, but also remember that they only make up 4% to 6% of the total population of last year users.

Other studies – summarised by Kilmer and Pacula (2009) - suggested that the average typical number of pills consumed per year per last year user may vary from 100 to 154 (UNODC 2008), 47 to 123 (Pudney et al. 2006), or 20 to 40 (Blickman 2004).

Using the lowest and highest estimate in table 5.21, our data suggest a range of 26 to 37 pills per user per year, but also shows the huge variation between user types.

#### Sensitivity analyses

We have carried out two sensitivity analyses. First, a few cases among the frequent users yielded unrealistically high consumption amounts per year (upwards of one thousand pills). Although it is difficult to say where to draw the line, we believe it is safe to assume that an annual consumption of over 500 pills is unrealistic. Table 5.22 reports the recalculated estimate while capping the amount consumed per user per year at 500 (i.e. higher values are removed). Capping reduces our estimates of total annual consumption by 650,000 pills (12.5%) for estimate 1 and 1,182,000 pills (22.7%) for estimate 2.

Second, answer categories for reporting the number of ecstasy pills consumed on a typical use day did not allow for decimals. Hence, the lowest number respondents could indicate, was '1'. However, as mentioned in chapter 3.3.3, some users – especially infrequent users - may consume less than one pill at a time. We will therefore examine how estimates change if we assume that a portion of those indicating that they use 1 pill in our current study would actually have used less than 1 pill. We will assume that that the distribution would be the same as reported for the survey in 2008/2009 among club and party visitors as described in chapter 3.3.3. The recalculated estimate is shown in table 5.22. Adjusting for consumption of less than 1 pill per use day reduces our estimate of total annual consumption by 161,000 pills (3.1%) for estimate 1 and 149,000 pills (3.3%) for estimate 2.

**Table 5.22: Adjusted amounts of ecstasy consumed per user type (pills) and total amount consumed per year (pills\*100,000) in the Netherlands\***

	Adjusted for capping at a maximum of 500 pills per user per year			Adjusted for those consuming less than 1 pill on a typical use day		
	Amount per user per year	Amount consumed at population level**		Amount per user per year	Amount consumed at population level**	
<b>Infrequent user</b>	9.14	10.48	10.67	8.58	9.84	10.01
<b>Occasional user</b>	50.56	16.34	16.71	49.16	15.89	16.24
<b>Frequent user</b>	204.75	18.85	12.97	269.71	24.83	17.08
<b>Total</b>		<b>45.67</b>	<b>40.35</b>		<b>50.56</b>	<b>43.33</b>

\*5% trimmed means, excluding the 2.5% lowest and 2.5% highest values.

\*\* Left value is based on the frequency distribution of last month use as assessed in the general population survey; right value is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

The estimates in the current study are on the low end or just below the range reported in the first drugs markets study (between 5,003,464 and 41,095,118). However, the estimates in both studies were based on different assumptions. More specifically, Kilmer and Pacula (2009) made no distinction between heavy and light users or other user groups, and assumed – for all European countries – a mean individual consumption of 30 pills per year for the low estimate and 154 pills per year for the high estimate. The low estimate was derived from a study by the Dutch National Criminal Investigation Services that reported a range of 20-40 pills (Van der Heijden 2003). Based on our highest and lowest estimates, mean individual annual consumption would be between 26 and 37 pills, suggesting that our numbers are more in line with this low estimate.

## 5.3 Cocaine

### *Netherlands*

In the Netherlands, cocaine is used in different populations which can be roughly divided into socially integrated cocaine powder users who snort the drug and marginalised crack (or basecokes) users who smoke or inhale their drug. The latter population overlaps to a large extent with the population of PHUs, although there is also a group of crack cocaine users who have never (or not recently) used opiates. Our web survey was expected to capture mainly cocaine powder users, which was confirmed by the very low number of crack users completing the survey (16 crack users against 698 cocaine powder users). For the estimates based on population surveys, only consumption data for cocaine powder are included.

As with amphetamine and ecstasy, the absolute number of last month cocaine users in the 2009 general population survey was low (n=30), which make data on the frequency of use, expressed as the number of use days, imprecise (table 2.3 and 5.23). We will therefore once again make two separate estimations based on the frequency distributions of (1) the GPS data and (2) data from a (national) non-probability sample of almost 3,000 people attending clubs and parties (table 5.23).

In spite of the different methodologies, the frequency distribution in these surveys is quite similar.

We have first calculated the distribution of users over user groups in our Dutch web sample on the basis of their use frequency in the past month (table 5.24; see also chapter 1.5). This frequency of use has been adapted from our original number of use days in the last 30 days to match the categories used in the (population) surveys as reported in table 5.23.

**Table 5.23: Frequency of cocaine use among last month users in the general population (16-64 years) and in a survey among visitors of parties (15-35 years)**

Last month users in GPS (2009) (N=30)			Last month users in survey on club and party visitors (2008/2009) (N=194)		
Every day or almost every day	2	5%	(Almost) daily	5	2.5%
Several times per week	1	5%	Several times/week	6	3.1%
Once a week or more	5	16%	Only in weekend	32	16.5%
Last month but not last week / „less than once a week in the last 30 days“	22	74%	Only at special occasions or seldom	151	77.8%

**Table 5.24 Distribution of users over user groups on the basis of their use frequency in the past month**

	No use	Less than once a week	At least once a week	Several times a week	(Almost) daily
<b>Infrequent user</b>	87.2%	53.9%	4.3%	18.2%	0%
<b>Occasional user</b>	11.0%	35.8%	26.1%	9.1%	28.6%
<b>Frequent user</b>	1.8%	10.2%	69.6%	72.7%	71.4%

Table 5.25 shows the numbers of cocaine users per prevalence category derived from table 5.2 and per frequency category derived from the combination of GPS prevalence data, and frequency data from the two surveys in table 5.23, with EUROSTAT population size.

**Table 5.25: Numbers of cocaine users in the Netherlands (15-64 years)\***

	Number of users Estimate 1**	Number of users Estimate 2**
Last year	133,845	133,845
Last year – not last month	78,076	78,076
Last month	55,769	55,769
• less than once a week	41,269 (74%)	43,388 (77.8%)
• at least once a week	8,923 (16%)	9,202 (16.5%)
• several times a week	2,788 (5%)	1,729 (3.1%)
• (Almost) daily	2,788 (5%)	1,394 (2.5%)

\* Prevalence data from 2009 GPS; population size data from EUROSTAT 2011.

\*\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

Table 5.26 shows the number of cocaine users in the Netherlands for each of the user categories as defined in the web survey (infrequent, occasional, and frequent users) by applying the proportions given in table 5.24 to the number of users listed table 5.25. The differences in frequency of use distributions had relatively little impact on the distribution of user groups. For both estimates, almost 70% of all last year users were infrequent users, while some 20% and 10% were formed by respectively the occasional and frequent user groups.

**Table 5.26: Numbers of last year cocaine users per user group in the Netherlands (15-64 years)**

	Estimate 1*		Estimate 2**	
	Total	% of all users	Total	% of all users
<b>Infrequent user</b>	91,217	68%	92,179	69%
<b>Occasional user</b>	26,743	20%	27,079	20%
<b>Frequent user</b>	15,843	12%	14,488	11%
<b>Total</b>	<b>133,803</b>	<b>100%</b>	<b>133,746</b>	<b>100%</b>

\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

\*\*Difference due to rounding of sub-estimates.

Finally, table 5.27 provides the estimates of the total amount of cocaine consumed per year, per user type group and in total for the Netherlands. We based these estimates on the 5% trimmed mean of the amount of amphetamine consumed per user. These trimmed means per user type group were multiplied by the size of the user type group to arrive at the total amount consumed by each user type group at population level. These totals were then summed to arrive at the final total estimate of the annual consumption of cocaine in the Netherlands.

**Table 5.27: Amount of cocaine consumed per user type (gram) and total amount consumed per year (kg) in the Netherlands\***

		Amount per user per year	Amount consumed at population level Estimate 1**	Amount consumed at population level Estimate 2**
<b>Infrequent user</b>	95% CI - lower bound	1.84	167.8	169.6
	95% CI - upper bound	2.28	208.0	210.2
	<b>5% trimmed mean</b>	<b>2.06</b>	<b>187.9</b>	<b>189.9</b>
<b>Occasional user</b>	95% CI - lower bound	16.33	436.7	442.2
	95% CI - upper bound	21.08	563.7	570.8
	<b>5% trimmed mean</b>	<b>18.87</b>	<b>504.6</b>	<b>511.0</b>
<b>Frequent user</b>	95% CI - lower bound	101.41	1,606.6	1,469.2
	95% CI - upper bound	154.25	2,443.7	2,234.7
	<b>5% trimmed mean</b>	<b>128.92</b>	<b>2,042.4</b>	<b>1,867.8</b>
<b>Total</b>	95% CI - lower bound		2,211.2	2,081.0
	95% CI - upper bound		3,215.5	3,015.7
	<b>5% trimmed mean</b>		<b>2,735.0</b>	<b>2,568.6</b>

\* 5% trimmed means, excluding the 2.5% lowest and 2.5% highest values. CI=confidence interval.

\*\* Estimate 1 is based on the frequency distribution of last month use as assessed in the general population survey. Estimate 2 is based on the frequency distribution among last month users in a (national) targeted survey among visitors of clubs and parties.

The estimates in the current study are within the range reported in the first drugs markets study (between 0.6 and 5.8 tons of cocaine), and our two estimates are just a little bit higher than the previous study's best estimate of 2.3 tons. Thus, despite differences in estimation methods, we arrive at very similar estimates. Kilmer and Pacula (2009) divided cocaine users into light (less than three times a month) and heavy users and assumed that 17% of past year users would be heavy users. In our study, some 20% of past year users would be heavy users as defined by Kilmer and Pacula. They also assumed that light users will use on average once a month and that the average number of use days for a heavy user will be uniformly distributed between 85 and 169 days. They further assumed that light users consume an average amount of 0.55 gram of cocaine per use day and heavy users consume an average amount of 0.90 gram of cocaine per use day. These figures fit quite nicely with our figures of 0.52 gram for infrequent users and 0.80 and 1.28 gram for occasional and frequent users.

### **Crack cocaine**

In the Netherlands, crack cocaine use is fairly common among problem users of opiates, a population which was estimated at 17,700 in 2008 (treatment multiplier method). It is assumed that the large majority of these users also consume crack (some 70 to 80%). However, the total population of crack users, also including those who do not co-use opiates, is not known. In a recent study in the three largest Dutch cities, the population of crack users has been investigated. Between 49% and 72% of the

respondents who were recruited by respondent driven sampling had used heroin in the past month. Between 43% and 50% of all crack users was a (near) daily user, who consumed crack on 6 to 7 days per week. It is not known whether those who only used crack had a different consumption pattern compared to those who also took heroin. If, for lack of better information, we assume - on the basis of these studies - that 75% of problem opiate users also consume crack and that some 60% of crack users also consume heroine, we can use the number of problem opiate users to estimate the number of crack users at roughly 22,125.

In the face-to-face interviews among heroin/crack users, the mean and median number of use days of crack per month were 20 and 28, and the mean and median daily dose 0.59 and 0.50 gram (see table 5.25). Mean and median monthly consumption were 13.98 and 7.50 grams and annual consumption 167.8 and 90 grams (assuming a population of chronic users and thus multiplying monthly consumption by 12). Given the low number of respondents, the median values may be better estimates and we will use both the mean and median values to estimate total annual crack consumption.

In a sample of chronic heroin users taking part in the efficacy trials of the Dutch medical heroin assisted treatment (Blanken et al. 2010; Blanken 2011), the average number of use days was 17 days for the heroin inhalers or smokers and 19 days for those who injected the drug. These averages fit quite well with those found in the face to face interviews among problem heroin/crack users. No data on amounts consumed per day are reported for this study.

Multiplying our estimated number of crack users by the mean and median individual annual consumption of crack from the face-to-face interviews yields estimates of annual crack consumption of 1.99 and 3.71 metric tons. Note, however, that these estimates combine crack consumption data from only 34 individuals with an absolute number of crack users estimated under questionable assumptions and are therefore to be treated as very rough and used with caution.

**Table 5.25: Number of use days in the past month and amount of crack consumed on a typical use day among problem hard drug users (opioids/crack) in the Netherlands (n=34)\***

	Number of use days	Grams on a typical day	Monthly consumption (grams)
<b>Mean</b>	19.82	0.59	13.98
<b>Median</b>	27.50	0.50	7.50
<b>Min.</b>	2	0.10	0.20
<b>Max.</b>	30	3.00	90.00

## 5.4 Conclusions and discussion

In this paragraph we have estimated (meth)amphetamine consumption for three countries, the Czech Republic, the Netherlands and Sweden. While figures for the Netherlands seemed to match those estimated before quite well, estimates for the Czech Republic were in the higher range, and those for Sweden were much higher than previous estimates, but the difference depended on the sources used for making the initial estimates and adjustments for problem drug users. It is clear that use patterns were different for methamphetamine users compared to amphetamine users, as figures of individual consumption were (much) lower for each user type in the Czech Republic compared with the Netherlands and Sweden.

Estimates of ecstasy and cocaine consumption were made only for the Netherlands. Our estimates for ecstasy consumption were in the low range of previous estimates. The previous low estimate was derived from a Dutch study and our numbers are more in line with this low estimate. Estimates for cocaine consumption aligned nicely with previous estimates; our estimates were well within previous ranges and close to the previous best estimate.

As indicated in the introduction of this paragraph and this chapter, there is much uncertainty with regard to the numbers of users in the population within frequency categories (in many or most EU countries), due to the low number of last month users. Perhaps increasing sample sizes or oversampling of specific age groups with higher prevalence rates may help solve this problem. Inquiring about last year frequency of use instead of or in addition to last month frequency of use may also help increase sample size because it captures all last year users. In countries where surveys are conducted with short time intervals (annually or bi-annually), a frequency distribution might be based on aggregated data sets. Using data from specific populations and settings where substance use is relatively common (like the dance scene), might add to our knowledge on consumption patterns if sample sizes are large enough, but at the cost of being not fully representative for the total population of users under study.

There is also a general lack of knowledge on underreporting of use. We do not know for example, whether especially heavy users are missed or underreport their (frequency) of use. Increasing consumption estimates with 20% or 50% is probably based on 'the best educated guess', but it would be useful if there would be more studies (cross-country) to support these percentages.

## 6 Conclusions and recommendations

This study explored consumption patterns, availability and annual consumption of (meth)amphetamine, ecstasy and cocaine from the demand side across several European Union Member States. It is the first study to attempt a distinction between different user types based on frequency of use and to use these types as a basis for estimating annual consumption. Although this effort was impeded by insufficient numbers of respondents for (meth)amphetamine, ecstasy and cocaine in most Member States and a lack of frequency of use data from general or targeted population surveys, our study yielded some interesting findings that show that it would be worthwhile to employ this approach in future drug market investigations.

Data collection through a web survey has its limitations (see report 1 on the cannabis market for a discussion), but our study shows that it also has great potential in drug research. Although the numbers of respondents obtained were often insufficient for the detailed analyses we had planned, we managed to recruit significant numbers of users of (meth)amphetamine, ecstasy and cocaine in the selected Member States. In a relatively short amount of time, we obtained data from nearly 5,000 users, including some 500 frequent users who are notoriously hard to capture in survey research.

Our typology of users shows that infrequent users, who take (meth)amphetamine, ecstasy or cocaine less than monthly, comprise the largest group of the past year users. Our study clearly shows that for all three drugs under investigation, the amount consumed on a typical use day generally increases with increasing frequency of use (number of use days). Accordingly, individual annual consumption was higher among occasional than infrequent users and was highest among frequent users. In terms of total annual consumption, the smallest group of frequent users is responsible for the largest part of the total estimated amounts of (meth)amphetamine, ecstasy and cocaine consumed.

Differences between user types in use intensity were corroborated by other findings such as higher rates of buying the three drugs and higher amounts of money spent on drugs among frequent users compared with occasional and infrequent users. Differences were also found in other aspects of consumption and availability. For instance, frequent users of (meth)amphetamine, ecstasy and cocaine consumed their drug more often at home than occasional and infrequent users.

For amphetamines and cocaine there are relatively large populations of problem drug users in many countries that are unlikely to be captured in general population surveys or targeted web surveys such as our study. However, like the frequent users in our study, these problem drug users will likely account for a major part of the total annual consumption because of their intensive use patterns. Estimates of total annual consumption are thus to a large extent dependent on the reliability of estimates of the size of PDU populations and their use patterns.

### 6.1 Recommendations for further research

We recommend that future drug market investigations distinguish between users of varying intensity of use, that they base this grouping on last year use frequency, and that they estimate individual annual consumption per user type and use these figures in conjunction with figures on the numbers per user type from population surveys to estimate total annual consumption.

In line with the previous recommendation, we suggest that future general and targeted population surveys inquire about drug use frequency in the past year. We believe that this is preferable to asking about past month use frequency because it captures all past year users and obtains valuable information.

In the current study respondents could indicate the number of ecstasy pills consumed on a typical use day only in whole numbers, while in fact people may take less than a whole pill, especially the less frequent users. More precise estimates of ecstasy consumption could be obtained in future studies by allowing numbers of pills to be indicated at one decimal or at least in halve or quarter pills.

Respondents indicated the amounts of (meth)amphetamine and ecstasy consumed on a typical use day by selecting among a list of specified amounts in grams. Unlike the corresponding answer categories for use of cannabis (see report 1), these amounts were not illustrated by picture cards, and respondents may have found it difficult to judge their consumption. It would be useful to test and develop a consistent format for measuring consumed amounts of drugs such as (meth)amphetamine and cocaine powder.

There is still insufficient knowledge of the degree of underreporting of drug use in population surveys, how it might be associated with the survey methodology and/or differ between countries and across different user groups. This issue is an important target for further research, as underreporting may be a relevant source of estimation uncertainty.

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# Report 3

## Heroin market: use characteristics, size of the market and impact of OST on the heroin market

### Introduction

Franz Trautmann and Tim McSweeney

In this report we combine an exploration of heroin consumption based on the findings from the face-to-face interviews with problem users and other sources (see report 3.1), sizing the market for heroin in England and the Czech Republic (report 3.2) and assessing the impact of opioid substitution treatment (OST), in the form of methadone maintenance treatment (MMT), on the heroin market (report 3.3). These three issues are inter-related. The description of consumption aspects forms the basis for sizing the market (calculated from the demand side). These consumption estimates and information on the size of the market are required for assessing the impact of OST in contributing towards avoided illicit heroin consumption. For the latter we have drawn upon face-to-face interviews with PHUs and existing published data sources.

We decided to focus on four countries here: the Czech Republic, England, Italy and the Netherlands. For these countries we have the most robust data for exploring heroin consumption and assessing the impact of OST on the heroin market, both from the face-to-face interviews and from other sources. Findings from Cochrane reviews (referred to in report 3.3, below) drew upon the results of only 16 studies originating from four of the seven Member States considered as part of this study: England (n=6), Italy (n=5), the Netherlands (n=3) and Sweden (n=2). We included the Czech Republic in the sizing of the market and impact of OST exercises and not in exploring heroin consumption as we did not have face-to-face interviews with heroin users in the Czech Republic.

## 1 Recent market and policy developments

Although the overall European heroin market is generally considered to be in long-term decline (UNODC 2012), the misuse of heroin and other opiates continues to account for the bulk of the burden associated with problem illicit drug use across Europe, including drug-related disease and mortality (EMCDDA 2011, p. 73).<sup>1</sup> In response, the treatment of heroin dependency with prescribed medicines such as methadone or subutex (and also heroin, and suboxone) using “maintenance goals is referred to as opioid substitution treatment” and is typically “reserved for patients with clearly established opioid dependency and prolonged daily opioid use” (Farrell, et al. 2012). First introduced in Europe during the late 1960s, forms of opioid substitution treatment (OST) were available in 31 European countries during 2009, accounting for almost half of global OST provision at this time (Cook, et al. 2010; see also Mathers et al. 2010).

According to the EMCDDA figures there were an estimated 1.3 million problem opioid users (POUs) in the European Union (EU) and Norway in 2009, with over half this number (53.4%; n=695,000) considered to be accessing forms of OST (EMCDDA 2011 p 78). But the type, accessibility and availability of OST vary considerably both within and between Member States (Cook et al. 2010, p. 49).

There have been at least three key developments throughout Europe in recent years of relevance to policy focussed on addressing heroin misuse, including:

- New recruitment to heroin use has fallen
- The profile of POUs varies considerably across different Member States
- Sharp reductions in heroin availability have been reported.

<sup>1</sup> For a more detailed assessment of the nature and extent of this burden globally, see Degenhardt and Hall (2012).

The average age of those accessing OST across Europe has increased in recent years (EMCDDA 2011, p. 75). Collating information from treatment demand data and other indicators, Barrio and colleagues reported that the average age of those accessing treatment for heroin misuse increased from 26.8 years in 1999 to 33.6 years by 2009 (Barrio et al. 2011, p. 36). In England between 2005/06 and 2011/12, for example, the number of new presentations of POUs to treatment aged 18 to 24 years fell by 62 (from 11,309 to 4,268). By contrast, the number of new POU admissions aged 40 years and over increased by 31 (from 8,787 to 11,527). This age group accounted for 31 of the entire adult treatment population in England during 2011/12, compared with 18 to 24-year olds who made up just 11 per cent of the national caseload (Roxburgh et al. 2012, p. 22-23).

Although the misuse of stimulants such as amphetamines and cocaine features prominently in countries like Spain and the England (UK), heroin is typically identified as the principal drug of concern for around half of those accessing specialist forms of treatment in Europe (51% in 2009 according to EMCDDA figures (EMCDDA 2011, p. 74). Yet considerable differences have been observed across Europe with regards the type of opioids for which assistance is sought. In the Czech Republic, for example, of the treatment seeking POU population identify principally as buprenorphine misusers (Mravcik a.o. 2011). Some northern European countries have seen the emergence of synthetic opioids to replace heroin as the principal drug of concern for POUs (e.g. fentanyl in Estonia). And the proportion of those seeking treatment who report injecting is also considered to be declining in most European countries.

There have also been reports of sharp reductions in heroin availability in some parts of England, Ireland and mainland Europe from late 2010. Both the scale and reasons for these disruptions are unclear and disputed, but have been variously attributed to the interaction of a range of factors, including adverse natural conditions (fungal infestation of poppy crops in Afghanistan and severe flooding in Pakistan, an important transit route), the volatile security situation in Afghanistan, the success of law enforcement efforts (particularly against organised crime groups), and strategic decision-making by traffickers (Hallam 2011; EMCDDA 2011 p. 77; Griffiths, et al. 2012).

No major changes in the formal policy regarding heroin have been observed in recent years. This is true for the selected Member States, but also for the EU more broadly. The legal provisions regarding heroin supply remained unchanged. The same holds for the prioritisation of supply reduction policies. In all EU Member States heroin is classified as illicit. In Member States differentiating between different classes or groups of illicit drugs, heroin is subsumed within the group of most hazardous drugs (EMCDDA, country legal profiles in: country overviews, <http://www.emcdda.europa.eu/publications/country-overviews>)

From a demand reduction perspective there have been some notable recent changes in a few Member States. In parts of England, for instance, the emphasis on drug-free treatment resulting in 'recovery' has gained currency and increased traction in policy responses to the treatment of heroin dependency (Inter-Ministerial Group on Drugs 2012). And while politicians and policy makers appear to have started to increasingly question the role and value of harm reduction in reducing the scale and impact of illegal drug use, there has been a major expansion of OST provision across the prison estate in England and Wales during recent years, via the Integrated Drug Treatment System (IDTS) (Stöver and Michels 2010).

## 2 Use (and typology of users)

Dependency is not an inevitable consequence of heroin use. Findings from the National Comorbidity Survey in the United States (Anthony, et al. 1994) indicated that 'only' one in four people using heroin during their lifetime met the (Diagnostic and Statistical Manual) criteria for dependence. However, lifetime prevalence does not say anything about actual occasional use over a longer period of time. There are good reasons to assume that the biggest share of lifetime prevalence of heroin use can be explained as 'experimental' drug use, i.e. trying out heroin a few times and then desisting (Kaya et al. 2004). This is different from longer-term recreational or occasional use of other drugs, like ecstasy or cannabis (Home Office 2012, pp. 29-34).

There have been a number of European studies exploring notions of 'occasional' or 'controlled' heroin use (Shewan and Dalgarno 2005; Warburton, et al. 2005; McSweeney and Turnbull 2007; Korf, et al. 2009), showing that reliable and representative information on types of heroin use other than frequent and/or problem use is limited. Identifying and accessing these groups for research purposes is also difficult. This is frequently explained by referring to occasional heroin users as a

hidden population. However, then the question rises why in particular occasional heroin users are a hidden population and other users of illicit substances are not. Korf a.o. have attempted to track down occasional, 'non-dependent' opium and heroin users by using purposive approaches like ethnographic fieldwork and 'targeted canvassing' (placing announcements in different media). Still the number of 'non-dependent' opium and heroin users identified was rather low. The researchers identified a total of 131 persons and interviewed 127 of them (Korf, et al. 2009). One third (32%) had used opium or heroin on five to nine occasions, 52 per cent between 10 and 49 occasions and 16 per cent had used more frequently. Two-fifths (43%) had used only heroin, 13 per cent only opium and 43 per cent both.

Unfortunately the study did not specify the period over which heroin had been used by these individuals. From the fact that the average age of the sample was 39 and the age of first use of heroin and opium was 22.5 and 23.9 years respectively, it can be concluded that at least some of the group stating that they had used between five and nine times in their life could reasonably be considered as experimental users, rather than longer-term occasional users. This might also be true for those reporting between 10 and 49 heroin or opium using occasions during their lives.

All in all we did not find sufficient backing for the existence of a substantial group of longer-term occasional heroin users legitimizing a differentiation between typologies of heroin users. We therefore decided to focus in this report on regular or PHUs only. In terms of our attempt to estimate the avoided illicit heroin consumption attributable to OST, the focus on POUs is considered justifiable since most of those accessing OST will be daily heroin users (Barrio et al. 2011; EMCDDA 2011, p. 75) and the bulk of the social and economic costs arising from the use of drugs like heroin have been attributed to problematic dependent users (Gordon et al. 2006).

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# Report 3.1

## Exploring heroin consumption

Franz Trautmann and Tom Frijns

### Abstract

In this report we explore some aspects of heroin consumption, using the data we collected through the face-to-face interviews and comparing our findings with data from other research and monitoring sources. We focus on Italy, the Netherlands and England, the three sample Member States where we have the most robust data from our face-to-face interviews. We worked with purposive samples to gain insights into the demand side of the drugs market. Occasional, non-dependent heroin use proves to be rather rare. We therefore do not differentiate between user types but focus only on regular or PHUs. The main issues of concern in our questionnaires were using and buying behaviours i.e. where drug users buy, what considerations play a role in their behaviour, etc.

## 1 Prevalence of use in the population

The available data for England, Italy and the Netherlands indicate a decrease of heroin use in recent years, as can be seen in the majority of EU Member States. The percentage of new heroin users in treatment has dropped in Italy from 85.6% in 1998 to 38.9% in 2010, in the Netherlands from 29% in 1998 to 5.2% in 2010, and in the UK from 54.0% in 1998 to 33.6% in 2010 (EMCDDA statistical bulletin 2012, Table TDI-3. New clients entering treatment by primary drug, 1998 to 2010, Part (i) New heroin clients by country and year of treatment (%)).

Italy reports in 2011 0.6% heroin use among students 15-19 year old against 0.8% in 2010. This is in line with the decline in drug use starting in 2008 (Serpelloni et al. 2011, p 8). The Dutch Drug Monitor reports a drop of heroin use among school students (age 12-18). Lifetime prevalence (LTP) increased from 0.7% in 1988 to 1.1% in 1996 and then fell to 0.6% in 2011. Last month prevalence (LMP) increased from 0.3% in 1988 to 0.5% in 1996 and then fell to 0.2% in 2011 (Van Laar a.o. 2012). In England, LTP for heroin use among school-aged young people (i.e. between 11-15 years) in 2011 was 0.6%. The corresponding figures for LYP and LMP were 0.4% and 0.3% respectively (NatCen Social Research 2012, p. 55).

The general prevalence figures point in the direction of a stagnation. The latest prevalence figures for heroin use among 16-59 year olds in England and Wales are 0.8% LTP, 0.1% LYP and 0.1% LMP. These figures are unchanged since they were first collated in 1996 (Inter-Ministerial Group on Drugs 2012). For the Netherlands LTP (population of 15-64 year old) is reported to have fallen from 0.6% in 2005 to 0.5% in 2009. LYP was in 2009 0.1% (Van Laar a.o. 2012). It is important to keep in mind that prevalence figures based on General Population Surveys (GPS) are regarded as underestimations since PHUs are unlikely to be included in general population samples (among others due to being homeless or in prison).<sup>1</sup>

## 2 Findings from in-depth interviews

For this chapter we are using the findings from our in-depth interviews among heroin users in Italy, the Netherlands and England. The findings can of course not be taken as representative due to the limited sample sizes. However, where possible

<sup>1</sup> It should be acknowledged that there are limitations of surveys in estimating prevalence of the more marginalised forms of drug use (e.g. heroin injection, crack use) due to the low prevalence figures, but in particular due to non-probabilistic errors (exclusion from the sampling frame, absence in household, non-response). On the other hand, surveys can identify a small but substantial number of people that used heroin in the past, but not at present. The characteristics of these users may provide insights into the reasons for their discontinuation of use, compared to long-term users identified in treatment centers. (<http://www.emcdda.europa.eu/stats12/gps/methods>)

we have compared the findings from our interviews with available research and monitoring data. As mentioned in the introduction of this part I (see part I, Introduction), we completed a limited number of in-depth face-to-face interviews with regular or PHUs. We worked with purposive samples to gain insights into the demand side of the drugs market. The main issues of concern in our questionnaires were using and buying behaviours i.e. where drug users buy, what considerations play a role in their behaviour, etc.

## 2.1 Demographics

### *Gender*

Table 1 shows the sample size per country, the total sample and the percentage of males and females in these samples. In total, 73% of all heroin users were male, and this did not differ much across countries.

**Table 1: Numbers and percentages of males and females among heroin users by country**

	Males		Females		Total	
	N	%	N	%	N	%
<b>Italy</b>	22	73%	8	27%	30	100%
<b>Netherlands</b>	33	73%	12	27%	45	100%
<b>England</b>	26	72%	10	28%	36	100%
<b>Combined</b>	81	73%	30	27%	111	100%

The male-female ratio we found in Italy and the Netherlands is slightly lower than the ones reported in other reports (based on larger, more systematic surveys). The Italian public services data report a male-female ratio of 85/15 (Centre for Biostatistics and Bioinformatics 2013a,b). Dutch treatment data report 80% male clients (Van Laar a.o. 2012). In England 73% of all clients in drug treatment during 2011/12 were male (Roxburgh et al. 2012).

### *Age*

Table 2 shows the average and median ages per country. There were significant age differences between countries: Dutch heroin users were older than those from Italy or England. A clear majority of respondents fell in the age group above 35 years, but this percentage differed across countries and was only significantly higher than the below 35 group in the Dutch sample (see table 2).

**Table 2: Age distribution by country**

	Mean	Median	< 34 years	> 35 years	P
<b>Italy</b>	36.1	36	12 (40%)	18 (60%)	.273
<b>Netherlands</b>	47.5	48	6 (13%)	39 (87%)	.000
<b>England</b>	34.5	35	17 (47%)	19 (53%)	.739
<b>Combined</b>	40.2	40	35 (%)	76 (%)	.000

Here the findings from our in-depth interviews are in line with other survey findings. The Italian health care services data report a mean age of 36.5 and a median age of 36 for heroin users in treatment (Centre for Biostatistics and Bioinformatics 2013a,b). The annual report 2011 of the Dutch Drug Monitor gives for 2010 an average age of 45 years (Van Laar a.o. 2012). For England the median age in this sample is exactly the same as in the published national statistics: 35 years (Roxburgh et al. 2012).

## 2.2 Characteristics of use

### *Age of first use*

Table 3 shows the mean and median age of first use of heroin by country. This average age of first use is highly dependent on the age distribution of the samples.

**Table 3: Mean age (years) of first heroin use**

	Mean	Median
Italy	19.6	18
Netherlands	21.7	20
England	19.3	18
Combined	20.3	19

On average, respondents had first used heroin when they were 20 years old, and the age of first use did not differ much across countries, also when controlling for current age in an ANCOVA ( $F = 0.09$ ,  $p = .915$ ).

Also here the interview data seem to be consistent with other survey data e.g. the Public Health Care Services in Italy report an average (mean and median) of first heroin use of 19 years (for Biostatistics and Bioinformatics 2013a,b).

### **Route of administration**

Respondents were asked how they usually consumed their heroin (see table 4). The distribution of routes of administration differed across countries. In the Italian sample there were more injecting heroin users than smokers or sniffers, whereas in the Dutch and the English sample more smokers than injectors could be found. The proportions of injectors and smokers differed among the three countries.

**Table 4: Routes of administration of heroin by country**

	Italy	Netherlands	England	Total
Injecting	23 (77%)	2 (8%)	11 (31%)	36 (40%)
Smoking	4 (13%)	23 (92%)	19 (54%)	46 (51%)
Sniffing	3 (10%)	0 (0%)	1 (3%)	4 (4%)
Combination of injecting and smoking	0 (0%)	0 (0%)	4 (11%)	4 (4%)
Total	30 (100%)	25 (100%)	35 (100%)	90 (100%)

The figures from our interviews for Italy and England differ substantially from the data from other sources. According to the Italian Public Health Care Services 67% of the heroin users in treatment are injecting, 23% smoking, 7% sniffing and 3% using in another way (Centre for Biostatistics and Bioinformatics 2013a,b). English treatment data report 18% of heroin users as being current or recent injectors (Roxburgh et al. 2012). For the Netherlands the findings from our interviews are in line with the report of the Dutch Drug Monitor for 2010 (Van Laar a.o. 2012). In both 8% injectors are reported.

### **Main location of use**

Respondents indicated location of heroin use by ranking the three places where they used most often from the options shown in table 5 (I = most often, III = least often). In total, 'one's own home' was mentioned most frequently as location of use followed by 'someone else's home.' 'One's own home' was most commonly reported as being the preferred location for use, followed by 'someone else's home.' 'On the street' or 'in a park' were mentioned less frequently.

We found some differences between countries in the total proportion of all options respondents could choose from, as shown in table 6. The preference to use at one's own home was higher among Italian respondents than among Dutch users, while a greater proportion of users from England stated that they used at someone else's home than from the other two countries. Using on the street or in a park was most common among Italian respondents. Finally, use in a drug consumption room was only reported for the Netherlands, the only country where these facilities exist.

**Table 5: Locations where heroin is most often consumed (N=111)<sup>1</sup>**

	Location nr. 1	Location nr. 2	Location nr. 3	Total
At my own home	52 (47%)	14 (13%)	2 (2%)	68 (61%)
At someone else's home	9 (8%)	27 (24%)	8 (7%)	44 (40%)
At a private party	0 (0%)	2 (2%)	1 (1%)	3 (3%)
At my workplace	0 (0%)	1 (1%)	0 (0%)	1 (1%)
At school, college or university	0 (0%)	0 (0%)	1 (1%)	1 (1%)
On the street or in a park	8 (7%)	16 (14%)	13 (12%)	37 (33%)
At a cafe/pub/bar	1 (1%)	0 (0%)	4 (4%)	5 (5%)
Other place of entertainment	0 (0%)	0 (0%)	1 (1%)	1 (1%)
At a music concert or festival	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Drug consumption room	14 (13%)	4 (4%)	0 (0%)	18 (16%)
Other				24 (22%)

<sup>1</sup> All percentages in this table are based on this total N.

**Table 6: Locations where heroin is most often consumed by country**

	Italy	NL	England	P
At my own home	24 (80%)	21 (47%)	23 (64%)	.014
At someone else's home	5 (17%)	11 (24%)	28 (78%)	.000
On the street or in a park	20 (67%)	11 (24%)	6 (17%)	.000
Drug consumption room	0 (0%)	18 (40%)	0 (0%)	n.a.
N	30	45	36	111

### ***Use of other substances***

We also asked respondents whether they had used other drugs besides heroin in the past month. Table 7 lists the outcomes.<sup>2</sup> Overall, the use of other drugs was lowest among Italian heroin users. In the Netherlands, 34 respondents (76%) reported to use crack cocaine next to heroin, in England this is true for 28 interviewees (78%). This is in line with other research findings (e.g. Roxburgh et al. 2012). No crack cocaine use was reported by Italian respondents.

Alcohol was the second most consumed substance overall in the Netherlands and England, and it was the substance most frequently used in Italy besides heroin. Cannabis was the next most commonly used substance. The prevalence of both alcohol and cannabis use among the respondents was lower in Italy than in England and the Netherlands. In the Netherlands cannabis was used more frequently than in the other two countries.

<sup>2</sup> Amphetamine, other stimulants, LSD and other hallucinogens were among the answer categories but were not mentioned at all and are therefore not included in the table.

Table 7: Last month prevalence of other drug use by country

	Italy		Netherlands		England		Total		P
	N	%	N	%	N	%	N	%	
Alcohol	5	17%	26	58%	22	61%	53	48%	.000
Barbiturates	1	3%	0	0%	0	0%	1	1%	n.a.
Benzodiazepines	0	0%	16	36%	17	47%	33	30%	.2881
Cannabis	3	10%	26	58%	12	33%	41	37%	.000
Cocaine	3	10%	7	16%	6	17%	16	14%	.716
Crack cocaine	0	0%	34	76%	28	78%	62	56%	.815 <sup>1</sup>
Mdma	0	0%	0	0%	1	3%	1	1%	n.a.
Methadone	2	7%	15	33%	21	58%	38	34%	.000
Methamphetamine	0	0%	0	0%	1	3%	1	1%	n.a.
Opiates	0	0%	0	0%	6	17%	6	5%	n.a.
Other drugs	0	0%	0	0%	2	6%	2	2%	n.a.

<sup>1</sup> Comparison between NL and UK.

## 2.3 Buying behaviour/availability

Here we focused on aspects related to the buying behaviour, availability and accessibility of heroin, such as:

- Ways of obtaining heroin
- Usual location of purchase and reasons to buy there
- Availability of other drugs at location of purchase
- Buying for someone else
- Ease of obtaining drugs and inability to buy.

### *Way of obtaining heroin*

The overwhelming majority of respondents stated that they usually pay for their heroin (97%; only one person per country indicated usually not paying for heroin). However, respondents also indicated how they obtained heroin on those occasions when they did not pay for it. The answers are summarized in table 8. In all three countries a common way of obtaining heroin (besides buying and paying for it directly) was to receive it for free from others. This occurred to a larger extent in the Netherlands than in England. The next most frequent way of obtaining heroin was to get it on credit, which in England was reported as frequently as getting it for free. In the Netherlands, getting heroin 'fronted' for selling was as common as getting it on credit, which was clearly more frequent than in the other two countries. Trading heroin for property or sex was not mentioned by Italian users, but was mentioned in the Netherlands and England.

Table 8: Ways of obtaining heroin

	Italy		Netherlands		England		Total	
	N	%	N	%	N	%	N	%
People give it to me	5	17%	13	29%	2	6%	20	18%
I steal it	2	7%	4	9%	1	3%	7	6%
I get it on credit	3	10%	9	20%	2	6%	14	13%
I get it fronted to sell	1	3%	9	20%	0	0%	10	9%
I trade it for other drugs	3	10%	4	9%	0	0%	7	6%
I trade it for property	0	0%	6	13%	1	3%	7	6%
I trade it for sex	0	0%	4	9%	1	3%	5	5%
Other	1	3%	1	2%	1	3%	3	3%

### *Usual location of purchase*

'On the street or in a park' were the most common answers to the question of where respondents usually buy their heroin. In Italy and the Netherlands these public settings were the most frequently named locations. In England 'delivery service'

was mentioned most frequently, followed by 'on the street or in a park'. The distribution of locations of purchase differed across countries.

**Table 9: Usual locations for purchasing heroin by country**

	Italy		Netherlands		England		Total	
	N	%	N	%	N	%	N	%
<b>On the street or in a park</b>	20	67%	23	51%	13	36%	56	51%
<b>At dealer's house</b>	6	20%	3	7%	0	0%	9	9%
<b>Delivery Service</b>	3	10%	1	2%	19	53%	23	21%
<b>At a club</b>	1	3%	0	0%	1	3%	2	2%
<b>Other</b>	0	0%	2	4%	1	3%	3	3%
<b>No answer</b>	0	0%	16	36%	2	6%	18	16%

### ***Availability of other drugs at the location where heroin is usually purchased***

In the Netherlands 76% of the respondents and in England 71% of the respondents reported buying heroin and crack cocaine from the same seller. When asked about the availability of other drugs at the location where they usually buy their heroin, 'only cocaine powder' was mentioned in all three countries, by 11 users (37%) in Italy, one user (2%) in the Netherlands and by five users (14%) in England. Other drugs than crack cocaine and cocaine powder were mentioned only in England. Ten users mentioned the availability of cannabis and two users indicated the availability of a wide range of drugs, including cannabis, cocaine, ecstasy, amphetamine, GHB, ketamine and mephedrone.

### ***Buying for someone else***

A total of 50 (45%) users indicated that they had bought heroin for someone else during the last 12 months, and this percentage did not vary across the three countries. Table 10 shows the number of persons these users had bought heroin for the last time that they purchased it. There was no significant variation in the distribution of categories across countries. Most users buy for only one or two other persons. Table 11 shows for which persons respondents bought heroin as part of their most recent purchase. Again, there was no significant variation across countries.

**Table 10: Number of others that heroin was bought for last time**

	Italy		Netherlands		England		Total	
	N	%	N	%	N	%	N	%
<b>1-2</b>	12	86%	10	63%	16	80%	38	76%
<b>3-5</b>	2	14%	5	31%	3	15%	10	20%
<b>More than 5</b>	0	0%	1	6%	1	5%	2	4%
<b>Total</b>	14	100%	16	100%	20	100%	50	100%

**Table 11: Specific others that heroin was bought for last time**

	Italy		Netherlands		England		Total	
	N	%	N	%	N	%	N	%
<b>Partner</b>	5	36%	5	36%	4	20%	14	29%
<b>Friend(s)</b>	8	57%	3	21%	8	40%	19	40%
<b>Relative(s)</b>	1	7%	0	0%	1	5%	2	4%
<b>Partner and friends</b>	0	0%	0	0%	1	5%	1	2%
<b>Other user(s)</b>	0	0%	6	43%	6	30%	12	25%
<b>Total</b>	14	100%	14	100%	20	100%	48	100%

### ***Ease of obtaining heroin and inability to buy***

In order to assess the degree of ease or difficulty with which heroin could be located and purchased, respondents were asked to describe: their own perceptions and experiences of the ease with which heroin could be obtained; the estimated time they needed to obtain it; and whether they sometimes wanted to buy heroin but were not able to do so. Respondents' own perception of the ease of obtaining heroin was measured on a 5-point likert scale ranging from (1) very difficult to (5) very easy. As can be seen in table 12, it was generally considered fairly or very easy to obtain heroin. Here we need to keep in

mind that heroin users were generally interviewed in large cities in the three Member States. In smaller cities and in particular in rural areas, it might be more difficult to obtain heroin. Another issue to be taken into consideration is that all respondents were experienced heroin users.

**Table 12: Ease of obtaining heroin by country**

	Mean	Std. dev.	Median	N
Italy	4.1	1.2	4.5	30
Netherlands	3.7	1.1	4.0	31
England	4.9	0.2	5.0	35
Combined	4.3	1.1	5.0	96

The majority of heroin users across the three Member States indicate that it was 'very easy' for them to buy heroin. Approximately 58 per cent of heroin users indicated that they could purchase their heroin in less than 30 minutes, while another 27 per cent state that it would take them less than an hour (see table 13). The estimated time needed to buy heroin varies across countries. In England, all of the interviewees state that they could get their heroin within 30 minutes; this is the case for only 38 per cent of the Dutch respondents and 30 per cent of the Italian interviewees. A significant number of Italian and Dutch users estimates that it would take them between half an hour and one hour or even longer to obtain heroin.

**Table 13: Estimated time needed to buy heroin by country**

	Italy		Netherlands		England		Total	
	N	%	N	%	N	%	N	%
Less than half an hour	9	30%	12	38%	35	100%	56	58%
0.5-1 hour	14	47%	12	38%	0	0%	26	27%
1-2 hours	4	13%	4	13%	0	0%	8	8%
Between 2 and 12 hours	3	10%	3	9%	0	0%	6	6%
Between 12 and 24 hours	0	0%	1	3%	0	0%	1	1%
Total	30	100%	32	100%	35	100%	97	100%

Finally, a total of 47 respondents (42%) indicate that there had been occasions in the past 12 months that they were unable to buy heroin. Table 14 shows the reasons they gave for being unable to obtain heroin. Sellers being unavailable or not having any heroin were the two most frequently mentioned reasons. However, the reasons reported to us differed between countries. English respondents report more frequently sellers not having any heroin as a key reason for being unable to buy. By contrast, a quarter of the Dutch respondents reports police activity as an important reason for being unable to buy (whereas none of the English respondents mentions this).

**Table 14: Reasons for not being able to buy heroin**

	Italy		Netherlands		England		Total	
	N	%	N	%	N	%	N	%
No sellers were available	5	36%	8	50%	4	24%	17	36%
Sellers did not have any	6	43%	2	13%	9	53%	17	36%
Sellers did not have the quality I wanted	0	0%	2	13%	0	0%	2	4%
Sellers were charging too much	1	7%	0	0%	0	0%	1	2%
Police activity kept me from the sellers	1	7%	4	25%	0	0%	5	11%
Other	1	7%	0	0%	4	24%	5	11%
Total	14	100%	16	100%	17	100%	47	100%

### **Strength of heroin**

In all three countries, opinions on the strength of heroin in the month preceding the interview vary. Approximately 31 per cent of interviewees state that the heroin they were buying was 'moderately strong'; whilst 23 per cent states it was generally 'very weak'. Only one in five interviewees believes that it was generally 'quite strong'. There is, however, considerable variation between the three countries. In the UK interviewees typically describe the heroin they used as 'very weak' (43%),

whilst only 20 per cent of Italian interviewees and three per cent of Dutch interviewees describes their heroin as 'very weak'. Interestingly when examining interviewees' opinions on the strength of crack a similar picture emerged: In the UK over half (53%) of the problem crack users describes the substance as 'weak' or 'very weak' compared to less than a quarter (21%) of Dutch interviewees. In Italy, almost three quarters of the sample (71%) describes the strength of the cocaine they were buying as 'moderate' or 'strong'.

### 3 Discussion and conclusions

The qualitative approach we used here, working with a limited sample size and using in-depth interviews of purposively sampled respondents makes that we have to be careful with drawing conclusions. We were looking for information helping us to better understand some aspects of the demand side of the heroin market, the drugs used, frequency of use, route of administration, sources of supply, search time, buying scenarios, etc. The findings should be taken as giving colour to the picture of what is actually happening on user level.

The gender distribution in our sample is similar in all three Member States with around three quarter male respondents. Other sources (treatment data) indicate a bit bigger share of male heroin users in Italy and the Netherlands.

There are some interesting differences regarding the characteristics of the respondents' samples in the three Member States. The mean age of the respondents in England and Italy was for instance clearly lower – 34.5 and 36.1 years respectively – then the 47.5 years in the Netherlands. This picture is confirmed by other sources (see above). The relatively high mean age of the Dutch respondents in our sample is in line with the picture of an ageing population of heroin users in the Netherlands, where the number of new treatment admissions of young users is rather low.

The figures on routes of administration from our interviews differ from monitoring data but still point in the same direction: They illustrate that Member States differ substantially regarding the preferred route of administration. In some Member States there is a trend away from injecting to smoking (chasing the dragon). England and in particular the Netherlands are examples for this (EMCDDA 2012).

We found some differences between countries regarding the preferred location for using heroin. The differences between countries regarding the preferences where to use heroin might have to be explained by the specifics of the country. This is of course evident for using in drug consumption facilities, an option only available for heroin users in the Netherlands, where these facilities are a common phenomenon in urban areas. Using on the street or in a park was most common among Italian respondents. Here not only the climate but also the reduction of harm reduction services in recent years might have to be taken into account.

There are also substantial differences between the Member State samples regarding the use of other drugs (in the past month) beside heroin. Using other drugs was rather rare in Italy (except for alcohol) compared to England and the Netherlands. In these two countries the use of cocaine, in particular crack cocaine was a common phenomenon – which is in line with other findings – while in Italy it was not mentioned once. Alcohol and cannabis were the next popular substances in England and the Netherlands. In the Netherlands cannabis was used more frequently than in the other two countries.

When asked about the availability of other drugs at their usual buying location, only (crack) cocaine was regularly mentioned by respondents from all three Member States. 'Other drugs' were mentioned only in England (i.e. cannabis, cocaine, ecstasy, amphetamine, GHB, ketamine and mephedrone). Different factors might play a role here. One is that sellers follow the demand. Heroin and (crack) cocaine is a popular combination. Buyers of heroin might frequently ask for cocaine. Another factor playing a part here might be the easy availability of certain other drugs at other sellers. This is definitely true for alcohol, but in the Netherlands also for cannabis, which proves to be popular among Dutch heroin users. Finally, the more limited availability of other drugs at a heroin seller might also – at least partly – be explained by the fact that street dealers might generally be 'one man's business'. In that case it is simply difficult to have a wide variety of substances in stock. The findings about the other drugs in the two preceding chapters are similar regarding the availability of other drugs at a seller of a specific

There is another interesting difference between the three Member States. While in Italy and the Netherlands most respondents buy their heroin 'on the street or in a park', in England most respondents buy their heroin through a 'delivery service', followed by 'on the street or in a park'.

According to the majority of respondents in all three Member States it is generally considered fairly or very easy to obtain heroin. More than three quarter of all respondents (in each country and in total) states that they can obtain heroin in less than one hour. Still there are some differences regarding the estimated time needed to buy heroin. Users from England unanimously indicate that it would take them less than half an hour to buy heroin, whereas quite some Italian and Dutch users estimate that it would take them between half an hour and one hour or even longer to obtain heroin. Here we need to be keeping in mind that heroin users were generally interviewed in large cities. In smaller cities and in particular in rural areas, it might be more difficult to obtain heroin. Another issue to be taken into consideration is that all respondents were experienced heroin users.

Interestingly enough a substantial number of respondents - nearly half of the ones answering the relevant question - indicate that there had been occasions in the past 12 months that they were unable to buy heroin. The two most frequently mentioned reasons were sellers being unavailable or not having any heroin. The latter was mentioned most frequently in England (9 out of 17), the first most frequently in the Netherlands (8 out of 16) where four respondents also referred to police activity as reason for being unable to buy.

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## Report 3.2

# Sizing national heroin markets in the EU: insights from self-reported expenditures in the Czech Republic and England<sup>1</sup>

Beau Kilmer, Jirka Taylor, Priscillia Hunt and Peter McGee

## Abstract

After alcohol, heroin consumption causes more social harm than any other intoxicating substance in Europe. Knowing the approximate size of the heroin market is important for making realistic projections about policy interventions as well as estimating the amount of money being earned by criminal organizations. Since users' quantity estimates can be unreliable, this report uses data about PHUs and estimates of weekly heroin expenditures in the Czech Republic and England to calculate the size and the volume of the market for these two countries, building on existing knowledge on quantity discounts to arrive at more reliable estimates. Previous estimates from Paoli, et al. (2009) suggest the typical PHU in Europe consumes 30 pure grams annually; roughly half the amount assumed by the UNODC (2005; 58 grams). Our calculations are consistent with a benchmark that is closer to 30 pure grams per year; however, there is likely variation in this value within countries, across countries, and over time.

## 1 Introduction

After alcohol, heroin consumption causes more social harm than any other intoxicating substance in Europe. In addition to the morbidity and mortality associated with heroin consumption, one of the negative consequences of the trade is the large amount of money it generates for criminal organizations. Estimates of retail heroin expenditure in the EU can range from €11 billion (Kilmer and Pacula 2009)<sup>2</sup> to €22 billion (UNODC 2005), suggesting there is potential for large profits in the market. This range also highlights the large amount of uncertainty there is about the actual size of the market in the EU.

There are several reasons why decision makers want to know how much heroin is used in the EU and how much users spend on it. First, information about expenditures helps put the trade in context compared to legal (e.g. alcohol, tobacco) and other illegal industries. Second, it provides insight about the revenues being generated by criminal traffickers. This information is not only of interest to law enforcement agencies, but also to those who seek to implement drug policy reforms that could reduce criminal proceeds. Third, knowing heroin expenditures and amounts consumed is necessary, but not sufficient, information for projecting the consequences of alternative regulatory regimes.

One possibility to size the market would be to ask users how many grams they consume over a given period of time and multiply this information by a measure of price. However, data collected via this approach are likely to be relatively unreliable as the quality and quantity of the product purchased is subject to considerable variation at street level. Since users are more likely to know what they spent rather than precisely what they consumed, an alternative approach for sizing the market is to ask users what they spend in a given week or month, extrapolate this to an annual estimate, and then multiply by the number of users. Not all types of users spend the same amount, so this needs to be done separately for each type of user.<sup>3</sup> Many studies suggest that most retail expenditures are made by the subset of users who consume regularly; those who use heroin only occasionally do not account for a very sizable share of the market (Hay et al. 2006; Paoli et al. 2009; Kilmer et al. forthcoming). The distribution of consumption rates for alcohol and many other commodities are also skewed, with a long

<sup>1</sup> We thank Vendula Belackova, Jon Caulkins, and Rosalie Pacula for insights on an earlier draft. The views here only reflect those of the authors.

<sup>2</sup> Assuming average retail heroin purity in Europe is equal to 25%; not reported in the text.

<sup>3</sup> An example of user classification used throughout the report here is occasional and problem users.

“right tail”, and heroin is hardly unique in this respect (Cook 2007; Caulkins et al. 2012). In this regard, a clear advantage EU Member States have over the United States and other countries in terms of sizing the heroin market is the systematic collection of information about PHUs. The EMCDDA and its National Focal Points (so called REITOX network) deserve much credit for generating prevalence estimates of both occasional and problem heroin use, and improving them over time.

This report uses the EMCDDA prevalence rates of problem heroin use, and estimates from field studies in the Czech Republic and England to calculate the size of the market for these two countries. Even though the field studies give us the building blocks needed for the estimates, the calculations still require a number of assumptions that will be made explicit. For a number of reasons we expect this approach to yield estimates that are likely to be high.

The report then goes a step further by using these expenditure estimates to calculate total pure grams consumed by PHUs. This not only provides a nice “reality check” about the reasonableness of our expenditure figures, it also contributes to the limited literature about the total number of pure grams consumed by a PHU (see discussion in Paoli et al. 2009).

## 2 Generating national expenditure estimates

There are a variety of ways to estimate the size of illegal drug market (Kilmer et al. 2011). The “supply side” approach estimates heroin flows into a country and then multiplies the amount that is not seized, nor exported, by some measure of price. There are a number of limits with this approach; notably, estimating the amount of heroin entering a country is very difficult. This approach works better when there is one source country that sends most of its product to one final market country (e.g. Colombian cocaine supplying the U.S. in the 1980s); but even then, the lags associated with storage can complicate these calculations.

On the other hand, “user-based” estimates start with users as the primary unit of analysis. One version multiplies the number of users by a measure of quantity consumed per user and price per unit of quantity to generate total expenditures (perhaps with an adjustment for bartering and in-kind transactions). Another version simply asks users how much they spent in the previous week or month and then multiplies this by 52 or 12. Ideally, information would also be collected about whether consumption in that period was less, more, or the same as a typical period.<sup>4</sup>

This report focuses on the second path version for two case study countries with available information: Czech Republic and England.<sup>5</sup> This chapter starts with past week expenditures since this is the harder number to come by. We then attempt to generate information about consumption in these countries. The final sub-section generates national expenditure figures and then discusses them in the context of other estimates in the literature.

When using multiple figures to generate any type of drug statistic for a country or jurisdiction, it is important that they come from the same general time period. Given fluctuations in markets, either due to policy interventions, weather shocks, or other factors, consumption patterns could be very different over these periods, rendering a combination of statistics problematic. For England, the estimates for past week expenditures are largely from 2006 and the problem opiate users figures are from 2005/2006, which does not raise much cause for concern.<sup>6</sup> For the Czech Republic, expenditures were from winter 2004/2005 and the PHU figures were from 2004.

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<sup>4</sup> In one of the early attempts to rigorously estimate heroin consumption for a country, Rhodes et al. (1997) used self-report information from arrestees about past week expenditures.

<sup>5</sup> Not all EMCDDA countries attempt consistently to classify their estimates of problem drug use by drug types. The selection of England and the Czech Republic also enable to test this methodological approach in two countries with different levels of heroin prevalence. In England, opiate users represent the largest group among problem drug users whereas in the Czech Republic problem methamphetamine use is much more common.

<sup>6</sup> Indeed, the numbers of deaths related to drug poisoning where heroin/morphine were mentioned on the death certificate in England did not change dramatically from 2004 to 2006 (2004, p. 816; 2005, p. 791; 2006, p. 764). We thank Jon Caulkins for sharing that insight.

## 2.1 Estimates of past-week expenditures per user

To arrive at estimates of expenditures per user, we identified in each respective case study country a survey of drug users in contact with treatment facilities who reported on their consumption patterns. To maintain comparability across both countries, mean values of past-week consumption are used in our calculations as median values were not available in the English study.<sup>7</sup>

### Czech Republic

The National Focal Point in the Czech Republic surveyed 409 problem use clients at 26 low threshold facilities<sup>8</sup> from November 2004 to March 2005 in order to estimate levels of consumption of problem drug users (Petros et al. 2005). These facilities can offer a number of services ranging from syringe exchange, to treatment referral, to infectious disease tests (Klinika Adiktologie 2006).<sup>9</sup> Based on 71 heroin using respondents, Petros et al. reported that average weekly expenditure was 3,240 CZK (Median 2,500 CZK). In 2004 this was the equivalent of €102 (31.904 CZK = €1).<sup>10</sup> Since some of these users were already receiving services at the time of the interview, their past-week consumption may have been somewhat reduced compared to before receiving services (even though the main aim of harm reduction services is not decrease in use). On the other hand, this population also included those who may have just started to attend the services, possibly because their use levels were higher than usual. Thus it is difficult to even sign this potential bias for this data source.

### England

The Drug Treatment Outcomes Research Study (DTORS) was a major national evaluation of drug treatment in England conducted in 2006 and 2007.<sup>11</sup> The baseline survey asked about past week heroin expenditure, and based on a sample of 1,144 heroin users, the mean amount was £129 (See table 1 below; DTORS 2009). In 2006, this was the equivalent of €192 (€ 1.486 \* £1). That said, this population used 18 days on average in the past month, which is less than the estimates discussed in the next chapter about use days in the month prior to entering the opiate substitution treatment (OST).

**Table 1: Heroin use days and expenditures among those entering treatment in England in 2006**

How often used in the last four weeks (%)					Mean number of days in the last 4 weeks used	Mean value (£) personally used in the last week
Daily	Most days	3 or 4 days a week	1 or 2 days a week	Less than once a week		
52	11	10	14	13	18	129

Source: DTORS 2009 (Table 21).

## 2.2 Estimates of the number of PHUs

A number of studies find that problem drug users account for the vast majority of retail expenditures, and this appears to be especially true for heroin (Pudney et al. 2006; Abt Associates 2011; Caulkins and Kilmer, this volume; Kilmer et al. forthcoming). As mentioned earlier, most EU Member States have institutionalized approaches to estimate the number of problem drug users. These estimates are reported to the EMCDDA and while it is not uncommon for the figures to be compared or summed across countries, the EMCDDA warns: "The EMCDDA has an operational definition of problem drug use, however the actual definition of the estimates used to inform this indicator often differ across the countries of the European Union and are dependent on the methods used (and the contributing data sources)." The English definition of problem drug use is identical to that of the EMCDDA<sup>12</sup> and the Czech one deviates only in that it does not include cocaine use, due to its very low prevalence in the country.

<sup>7</sup> Since we rely on means instead of medians, our expenditure estimates may be inflated since the mean is more sensitive to outliers. This would also inflate our total consumption figures since expenditures are in the numerator.

<sup>8</sup> The NFP annual report does not provide more details on sampling.

<sup>9</sup> For more information on low-threshold facilities in the Czech Republic, see also [http://www.emcdda.europa.eu/attachements.cfm/att\\_81292\\_EN\\_CZ%20poster.pdf](http://www.emcdda.europa.eu/attachements.cfm/att_81292_EN_CZ%20poster.pdf): Last accessed: 15 November 2012.

<sup>10</sup> This was the conversion factor listed as a cumulative monthly average for the year 2004 by the Czech National Bank.

<sup>11</sup> From Jones et al. (2009): "In each of 94 areas during a four- to seven-week window between February 2006 and March 2007, the study recruited and interviewed 1796 adults seeking treatment for primary drug (not alcohol) problems. Interviewees had made face to face contact with staff at a representative sample of community or residential services offering interventions intended to follow a systematically delivered treatment plan. Interviews were to be conducted as soon as possible (and at least within four weeks) after initial assessment."

<sup>12</sup> In Scotland, problem drug use refers to opiates and/or the illicit use of benzodiazepines and drug injecting, in Wales it is long duration or regular use of opioids, cocaine powder and/or crack cocaine and in Northern Ireland problem opiate and/or problem cocaine powder use (Davies et al. 2011).

### **Czech Republic**

The National Monitoring Centre for Drugs and Drug Addiction in Prague is charged with carrying out the activities of the National Focal Point and has been collecting information and data on the five key indicators according to EMCDDA guidelines (See annex 1 for more information about the different approaches used in the Czech Republic). Based on data from low-threshold drop-in centres, it publishes annually an estimate of the prevalence of problem drug user in the Czech Republic.

As Studnickova and Petrasova note (2011), the Czech Republic differs from the majority of other EU countries in that opiate users are not the dominant group of problem drug users; the heroin users are vastly outnumbered by methamphetamine users. Even in 2003, when heroin use was estimated to be more common than today, it was still in the minority: "It is estimated that there are 22,000 problem Pervitin users, and 13,000 – 15,000 PHUs." (Mravčík et al 2003, p. 25). For 2004, the best estimate presented was 9,700 PHUs, which amounts to 1.34 problem users per 1,000 population. Currently, there are estimated to be 30 900 problem methamphetamine users and 9,300 PHUs, out of whom 4,700 heroin users and 4,600 buprenorphine users (Mravčík, Grohmannová et al. 2012). This means that while in 2003, one third of PDUs were problem opiate users, now it is only one fourth. Additionally, while the vast majority of opiate users were in the past expected to use heroin, currently, half of them are actually illicit buprenorphine users.

### **England**

Utilising multiplier and capture-recapture methods, Hay et al. (2007) estimate the number of problem opiate users in England by largely relying on four national treatment and criminal justice data systems:

- The National Drug Treatment Monitoring System
- The National Offender Management Service Offender Assessment System
- Drug users convicted under the Misuse of Drugs Act (1971) for offences involving possession (or possession with intent to supply) heroin, methadone and/or crack cocaine from the Police National Computer (PNC)
- Counselling, Assessment, Referral, Advice and Throughcare services data for drug users in prison.

The authors argue for the UK that, "Non-problematic use of opiates and crack cocaine is comparatively rare so it is safe to assume that those convicted or cautioned for possessing those drugs are likely to be problematic users whereas the same could not be assumed for drugs such as cannabis and powder cocaine which are commonly used intermittently." Their final estimate for problem opiate users in England circa 2005/2006 was 286,566 (95% CI: 281,668 – 299,394), amounting to 8.6 problem drug users per 100 000 population. Since not all problem opiate users use heroin, we multiply this amount by the share of primary opiate treatment admissions who were primary heroin users:  $286,566 * 0.89 = 255,044$ .<sup>13</sup>

## **2.3 Estimates of national expenditures and comparisons with existing figures**

### **Czech Republic**

Multiplying the 9,700 problem users (as of 2004) by the product of mean weekly expenditure (3,240 CZK) and 52, then converting this to Euros (31.904 CZK = €1)<sup>14</sup> suggests an annual expenditure figure circa 2004 of €51 million (in €2004).

This is very similar to the €53 million (2008) estimate generated by Vopravil (2010).<sup>15</sup> That said, there are some notable differences between the two estimates. Vopravil (2010), based on the National Focal Point's data, estimates there are only 6,400 PHUs in 2008, i.e. roughly a third less than the number reported in 2004. Rather than a decline in the number of problem opiate users (the estimated number actually grew 16.5% between 2004 and 2008), this reflects the fact that from 2006 onwards available data enable a differentiation between heroin users and users of illicit Subutex (buprenorphine) users,<sup>16</sup> who are estimated to represent over 40% of all problem opiate users in 2008 (see table A-2 in annex 1).

It is quite likely that at least some of the estimated 9,700 problem opiate users in 2004 were in fact Subutex, rather than

<sup>13</sup> "In 2009/10 primary heroin users accounted for 89% of all presentations to treatment for primary opiate use" (Davies et al. 2011, p. 83). We assume the ratio is similar for problem opiate users regardless of treatment status.

<sup>14</sup> This was the conversion factor listed as a cumulative monthly average for the year 2004 by the Czech National Bank.

<sup>15</sup> To estimate the size of the user population, Vopravil (2010) relied on the Global Population Survey for the number of recreational/occasional users and on the National Focal Point for at the number of problem drug users. For recreational users, he omitted GPS respondents who indicate they use heroin at least once a month, assuming they are problem drug users and therefore covered by the multiplier. Those from the GPS survey only accounted for 2.2% of total consumption, further confirming that it is the problem drug users that are responsible for most of the activity on the market.

<sup>16</sup> Subutex was introduced as a substitute medication but its non-treatment abuse quickly became common in the Czech Republic in the first half of the 2000s. By the time Subutex was differentiated from heroin in estimates of problem opiate use, its abuse had been well established.

heroin users. This is acknowledged by the fact that while the 2004 Reitox report refers to this group as 'PHUs,' the 2006 report uses the label 'problem opiate users' and subsequent editions explicitly state that data are not available regarding the ratio of heroin to Subutex users for 2002-2005. The difficulty of estimating the number of problem Subutex users in the first half of the 2000s stems largely from the fact the drug was only registered in the Czech Republic in 2000 and the subsequent years were marked by a rapid growth in the number of its illegitimate users (Mravčík et al 2003).

One possible, albeit crude, way to estimate the number of problem Subutex users in 2004 is to assume that they represent the same share of all problem opiate users as in 2006, i.e. the first year for which there is an estimate of problem Subutex users available. In 2006, there were 4,300 problem Subutex users, accounting for 41% of all problem opiate users. Applying this percentage to the 2004 figure yields a total of 3,970 problem Subutex users. That would mean the number of PHUs in 2004 was only 5,730, which would put the national expenditure at approximately €30 million. However, this method might overstate the extent of problem Subutex use in the country as the substance was less common in 2004 than in 2006. Indeed, the State Institute for Drug Control reported that the amount of Subutex distributed in the country grew from 2,222 grams in 2004 to 3,414 grams in 2006 (*Státní ústav pro kontrolu léčiv 2007*), thereby increasing the amount available for illicit diversion.

An alternative approach would be to assume that the proportion of problem Subutex users who sought treatment remained constant between 2004 and 2006. Based on information from the treatment demand register maintained by the Prague Hygiene Service, 740 clients sought treatment in relation to the use of Subutex as a primary or secondary drug in 2006, representing 17.2% of all estimated problem Subutex users (Polanecký et al. 2007). Using this percentage for 2004 (which saw 259 recorded Subutex-related treatment demands) suggests there were 1,505 problem Subutex users in 2004. This would put the number of PHUs at 8,195, which would correspond to an annual expenditure of €43 million. Both estimates based on assumptions of some problem Subutex use lead to national expenditures lower than that of Vopravil (2010). In addition, this discrepancy is exacerbated by two factors. Vopravil (2010) calculates the final expenditure figure by multiplying the volume of reported consumed heroin by its retail price, which in this particular case yields slightly higher values than relying on self-reported weekly expenditures. Even more importantly, the Euro lost approximately 22% of its value against the Czech crown between 2004 and 2008, which means that the observed difference between the two estimates would be much smaller, if expressed in CZK.

### **England**

If one assumes that weekly spending was consistent over the year, annual spending for this group would be close €9,968 (= €192 \* 52 weeks). If the 286,566\*89% PHUs in England average €9,968 per year on heroin, this would put the English retail market for heroin at approximately €2.5 billion circa in 2006. Similar to our Czech estimate, this is larger than the €1.3-€1.8 billion estimated by Pudney et al. (2006) for England and Wales in 2003/2004; however, it is unclear what is driving this difference since Pudney et al. did not publish their user estimates.<sup>17</sup>

## **3 Generating estimates of pure heroin consumption**

We now use information about annual expenditure to better understand pure grams consumed. This not only makes for a nice validity check to make sure these expenditure estimates have some face validity, but it also contributes to the growing literature about quantities consumed and is relevant for policy purposes, particularly in terms of health consequences. Further, focusing on pure quantities is also important for making comparisons across jurisdictions and over time: a €10 bag will always be 10 Euros, but it is what is inside that bag that could change across space and time.

<sup>17</sup> Pudney et al (2006) use survey data to calculate prevalence through ratios of use between the arrestee and non-arrestee populations. Authors take into account non-response and under-reporting in surveys through several statistical techniques and included youth (aged 10-16), which is something that had not been accounted for previously in the literature. For the non-offending adults, authors use the 2003 data in the Offending, Crime and Justice Survey (OCJS), a longitudinal survey conducted over the four year period 2003-2006. For arrested offenders, Pudney et al (2006) use the Arrestee Survey (AS) conducted in 2003/04. To include youth, authors use the 2003 Schools Survey. To generate the number of drug users in England, Pudney et al (2006) combine the probability of an individual being arrested with two conditional probabilities- the probability of using drugs given an individual was arrested and the probability of using drugs given an individual had not been arrested. Pudney et al (2006) also needed to calculate the number of arrests for those not living in households (and thus not in any of the surveys).

### 3.1 Previous literature

The lack of consistent information about the quantities of drugs consumed by users is often pointed out (e.g. Pudney et al. 2006; Kilmer and Pacula 2009). Most Member States do not collect this type of data, and the EMCDDA does not ask Member States to report data about heroin use days or quantities consumed. There have been improved efforts to collect data on quantities consumed per a use-day information in Europe (e.g. Reissnera et al. 2011)<sup>18</sup> and there are some important field studies. However, the insights we have about the amount of heroin consumed largely come from treatment populations, mostly in the UK.

Based on a sophisticated analysis of heroin consumption among arrestees in the UK by Singleton et al. (2006), Paoli et al. (2009) calculated that users, on average, consume approximately 29 grams of pure heroin per year.<sup>19</sup> Paoli et al. (2009) also discussed Bramley-Harker's (2001) estimate for the UK, which is closer to 40g per year, and note that this figure is likely to be high since it assumed that none of the heroin users spent any time in the previous year in prison or jail.<sup>20</sup> Based on these findings and their review, Paoli and colleagues conclude: "We believe that an estimate of 100 pure milligrams per user per day—consistent with an annual estimate of about 30 pure grams—for countries with opiate prices that are, relative to average earnings, much lower than the United States, is reasonable and not inconsistent with judgments of experts." The assumption of 30 pure grams for users in Europe is much smaller than the figure of 58 grams offered by UNODC (2005).

### 3.2 Estimating pure grams consumed per user

An alternative approach for estimating the amount of pure heroin consumed in a country is to divide total expenditures by price per pure gram, after making a number of technical adjustments. Since many countries have no information about total expenditures, let alone reliable information about the retail purity, this approach cannot be universally applied.

This section uses information about weekly heroin expenditures in the Czech Republic and England from the previous section to help inform our understanding of total amount of pure heroin consumed in these countries for a particular year (Czech Republic = circa 2004; England = circa 2006). The basic model is:

$$\left( \frac{\text{Mean weekly expenditures} \times 52}{\text{Mean Euros spent per gram acquired}} \right) \times \text{Mean retail purity}$$

where the quotient from the left-hand term in (1) gives us the average number of raw grams consumed in the past year, and multiplying this by mean retail purity generates an estimate of total pure grams consumed.

Mean Euros spent per gram acquired is benchmark retail price reported to the EMCDDA multiplied by a quantity discount adjustment. It is well documented that quantity discounts occur in illegal drug markets just like they do for legal commodities (Caulkins and Padman 1993; Caulkins and Pacula 2006).<sup>21</sup> Since most heroin users make purchases below 1 gram (e.g. see Mcsweeney et al. this volume), the amount they end up paying for 1 gram of heroin (over multiple transactions) can exceed the price of a single 1 gram purchase, as typically reported in official documents. Not accounting for the quantity discount would in effect underestimate the amount spent (thereby decreasing the denominator in the first term), which would lead to an inflated estimate of total grams consumed (Caulkins 1994).

The purchase price of an illicit drug as a function of weight is often modelled as a power function with an exponent in the vicinity of 0.7-0.8 (Caulkins and Padman 1993; Caulkins 1994). This example uses an exponent of 0.75:

$$\text{Purchase Price} = \alpha (\text{Purchase size}^{0.75})$$

<sup>18</sup> "In the European sample, about 30% of patients consumed heroin on a regular basis ( $\geq 25$ days), 30% on a moderate level (5 to 24 days) and 40% occasionally ( $< 5$  days) during the last 30 days before being interviewed. Note that in this study all patients were recruited at the beginning of a new treatment episode at the respective treatment facility; however they could have been in treatment in another institution, e.g. a maintenance clinic, during the last months."

<sup>19</sup> The following two paragraphs are reproduced from Kilmer and Pacula (2009).

<sup>20</sup> The assumption here is that consumption in prison is non-existent or much lower than when not incarcerated, even though that might well not be the case.

<sup>21</sup> It is conceivable that, given factors such as enforcement risks and storage costs, quantity discounts in drug markets are higher than for other commodities.

Thus, if we are given the purchase price for 1g (e.g. from the EMCDDA), then  $\alpha$  (the scaling factor) simply equals that purchase price since the parenthetical term in (2) would be 1. For example, if it is believed that 1g of heroin costs €55 on the street, this model would suggest that the price paid for 0.1g would cost €9.78 [= 55\*(0.1<sup>0.75</sup>)]. Indeed, if 0.1g was the typical purchase quantity, then Euros spent per gram acquired would be €9.78, or 78% more than what is typically referred to as the standard price for 1g (97.8/55 = 1.778). If the typical purchase quantity was 0.2 gram, then Euros spent per gram acquired would be €82.2, or about 1.5 times more than the €55 benchmark retail price.

It needs to be added that even after taking into account bulk discounting as discussed above, the model (1) might be susceptible to bias as there might be some correlation between the purity of a purchase and the frequency of purchases.

### Czech Republic

The average price paid per raw gram in the aforementioned expenditure survey was 1,024 CZK, which is roughly €32 Euros circa 2004. Purity estimates reported to the EMCDDA are based on a relatively small number of samples that are submitted to testing facilities.<sup>22</sup> Since some of these samples could be from upper-level transactions, there is a reason to believe that the reported purities may even be larger than what is actually available at the retail level. That said, the 2002 REITOX report noted, "It is possible to claim that police data about retail sales are more readily available and they provide a better picture of the current state of illicit markets than data about wholesale drug prices" (Mravčík et al 2003).<sup>23</sup> For 2004, it is reported that the mean retail price was €32 and mean purity was 12% (Mravčík et al. 2005). This is a sizable drop from the previous years and the 2004 report notes, "The Police National Drug Squad reported cases of sales of very low-purity heroin (5-10%) in 2004; it was sold for approximately €25. On the contrary, the price of a gram of 20% heroin may reach €47."<sup>24</sup> Given that the price paid by the respondents was roughly in line with the price per gram reported by police, we do not apply a discount to purity and assume the retail heroin purity in 2004 was indeed close to 12.5%.

Since we do not have good information about the weight of a typical heroin purchase in these two countries, we generate pure grams per user for two different values which are clearly low and high estimates, but definitely not lower and upper bounds: 0.1g and 0.5g per transaction. This suggests that a reasonable range for past year consumption in the Czech Republic could have been between 11 and 17 grams circa 2004 (table 2).

**Table 2: Generating pure grams consumed in the past year for the Czech Republic and England**

	Mean past week spending *52	Mean retail price per raw gram	Mean retail purity	Typical purchase = 0.1g		Typical purchase = 0.5g	
				Raw grams per user	Pure grams per user	Raw grams per user	Pure grams per user
<b>Czech Republic (2004 CZK)</b>	168,480	1,024	12.5	92.5	11.6	138.4	17.3
<b>England (2006 GBP)</b>	6,708	52	43.5	72.5	31.6	108.5	47.2

**Notes:** Quantity discounts estimated with exponent of 0.75 and calculated as presented in formula (2) above.

However, for 2005, the Czech Focal Point (2006) reported that: "The quality of distributed heroin is often low, around 10%; in such cases, the price is usually CZK 800 to 1,000" (Mravčík et al. 2006, p. 69). Since 1000 CZK was the approximate cost of a gram circa 2002, one could infer that the typical quantity purchased may be close to a gram. It may be a stretch given the fluctuations described in 3.2., but if this correct, then there would be no need for the quantity discount in the Czech Republic. This would increase mean pure grams per user closer to 21 grams per year.

### England

Law enforcement data reported to the EMCDDA suggest that a gram of heroin in 2006 was £52 (€77) and street purity was reported to be 43.5%. The International Drug Monitoring Unit (IDMU) conducts an online survey and survey at festivals to identify prices of various drugs, which provides 'non-law enforcement' based estimates of prices. The price information was very similar to the street prices reported to IDMU: £55.<sup>25</sup> Combining these figures with the other estimates in table 3 suggests a reasonable range for past year consumption in England circa 2006 could have been between 32 and 47 grams.<sup>26</sup>

<sup>22</sup> The National Focal Point does not have information available on the number of samples analysed in 2004.

<sup>23</sup> In addition, it should be noted that Czech price data often come separately for both wholesale and retail.

<sup>24</sup> Whether or not this reduction in purity was attributable to the Afghan poppy cutback or the invasion of Iraq is outside the scope of this paper. For more information on the former, see Paoli et al. (2009).

<sup>25</sup> <http://www.idmu.co.uk/big-hike-in-2010-uk-drug-prices.htm>. Data from IDMU suggests that a typical heroin bag includes about 0.17g.

<sup>26</sup> Since the 2006 and 2011/2012 price per raw gram are roughly similar (Davies et al. 2011), we assume that this discount also applied in 2006.

### 3.3 Estimates of total national consumption

#### **Czech Republic**

Using a range of 12-21g pure heroin consumed per user per year generated above and multiplying it by the number of problem users in the country (9,700) suggests the total pure heroin consumption in the Czech Republic around 2004 was approximately 0.11-0.2 tons. This is largely consistent with Vopravil's total quantity estimate for 2008, when adjusted for purity (Vopravil and Belackova 2012). Of course, this approach assumes that consumption of heroin among occasional users in the general population is negligible as it represents only a small fraction of the overall total. This assumption is also used in other existing literature, which puts the general population's share of total heroin consumption at slightly above 2% (Vopravil 2010). As was the case with the estimates of national expenditures presented in chapter 2, this calculation conceals the fact that some of the 9,700 problem users might be Subutex, rather than heroin users, as discussed in chapter 2.3.

#### **England**

Multiplying the number of PHUs in England (255,044) by the estimated annual consumption of 32g and 47g generated above yields estimates of 8-12 tons of pure heroin consumed annually in England. It should be noted that whereas the estimate of national expenditures was higher in comparison with other existing figures, the estimate of pure heroin consumption fits in the upper half of Pudney et al.'s (2006) estimate for England & Wales: 7 tons +/- 5 tons in 2003/2004.

Our figures are quite similar to numbers derived from the UK's Serious Organized Crime Agency (SOCA). SOCA (2010) estimated that there were 18 to 23 tons of heroin supplied to the United Kingdom in 2008. This figure described heroin at import purity of 67% required to supply the UK market and also included seizures that did not make their way to the retail market. According to the Home Office, 1.5 tons of heroin was seized in 2008/09 in England/Wales (Mulchandani et al. 2010). This suggests an approximate range in pure grams for the UK of 10.5 tons ( $18 \times 0.67 - 1.5$ ) to 14 tons ( $23 \times 0.67 - 1.5$ ). With Scotland and Northern Ireland accounting for 12.4% of UK heroin consumption (Pudney et al., 2006), this suggests an approximate range of pure heroin consumed in England & Wales of 9 to 12 tons.

## 4 Discussion

There are multiple ways to measure the size of the heroin market: number of users, number of problem users, retail expenditures, raw grams consumed, and pure grams consumed. This report focused on total expenditures by PHUs who account for the vast majority of retail transactions. Our estimate for the Czech Republic circa 2004 was slightly more than €50 million and is likely high since some users defined as PHUs were in fact abusing buprenorphine; however, we don't believe this was as much an issue in 2004 as it is today.

Our estimate for England was €2.5 billion circa 2006, and this is larger than the expenditure estimate generated by Pudney et al. (2006). This makes sense since our expenditure figure is based on a group that had recently entered treatment, and we expect their consumption to be near peak levels at intake. Thus, one should consider this figure to likely be a high estimate.

Our expenditure approach also allows us to generate estimates of total pure grams of heroin consumed in these two countries. Our estimates for the Czech Republic and England were 12-21 and 32-47 pure grams, respectively, and the previous caveat about the English figure possibly being inflated since it is based on a treatment population is still applicable.<sup>27</sup> Previous estimates from Paoli, et al. (2009) suggest that the typical PHU in Europe consumes roughly 30 pure grams annually; nearly half the amount assumed by the UNODC (2005; 58 grams). Our calculations are consistent with a benchmark that is closer to the 30 pure grams per year.

In addition, this research exercise has revealed the importance of asking about weekly expenditures of PHUs. For instance, in the seminal study of problem drug users in the Czech Republic (Petros et al. 2005), which remains until today an authoritative source of data on consumption patterns, information on weekly expenditure did not always correspond to a simple multiplication of the volume of weekly consumption by average retail price. This discrepancy suggests that questions targeting weekly expenditures may help reveal other factors in play, such as the need to adjust for quantity discounts.

<sup>27</sup> It is beyond the scope of this paper to assess why the estimate is lower in the Czech Republic, even though one likely explanation is the notable difference in the average purity of retail heroin. It should also be added that the Czech estimates of the number of problem drug users are based on primary drug, which allows for the possibility of heroin users supplementing their abuse with buprenorphine from the black market.

Another factor to keep in mind when assessing the size of drug markets via expenditures is seasonality of drug use as patterns of drug consumption may vary at various times of the year.<sup>28</sup> In such instances, values reported in research literature may depend on when in a given year a particular survey was conducted. While this might not be an issue for this paper in particular – DTORS, the source of data for consumption data in the United Kingdom, was conducted throughout the entire year and is thus unlikely to be affected by any potential variations between seasonal consumption patterns<sup>29</sup> – the possibility that slightly different data might over- or under-estimate long-term consumption needs to be taken into account when imitating calculations presented above.

A consideration should also be given to the impact of substitution treatment on overall consumption patterns. Reductions in heroin consumption while exposed to OST will undoubtedly deliver benefits for the individual user. What is less clear is the broader impact (adverse or otherwise) this avoided heroin consumption will have on the purity and availability of heroin within the market, and the implications of this for those still active as consumers within it. PHUs not engaged in methadone maintenance treatment and other forms of opioid substitution treatment will account for a disproportionately large amount of the illicit heroin consumed in a given market in comparison to general and substitution treatment populations. Removing them, or significantly curtailing their involvement in the market by engaging them in MMT, is likely to considerably undermine its viability and disrupt functionality by removing key operatives from it. Traditionally demand and supply reduction activities have tended to operate in isolation in this regard, but complementary efforts could disrupt functionality to a greater extent (but care needs to be taken to avoid unintended negative consequences and harms). Understanding these mechanisms will require further concerted research in this area.

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<sup>28</sup> See, for instance, a discussion of existing research literature on the topic in Langworthy and McKelvie (2005).

<sup>29</sup> The survey of problem drug users used as a source of Czech consumption data (Petros et al. 2005) was carried out between November and March.

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# Annex 1: More information about estimating the prevalence of problem heroin use in the Czech Republic (authored by Jirka Taylor)

This annex provides some additional details on methods utilised in the Czech Republic to estimate the population of problem opiate/heroin users. As Studnickova and Petrasova pointed out (2011), the Czech Republic differs from the majority of other EU countries in that opiate users are not the dominant group or problem drug users, vastly outnumbered by methamphetamine users. In terms of numbers, there are two available estimates of the population of problem drug users: one provided by the National Focal Point and the other by the Drug Epidemiology Centre in Prague. Both estimates are very similar in their results, even though the latter has a notably larger range.

## **National Focal Point**

The National Focal Points' estimate is regularly presented in annual reports on the state of drugs in the Czech Republic and relies on a multiplier value – proportion of users who are in contact with a low-threshold facility – which is applied to the number of all problem users recorded by low-threshold facilities in the country. Additionally, a capture-recapture methodology is applied in selected years as an auxiliary method, in order to verify the figures estimated with the use of multiplier.

The value of the multiplier is arrived at by a peer-nomination technique, which consists of asking respondents (i.e. low threshold clients) about a) how many people they know well are regular drug users, and b) how many of these have been in contact with a low-threshold centre or outreach programme in the last year. The results are weighted by the size of the population of drug users an individual respondent knows and only respondents who provide a reasonable number of known drug users are included in the calculation.<sup>30</sup> The multiplier is collected for each of the country's 14 administrative regions and its value is updated periodically, with the most recent revision made in 2010. Table B-1 indicates 2010 multiplier values for the entire country, and for the Prague, Usti nad Labem and Plzen regions, which combined account for more than 80% of all estimated PHUs.<sup>31</sup>

**Table A-1: Multiplier values for selected regions and the entire country (2010)**

Region	Mean value	95% CI	
Prague	0.80	0.69	0.91
Usti nad Labem	0.62	0.56	0.68
Pilsen	0.62	0.44	0.79
Czech Republic	0.68	0.65	0.71

(Mravčík et al. 2010, p. 38).

Applying the multiplier value to the recorded number of users who are in contact with low-threshold facilities, it is possible to estimate the total number of PHUs. Table B-2 shows that, after a decreasing trend in the first half of the last decade, the number of problem drug users appears to be on the rise, even though much less so for heroin users. It also demonstrated that Subutex users form an important part of problem users of opiates. The categories of total problem drug users and heroin users are presented with their confidence interval values.

<sup>30</sup> In the case of Czech multiplier surveys, the upper boundary of a 'reasonable' number of known drug users was arbitrarily set as 20 and later increased to 25. Responses in excess of these values are excluded as non-credible.

<sup>31</sup> Multiplier values for 2004 were not reported by the National Focal Point.

**Table A-2: NFP estimations of the number of problem users (2006-2010)**

Year	Total number of problem drug users	95% CI	Problem users of opioids	Subutex users	Heroin users	95% CI
2002	35,100	n/a	13,300	n/a	n/a	n/a
2003	29,000	n/a	10,200	n/a	n/a	n/a
2004	30,000	26,900 – 33,700	9,700	n/a	n/a	n/a
2005	31,800	28,600 – 35,700	11,300	n/a	n/a	n/a
2006	30,200	26,500 - 35,100	10,500	4,300	6,200	5,300 - 7,300
2007	30,900	28,900 - 32,700	10,000	4,250	5,750	5,200 - 6,200
2008	32,500	30,400 - 34,700	11,300	4,900	6,400	5,800 - 7,000
2009	37,400	33,300 - 41,500	12,100	5,100	7,100	6,600 - 7,600
2010	39,200	32,300 - 46,300	11,000	5,000	6,000	5,500 - 6,400
2011	40,200	32,700 – 47,700	9,300	4,600	4,700	4,350 – 6,000

(Mravčík et al. 2012).

As a part of the multiplier survey, clients of low threshold facilities were also asked about the proportion of users they know who are enrolled in a substitution programme. It emerged that 8% (95% CI: 7-10) of all problem drug users and 23% (95% CI: 20-27) of problem opiate users, respectively are in substitution treatment.<sup>32</sup> Applied to the numbers from table B-2 above, this would mean the number of substitution treatment clients is approximately 3,100 (95% CI: 2,600 – 3,700), using the multiplier for all problem drug users, or 2,800 (95% CI: 2,400 – 3,300), using the multiplier for problem opiate users. Importantly, calculations that are based on the amount of Suboxone and Subutex distributed legally arrive at roughly similar estimations, placing the number of substitution treatment clients slightly above 3,000.<sup>33</sup> This similarity of estimates can be thus viewed as a crude cross-validation of the use of the multiplication method.

It needs to be added that there are inherent uncertainties about the value of the multiplier since respondents in multiplier surveys (i.e. clients in contact with low threshold facilities) are not a representative sample of the entire population of problem drug users and there is a high probability that the social networks of people represented in this sample are highly overlapping (Mravčík et al. 2011). As a result, it is possible that in reality the value of the multiplier is somewhat lower than the reported one and, by extension, the number of problem drug users somewhat higher. Public Health Office in Prague, Drug Epidemiology Unit Public Health Office in Prague, in particular its Drug Epidemiology Unit is charged with carrying out the activities of the National Drugs Information System and has been collecting information and data on demand for treatment indicator (both on clients in treatment in general and on first treatment demands) according to EMCDDA guidelines. Based on its data, it publishes annually an estimation of the prevalence of problem drug use in the Czech population. Importantly, these estimates do not abide by EMCDDA definitions of problem use and as such are not recognised by the EMCDDA and are not part of the Czech annual reports to the agency.

In its calculations, the Centre relies on the multiplication method using two in-treatment rates, produced in the framework of an impact analysis of a drug policy reform in 2001 (Zabransky et al. 2001). The first rate was determined using the capture-recapture method in three Czech administrative districts, which yielded the result of 15-20%. The other was established in a quantitative analysis based on the nomination technique to be between 20% and 37%. The Centre for Drug Epidemiology uses the average of the two ITR values and applies it to the number of drug users registered in treatment. The results of its most recent annual report (2010 data)<sup>34</sup> are summarised in table A-3:

<sup>32</sup> Mravčík et al. 2011, p. 55.

<sup>33</sup> According to the Czech Ministry of Health, 3,517g of buprenorphine was distributed to clients with prescriptions in 2009. Using the same assumption as in previous years, (average length of treatment six months, average daily dose 6g), this corresponds to approximately 3,200 users (Ministerstvo zdravotnictví ČR, IOPL (2011) Přehled dovozu a distribuce metadonu a přípravku Subutex a Suboxone v r. 2010. Praha: Ministerstvo zdravotnictví ČR, cited in: Mravčík et al. 2011, p. 52).

<sup>34</sup> The annual report for 2004 is not available.

**Table A-3: Estimation of the number of PHUs (2010)**

	<b>Mean</b>	<b>Max</b>	<b>Min</b>
Registered heroin users	1,436	N/A	N/A
M/C-R in-treatment rate (per Zabransky et al 2001)	17.5%	15.0%	20.0%
M/C-R estimate of problem use population	8,206	9,573	7,180
M/nomination rate (per Zabransky et al. 2001)	28.5%	20.0%	37.0%
M/nomination estimate of problem use population	5,039	7,180	3,881
Average estimate of problem use population	6,622	8,377	5,531

(*Studnickova and Petrasova 2011*).



## Report 3.3

# The impact of opioid substitution treatment (OST) on the European heroin market

Tim McSweeney and Oonagh Skrine

## Abstract

Using a combination of existing and primary data sources, we sought to estimate the impact of opioid substitution treatment (OST), in the form of methadone maintenance treatment (MMT), in contributing towards avoided illicit heroin consumption across four EU Member States. We conservatively estimate that the amount of pure illicit heroin consumed per year, per problem heroin user (PHU) not in MMT is 21.5 grams. Our high estimate is 54.0 grams per year. These are broadly consistent with previous published estimates for annual consumption rates among European PHUs (30.0-58.0 pure grams). Drawing from a wider lower and upper bound range, we then estimate that the amount of pure illicit heroin consumption averted per PHU retained in MMT each month ranges from a conservative estimate of 1.26 grams to a high estimate of 3.09 grams. This compares with estimates for the amount of pure heroin consumed when not engaged in MMT, which ranged from 1.79 to 4.5 grams per month. At an individual level, changes on this scale are equivalent to a 70 per cent reduction in the amount of pure heroin consumed while retained in MMT. Avoided illicit heroin consumption on this scale across a population of 221,452 PHUs assumed to be accessing MMT throughout the four case study Member States is equivalent to between 0.3 metric tons (conservative estimate) and 0.7 metric tons (high estimate) of pure heroin consumption avoided for each month retained in MMT, again drawing these estimates from a wider lower and upper bound range. Extrapolating these estimates across the four case study Member States considered, we conclude that retention in MMT may reduce overall pure heroin consumption by around 30 per cent. The impact of this avoided heroin consumption on broader market dynamics (e.g. the price, purity and availability of heroin), and the implications of this for those still active as consumers within it, is unclear however. Inevitably, given the level of uncertainty around many of our assumptions, the resulting estimates and their ranges are subject to considerable margins of error, and would thus require additional data and sensitivity analyses to further refine them.

## 1 Introduction

Using a combination of existing and primary data sources, here we seek to estimate the impact of opioid substitution treatment (OST), in the form of methadone maintenance treatment (MMT), in contributing towards avoided illicit heroin consumption across four EU Member States - the Czech Republic, England, Italy and the Netherlands. The choice of country and form of OST selected was largely a pragmatic one: determined on the basis of the availability of primary interview and published data with which to quantify this impact (e.g. relating to estimates for the size of the problem opiate using population, numbers in treatment and evidence for the impact of this particular form of OST pre and during periods of exposure). Using these four countries as case studies also ensured a focus on Member States with both high (England and Italy) and low (Czech Republic and the Netherlands) prevalence estimates for problem opioid use (POU) (EMCDDA 2011, p. 74). And as discussed below, more than four-fifths of those accessing OST in these Member States are considered to be in receipt of MMT.

## 2 Evidence for the effectiveness of OST

The evidence in support of OST, and in particular the maintenance prescribing of methadone or buprenorphine (and to a lesser extent heroin and a buprenorphine/naloxone combination), is considerable and persuasive. For instance, we have considered results from nine systematic Cochrane reviews of OST conducted to date (Clark et al. 2002; Faggiano et al. 2003; Mattick et al. 2008, 2009; Minozzi et al. 2008, 2009, 2010; Ferri et al. 2011; Gowing et al. 2011). These have collated results from 128

individual studies involving a total of 30,348 participants (an average of 237 per study; Mdn=163, R=15-1,300). This body of work is informed by the experiences of 22 countries in delivering OST over a 40-year period (with studies published between 1969 and 2010), spanning regions as geographically and culturally diverse as North America (54.1%, n=73), Europe (25.9%, n=35)<sup>1</sup>, Australia (8.9%, n=12), Asia (5.9%, n=8) and the Middle East (5.2%, n=7)<sup>2</sup> (data collected from the United States accounted for more than half (52.6%, n=71) of the evidence base considered, however.). These meta-analyses drew largely on the findings of randomised control trials (RCTs) (61.7%, n=79), with fewer controlled/observational prospective studies (33.6%, n=43), cross-sectional (3.1%, n=4) and case control studies (n=1). And the use of OST was also considered across a range of treatment settings (e.g. inpatient, outpatient and prisons).

In their summary of five Cochrane reviews of OST published in 2003, for instance, Amato and colleagues observed how MMT is more effective than no treatment (waiting list), less effective than l-alpha-acetylmethadol (LAAM) maintenance treatment (LMT), and no different from heroin maintenance treatment (HMT) in reducing rates of illicit heroin use (2005, p. 321).

And as part of their review of the evidence relating to the use of supervised injectable heroin (SIH), drawing upon the results of six RCTs involving in excess of 1,500 patients sampled across six countries over a 15-year period, Strang, Groshkova and Metrebian (2012) estimated that forms of SIH delivered important clinical benefits to around the 1,000 long-term refractory and chronically heroin-dependent individuals across the EU<sup>3</sup>. This included major reductions in the continued use of illicit heroin among those with a poor history of compliance with others forms of OST, such as MMT.

In aggregate, these findings point to the benefits of retention in OST, and in particular MMT, in contributing towards reducing the frequency and intensity of illicit heroin use. These reductions can in turn promote broader physical, social, and behavioural changes and contribute towards greater social integration, with commensurate benefits for both the individual and community (Amato et al. 2005, p. 326). For a recent comprehensive review of OST effectiveness, see Bell (2012).

Yet Farrell and colleagues have remarked recently that “despite the breadth of published evidence, [OST] remains controversial, with some strongly polarised views on the priority of outcomes ranging from stable maintenance to stable abstinence from all drugs” (2012). This situation persists, they argue, despite the use of OST being supported and endorsed by prominent bodies such as the World Health Organization, the UK National Institute for Health and Clinical Excellence, and via more than 20 multilingual guidelines. Faggiano and others contend that “agreement has not been reached about the goal of the treatment [since this] reflects at the moment different ideas on the model of the disease” (2003, p. 3). In their overview of findings from some of the early Cochrane reviews examining the effectiveness of OST, Amato and colleagues observed that despite forms of OST having “been shown to enable dependent heroin users [to] achieve a sustained reduction in their heroin use, at least for the duration of...treatment”, it did so “despite enjoying mixed popularity among heroin users, treatment providers, and policymakers” (2005, p. 322) (cf. Neale 1998; Harris and McElrath 2012).

So despite this body of evidence, controversy still persists about the extent to which OST contributes towards:

1. Facilitating the attainment of ‘recovery’ orientated goals (a debate which has gained prominence in a number of countries in recent years - (see McKeganey et al (2004), Australian National Council on Drugs (2012) and Strang and colleagues (2012) for recent commentaries)
2. Extending opioid using careers (Kimber et al. 2010)
3. Drug-related mortality (e.g. via overdose and/or the diversion of OST medications) (Centers for Disease Control and Prevention 2012; Frisher et al. 2012).

<sup>1</sup> These Cochrane reviews drew upon the results of 14 studies from three of the four case study Member States considered in more detail here: England (n=6), Italy (n=5) and Holland (n=3).

<sup>2</sup> One study involved data collection across seven countries, hence the total number of countries within these regions (n=135) is greater than the number of individual studies cited (n=128).

<sup>3</sup> In addition to the estimated 1,000 EU patients based in Denmark, Germany, the Netherlands, Spain and the UK, Strang and colleagues suggested a further 1,400 chronically dependent heroin users in Switzerland were in receipt of SIH (2012, p. 13).

## 3 Methods

The information used to inform this work was derived from the following sources:

- Existing peer reviewed research
- Contemporary published and unpublished statistics and
- Supplemented with primary data gathered through interviews with heroin users in the relevant Member States.

Further details of the strategies used to recruit these interviewees and information about their characteristics are described in the Introduction of Part I.

Much of the empirical material used was identified via searches of PubMed conducted in July 2012. Search terms deemed relevant<sup>4</sup> were used to identify contemporary research results published between 2008 and 2012. From the 3,209 'hits' (1,368 of which were duplicates) there were 1,841 potentially relevant publications identified. Titles and abstracts were examined in an effort to identify material providing data on the number of days and/or amount of illicit heroin used pre and post-OST admission. This process led to the exclusion of 1,742 matched documents and the identification of 99 potentially relevant studies. Published statistics were identified via a range of sources (principally the EMCDDA) and these are referenced throughout.

## 4 Assumptions

In order to estimate the avoided heroin consumption attributable to OST it was necessary to make a number of informed assumptions relating to the:

- Number of POUs within the four Member States being considered and the proportion of this group thought to be accessing OST and MMT
- Nature and extent of their heroin consumption (frequency, amount and purity) when not accessing MMT
- Nature and extent of any changes in this heroin consumption (frequency, amount, purity) while exposed to and retained within MMT.

There are of course a great many omitted factors and influences which could additionally be used to inform such an estimate, and these caveats are considered in more detail later

### 4.1 Numbers of POUs and rate of OST access

Estimates of problem opiate use (POU) across Europe have been calculated using different definitions and methodologies, covering variable time periods, and so must be interpreted with some caution. (See report 3.2 for a more detailed discussion of the definitions and estimates used by the Czech Republic and England, for example.) Using data from a range of published sources, we have assumed there are 505,173 POUs within the four Member States being considered – ranging from a low of 478,898 to a high of 526,100 users. Details of these estimates, by Member State, are provided in table 1 below.

<sup>4</sup> Search terms included: 'buprenorphine treatment', 'heroin prescribing', 'methadone treatment', 'OST', 'suboxone' and 'subutex'.

**Table 1: Existing estimates for the number of POUs, by case study Member State**

Country	Estimated number of POUs	Range	Year	Source
Czech Republic	6,622 <sup>5</sup>	5,531-8,377	2010	Mravčík et. al., (2011) and Studnickova and Petrasova (2011)
England	262,428	258,782 – 268,517	2008/09	Hay et al. (Undated)
Italy	218,423	197,285 – 231,106	2010	EMCDDA's 2012 Statistical Bulletin (Table PDU-1 Part iii)
Netherlands	17,700	17,300 – 18,100	2008	Cruts and Van Laar (2010)
<b>TOTAL</b>	<b>505,173</b>	<b>478,898 – 526,100</b>		

Based on published EMCDDA data (2011, Table HSR-3), we assume that just over half these POUs (52.6%, n=265,721) are accessing OST, with more than four-fifths of this group in receipt of methadone maintenance treatment (MMT) (83.3%, n=221,452). For the purposes of this exercise the majority of those in MMT are hereafter assumed to be PHUs. These estimates, by case study Member State, are set out below in table 2.

**Table 2: Existing estimates for the number of POUs in OST and MMT, by case study Member State**

Country	Estimated number in OST	As a % of all estimated POUs	Estimated number in MMT (and % of OST cases)	Year
Czech Republic	3,986	60.2%	686 (17.2%)	2009
England	143,219	54.6%	120,889 (84.4%) <sup>6</sup>	2008
Italy	107,892	49.4%	89,968 (83.4%)	2009
Netherlands	10,624	60.0%	9,909 (93.3%)	2009
<b>TOTAL</b>	<b>265,721</b>	<b>52.6%</b>	<b>221,452 (83.3%)</b>	

Source: EMCDDA 2011 Statistical Bulletin (Table HSR-3).

## 4.2 Nature and extent of heroin use pre-OST

Estimates relating to the nature and extent of illicit heroin consumption (i.e. the frequency, amount and purity) immediately prior to accessing OST have been calculated using a combination of primary interview data from face-to-face interviews and published statistics. Data describing patterns of consumption in the period prior to accessing treatment may be atypical, however, should the frequency and/or intensity of use peak during this time. Intake findings from the Australian Treatment Outcome Study (ATOS) noted though that the self-reported frequency of last month heroin use among a sub-sample of respondents not accessing treatment (21.9 days) was higher than that reported by those accessing OST (19.2 days) and residential rehabilitation (17.1 days) (Ross et al 2005, p. 413).

As described in table 3, based on interview data with 126 treatment seekers in the four case study Member States who reported using heroin at least once in the 30 days prior to accessing OST, one assumption is that illicit heroin is consumed by PHUs during 25 days of each 30-day period (equivalent to 83.3 per cent of the days available during this time).

**Table 3: Self-reported frequency of heroin use in the 30 days prior to accessing OST (N=126)**

Country	Average (mean) days heroin reportedly used month prior to accessing OST (N=126)
Czech Republic	23.0 (SD=11.1), n=12
England	24.0 (10.3), n=38
Italy	24.6 (9.6), n=36
Netherlands	27.8 (6.3), n=40

<sup>5</sup> This figure relates to an estimate for the number of PHUs.

<sup>6</sup> This particular estimate may need to be treated with some caution since it has recently been noted that the National Drug Treatment Monitoring System (NDTMS) in England does not distinguish between different forms of OST, or dosage levels (Teather 2010).

These self-reported patterns of heroin use prior to OST admission were compared with published data relating to 41,487 English heroin users screened using the Treatment Outcomes Profile (TOP) (Marsden et al. 2008). As set out in table 4, these data indicated that illicit heroin was used on average during 21.9 days of the last month (equivalent to 78.2 per cent of the time available over the 28-day reference period covered by TOP).

**Table 4: Self-reported frequency of heroin use in the month prior to accessing OST among English treatment seekers reviewed using TOP (N=41,487)**

Average (mean) days heroin reportedly used in the last month	N	Year	Source
22.9	13,542	2008	Marsden et al (2009, p. 1266)
21.9	15,241	2010-11	Roxburgh et al (2011, p. 18-19)
21.1	12,704	2011-12	Roxburgh et al (2012, p. 18-19)

In combination these interview and published data provide us with a range for the estimated frequency of illicit heroin use over a 30-day period by PHUs not in OST: from a low of 21 days during the last 28 (i.e. using heroin during 75 per cent of the available days) to a high of 25 days (using on 83 per cent of the previous 30 days). Taking a higher range figure as our 'best' estimate, we have therefore assumed that PHUs not in OST will consume illicit heroin on 24 days during a 30-day period.

Both this range and 'best' estimate are deemed more conservative than those from other published sources and as a consequence may assist in minimising any potential for bias arising from a tendency for the frequency of heroin use to escalate in the period prior to OST admission. Table 5, below, for example, sets out the average number of days heroin was reportedly used in the month pre-OST entry among 1,096 participants from six countries. These published figures indicated that illicit heroin was used on an average (mean) of 27.2 days in the month prior to treatment (median=27.4, range= 21.2–29.2, SD=1.97).

**Table 5: Average number of days illicit heroin reportedly used in the month pre-OST entry (N=1,096)**

Source	Treatment type	Sample	Country	Mean days heroin used in the month pre-OST
Anglin et al. 2008	Methadone (maintenance)	N=315	USA	21.2 (SD=11.7)
Blanken et al. 2012	Methadone (maintenance)	N=37	Netherlands	26.9 (SD=5.4)
Haasen et al. 2010	Heroin assisted treatment (HAT)	N=59	Germany	27.95 (SD=4.89)
	Methadone (maintenance)	N=48		28.74 (SD=3.91)
Oviedo-Joekes et al. 2010a	Methadone	N=111	Canada	27.4 (SD=5.7)
	Diacetylmorphine	N=115		26.6 (SD=7.3)
Oviedo-Joekes et al. 2010b	Current heroin-assisted treatment (C-HAT)	N=24	Spain	26.8 (SD=7.1)
	Discontinued HAT (D-HAT)	N=18		27.3 (SD=5.5)
	Never received HAT (N-HAT)	N=12		25.6 (SD=9.3)
Schwartz et al. 2011	Methadone (interim)	N=99	USA	29.2 (SE=0.30)
	Methadone (standard)	N=104		29.1 (SE=0.38)
	Methadone (restored)	N=27		29.1 (SE=0.51)
Strang et al. 2010	Injectable methadone	N=42	England	27.0 (SD=4.1)
	Injectable heroin	N=43		28.0 (SD=3.0)
	Oral methadone	N=42		27.5 (SD=3.0)

Using data from in-depth interviews with treatment seeking heroin users we estimate that the average (median) amount (in grams) of illicit heroin consumed on a typical using day by PHUs not in receipt of OST ranges from a low of 0.5 grams to a high of 1.0 gram, with a 'best' estimate of 0.75 grams consumed per using day (see table 6 below).

**Table 6: Self-reported amounts of heroin consumed each using day in the 30 days prior to accessing OST (N=122)**

Country	Median grams of heroin reportedly consumed on a typical using day
Czech Republic	0.50 (SD=1.2; Mean=1.1), n=12
England	0.70 (1.3; 1.0), n=37
Italy	1.0 (1.1; 1.4), n=34
Netherlands	0.75 (0.9; 1.0), n=39

Our mid-range estimate for the amount of heroin consumed on a using day is higher than the 0.25 – 0.5 gram per day of heroin typically used by over half the 406 heroin users interviewed by Parker and colleagues (1987, p. 152) and higher than the figure described by Gossop et al (1988, p. 1160), where 70 per cent of the opiate injectors questioned used less than 0.5 of a gram of heroin each day<sup>7</sup>. This particular study also found no difference between heroin 'chasers' (those consuming the drug by inhalation) (n=32) and injectors (n=44) in the amount of heroin reportedly used on a daily basis.

In contrast to more contemporary research, however, our pre-OST estimate of 0.75 gram of heroin consumed per using day is lower than the 0.88 gram reportedly used by treatment seeking heroin users in Scotland (McKeganey et al. 2009, p. 254) and the one gram used by a sample of Irish heroin users pre-MMT admission (Cox et al. 2007, p. 4).

Though more recent studies have questioned treatment seeking opioid users about the amount of heroin they typically consume (Jones et al. 2009, p. 35), the results have not been published. And since its roll-out in England during 2007, the TOP has contained a question on the average amount of opiates consumed on a using day in the 28 days prior to treatment start, review and discharge. However, this particular information from TOP has never been consistently collated for and reported to the National Treatment Agency in England by local drug treatment providers.

Estimates for the purity of consumed illicit heroin were sourced via the most recently published EMCDDA statistics relating to 5,640 street-level heroin seizures during 2010 across the four case study Member States (but most of these data related to English seizures). These data, as set out in table 7 below, indicated that the purity of heroin seized by police at a local level ranged from 0.1 to 93 per cent, with an average (mean) unweighted purity rate of 32.5 per cent.

**Table 7: Purity of seized street-level heroin<sup>8</sup> during 2010, by Member State (N=5,640)**

Country	Mean purity level	Purity level range	N	Source
Czech Republic	24.6	1.4 – 70.1	51	EMCDDA's 2012 Statistical Bulletin (Table PPP-6 Part i)
England	34.9	0.1 – 93.0	5,528	
Italy	26.0	2.4 – 48.0	37	
Netherlands	44.5	1.0 – 69.0	24	

Using these data as the basis for estimating the purity of heroin consumed by PHUs may be problematic for two reasons, however. Firstly the range in purity levels is considerable and the period in question coincides with reports of sharp reductions in heroin availability in some parts of the UK, Ireland and mainland Europe from late 2010 (as discussed above). In England and Wales, for instance, the purity of heroin seized by both local police and border security fell between 2009/10 and 2010/11 by 14 and 13 percentage points respectively (Coleman 2011, p. 16). In contrast to the EMCDDA estimates, heroin seizure data from local police forces (who are responsible for making 99% of all seizures) in England and Wales, using 32 observation points over an eight-year period, indicated average purities ranging from 16 to 52 per cent<sup>9</sup>, with an average (median) purity level of 42 per cent (ibid, p. 30).

However, we have opted to use a more conservative estimate for heroin purity based around the interquartile range<sup>10</sup> published by the EMCDDA, with the distribution of mean purity levels varying from 16.8 to 33.2 per cent (low and high estimate respectively), with a mid-range estimate of 25 per cent purity ('best' estimate) (EMCDDA 2011, p. 72).

<sup>7</sup> 19 per cent of respondents informing the work of Parker and colleagues reportedly used 0.5–0.75g each day; 11 per cent used over 0.75 g per day.

<sup>8</sup> Purity estimates for the Czech Republic relate to 'brown' heroin. The type of heroin seized in the remaining sample Member States is 'undistinguished'.

<sup>9</sup> These purity levels over this eight-year period were lowest for samples submitted for analysis in January to March 2010/11 and peaked during the same period in 2007/08.

<sup>10</sup> This refers to the range of the middle half of the reported data.

Using the ranges described above relating to the perceived frequency of illicit heroin use, the amount consumed and corresponding purity levels, the volume of pure heroin consumed in each month not in OST is estimated to range from 1.79 to 8.25 grams, with a mid-range estimate of 4.5 grams. Given uncertainties about the plausibility of the upper range, the low and mid-range have instead been used to form the basis of what we consider to be conservative and high estimates, respectively. Needless to say both presuppose stability in the frequency, amount and purity of illicit heroin being consumed over this period. The details are set out in table 8 below.

**Table 8: Conservative and high estimates of heroin consumption among PHUs not accessing OST in four case study Member States**

Assumption	Conservative estimate	High estimate
Frequency (days) of use last month	21	24
Amount (grams) used per day	0.5	0.75
Purity	17%	25%
Pure grams of heroin consumed per month per PHU <sup>11</sup>	1.79	4.5
Pure grams of heroin consumed per year per PHU <sup>12</sup>	21.5	54

Our conservative estimate for the pure grams of illicit heroin consumed per year, per PHU (21.5g) is lower than the (30.0g) estimate for European PHUs produced by Paoli, et al. (2009, p. 263), which was not calculated based on assumptions about consumption patterns in the period immediately prior to accessing OST. Our high estimate (54.0g), by contrast, is more in line with that previously proposed by the UNODC for European heroin users (58.0g) (ibid; and referred to in the 2012 World Drug Report).

### 4.3 The nature and extent of any change in heroin consumption while exposed to and retained within OST

Estimates relating to the impact of OST on the nature and extent of illicit heroin consumption (i.e. the frequency and amounts used) while exposed to such interventions have been calculated using a combination of primary interview data and both published and previously unpublished statistics. Using published data from 1,386 PHUs in receipt of methadone from six countries revealed that the scale of reported reductions in illicit heroin use falls by between 11 and 91 per cent at different points during the course of a treatment 'journey'. These results, set out in table 9 below, illustrate how the benefits of methadone in this regard would appear to be greatest during the early stages of treatment, but that this impact may diminish markedly over time.

<sup>11</sup> Based on a 30-day month.

<sup>12</sup> Or 360 days.

**Table 9: The self-reported impact of methadone on the frequency of heroin use (N=1,386)**

Reference	Treatment	Sample	Country	Mean days used pre-OST	Mean days used at first follow-up	% change
Schwartz et al. 2011	Methadone (interim)	N=99	USA	29.2	At 4-month	
					2.6	-91.1%
	Methadone (standard)	N=104		29.1	3.7	-87.3%
	Methadone (restored)	N=27		29.1	2.8	-90.4%
Anglin et al. 2008	Methadone (maintenance)	N=315	USA	21.2	At 6 months	
					5.5	-74.1%
Blanken et al. 2012	Methadone (maintenance)	N=37	Netherlands	26.9	At 6 months	
					24.0	-10.8%
Haasen et al. 2010	Methadone (maintenance)	N=48	Germany	28.74	At 6 months	
					7.0	-75.6%
Cox, Comiskey and Kelly 2007	Methadone	N=167	Ireland	(Last 90) 57.4	At 12 months	
					15.4	-69.0%
Gossop et al. 2000	Methadone (maintenance)	N=333	England	(Last 90) 57.4	At 12 months	
					24.0	-58.2%
	Methadone (reduction)	N=145		(Last 90) 70.2	30.4	-56.7%
Oviedo-Joekes et al. 2010	Methadone	N=111	Canada	27.4	12 months	
					12.0	-56.2%

As described in table 10, an alternative estimate can be developed using interview data with those respondents providing information about the frequency of illicit heroin consumption in the 30-day period immediately prior to commencing both OST and interview (N=74). These data provided us with another potential range for the estimated impact of OST on the frequency of illicit heroin use: from a low of 25 per cent to a high of 52 per cent reduced days of heroin use per month. This equates to an unweighted mid-range estimate for the number of heroin using days falling by 43 per cent while exposed to OST.

**Table 10: Changes in the reported frequency of illicit heroin consumption in the 30 days prior to accessing OST and interview (N=74)**

Country	Average (mean) days heroin reportedly used in month prior to OST (t1)	Average (mean) days heroin reportedly used in month prior to interview (t2)	Average (mean) weeks between t1 and t2	% change
England (n=33)	26.5 (SD=7.2)	14.4 (9.7)	5.5 (7.8), n=30	-45.7%
Italy (n=19)	27.4 (6.7)	20.6 (12.1)	147.8 (226.7), n=19	-24.8%
Netherlands (n=22)	29.1 (3.3)	13.9 (11.7)	419.5 (414.1), n=17	-52.2%

Given the length of time that both the Italian and Dutch respondents had been in OST at the point of interview, their ability to accurately recall patterns of behaviour after many years is likely to be questionable. That said, the frequency of heroin use reported in the period prior to accessing MMT is entirely consistent with other data presented above. The size of the sample though clearly limits the generalisability of these data.

These self-reported patterns of heroin use pre-OST admission and beyond were again compared with published data relating to 41,487 English heroin users screened five months into treatment using TOP<sup>13</sup>. As set out in table 11, these data revealed reductions in the frequency of illicit heroin consumption whilst retained in OST (which in an English context will predominantly be MMT), ranging from 64 to 72 per cent.

**Table 11: Self-reported frequency of heroin use in the month prior to accessing OST and pre-initial care plan review using TOP, among PHUs (N=41,487)**

Average (mean) days opiates reportedly used in the month pre-OST	Average (mean) days opiates reportedly used in the month pre-initial TOP review	% change	N	Year	Source
22.9	8.3	-63.8	13,542	2008	Marsden et al. (2009, p. 1266)
21.9	6.4	-70.8	15,241	2010-11	Roxburgh et al. (2011, p. 18-19)
21.1	5.9	-72.0	12,704	2011-12	Roxburgh et al. (2012, p. 18-19)

In contrast to the findings presented in table 9, above, which indicated that the impact of OST may diminish over time, previously unpublished TOP data made available for this research<sup>14</sup> describing patterns of self-reported heroin consumption in the 28 days prior to OST admission and discharge among 36,000 patients accessing this support in England over a five-year period (between 2007/08 and 2011/12), suggests a greater degree of stability in the impact of OST on the frequency of illicit heroin use over the medium and longer-term.

While these data have not been adjusted to reflect the impact of different treatment modalities delivered in combination, and are biased towards outcomes reported for planned treatment discharges, they point towards a more modest five percentage point difference in the rate of reduction reported by those discharged after 5.5 months in treatment, when compared with PHUs spending 20 months engaged in OST prior to their subsequent discharge.

As set out in table 12, self-reported illicit heroin use fell by 73 per cent among the 36,000 problem users admitted to OST in England since 2007, and subsequently discharged from it after spending, on average, one year in treatment.

**Table 12: Changes in self-reported use of heroin among patients accessing OST in England, 2007-2012 (N=36,022)**

Year of admission	N	Frequency of reported heroin use in the last 28 days						Difference (mean, 95% CI, % change)			Days in OST (mean, median, standard deviation)		
		Days used pre-OST admission (mean, median, standard deviation)			Days used pre-OST discharge (mean, median, standard deviation)			M	95% CI	%	M	Md	SD
		M	Md	SD	M	Md	SD	M			M	Md	SD
2007-08	3,496	20.6	28.0	10.9	6.4	0	10.6	14.2	13.7-14.6	-69	607	456	482
2008-09	8,989	19.6	28.0	11.5	6.1	0	10.3	13.5	13.2-13.8	-69	501	382	402
2009-10	9,820	19.3	28.0	11.7	5.0	0	9.6	14.4	14.1-14.6	-74	391	323	288
2010-11	8,678	17.7	28.0	12.3	3.8	0	8.5	13.9	13.6-14.2	-78	282	238	199
2011-12	5,039	16.2	22.0	12.5	4.2	0	8.8	12.0	11.7-12.4	-74	168	147	109
<b>TOTAL</b>	<b>36,022</b>	<b>18.7</b>	<b>28.0</b>	<b>11.9</b>	<b>5.0</b>	<b>0</b>	<b>9.6</b>	<b>13.7</b>	<b>13.5-13.8</b>	<b>-73</b>	<b>382</b>	<b>271</b>	<b>338</b>

<sup>13</sup> The average (mean) time between initial and follow-up TOP review was 18.8 weeks (SD=6.6).

<sup>14</sup> We are very grateful to Brian Eastwood, TOP Implementation Manager, and the National Treatment Agency for making these data available to us.

Taken together, these interview and published and unpublished data provide the basis for proposing a range for the estimated reduction in the frequency of illicit heroin use while exposed to OST: from a low of 25 per cent to a high of 72 per cent. Taking the mid-point between this range as our 'best' estimate, we therefore assume that PHUs accessing and retained within OST will reduce the frequency of their illicit heroin consumption by 49 per cent.

Research by Keen and colleagues in Ireland has also demonstrated how the average number of daily heroin using episodes falls significantly while exposed to MMT: from 3.02 (SD=1.73) at baseline, to 0.32 (SD=0.76) at three months and 0.22 (SD=0.54) by 12 months (2003, p. 464).

We were only able to locate one published research study describing the impact of OST on the amount of heroin consumed by PHUs. Data from the Research Outcome Study in Ireland (ROSIE) reported that in the 12 months after admission to MMT, the average (mean) reported amount of heroin consumed per using day among 167 respondents fell by 70 per cent: from 1.0 gram (SD=1.0) in the month prior to treatment intake to 0.3 gram (SD=0.7) at one-year follow-up (Cox, et al. 2007, p. 4).

In the absence of data from other sources, our estimates in relation to this are also informed using the findings from in-depth interviews with heroin users reporting changes in the amounts of heroin being consumed in the period prior to both OST admission and interview (N=69). Respondents from three countries reported impacts ranging from no change to a 77 per cent reduction in the amount of heroin being consumed on a using day while exposed to OST (these serve as our low and high estimates respectively). This range therefore provides a 'best' or mid-range estimate of a 39 per cent reduction in the average amount of heroin consumed which is attributed to OST (see table 13 below).

**Table 13: Self-reported changes in the amount of heroin consumed each using day in the month prior to accessing MMT and pre-interview (N=69)**

Country	Average (median) grams of heroin consumed on typical using day pre-MMT	Average (median) grams of heroin consumed on typical using day pre-interview	% change
England (n=33)	0.75 (SD=1.4; M=1.0)	0.40 (0.7; 0.6)	-47%
Italy (n=19)	1.0 (1.2; 1.8)	1.0 (1.2; 1.4)	0%
Netherlands (n=17)	1.0 (1.2; 1.3)	0.23 (0.5; 0.4)	-77%
<b>TOTAL (N=69)</b>	<b>1.0 (1.3; 1.3)</b>	<b>0.50 (0.9; 0.8)</b>	<b>-50%</b>

We have also assumed that the ranges for heroin purity remain stable and apply the low (17%), mid (25%) and high (33%) estimates for the distribution of mean purity levels described above. Triangulating these ranges relating to the assumed nature and extent of illicit heroin consumption while exposed to and retained in MMT, the parameters of our estimates are set out below, in table 14.

**Table 14: Estimates and assumptions about the frequency, amount and purity of illicit heroin consumed per month whilst retained in MMT**

	Low estimate	Mid estimate	High estimate
Frequency (days) of heroin use per month retained in OST	Is reduced by 25%	Is reduced by 49%	Is reduced by 72%
Amount (grams) consumed per day while retained in OST	Remains unchanged	Is reduced by 39%	Is reduced by 77%
Purity of heroin consumed	17%	25%	33%

## 5 Estimated impact of MMT on avoided illicit heroin consumption

On the basis of these assumptions we estimate that the amount of pure illicit heroin consumption averted per PHU retained in MMT each month ranges from 0.45 grams to 4.21 grams, with a conservative estimate of 1.26 grams and a high estimate of 3.09 grams. This compares with estimates for the amount of pure heroin consumed when not engaged in MMT, which ranged from 1.79 to 4.5 grams. At an individual level, changes on this scale are equivalent to a 70 per cent reduction in the amount of pure heroin consumed while retained in MMT. Details of these estimates for the amount of averted pure heroin consumption attributable to MMT are provided in table 15, below. Using these estimate ranges, a 95 per cent confidence interval for the amount of pure heroin consumption averted per PHU retained in MMT each month ranged from 0.75 and 2.63 grams, based on 400 random draws using a Monte Carlo simulation<sup>15</sup>.

Avoided illicit heroin consumption on this scale across the 221,452 PHUs considered to be accessing MMT throughout the four case study Member States is equivalent to between 0.1 and 0.9 metric tons of pure heroin consumption avoided for each month retained in MMT<sup>16</sup>, with a conservative estimate of 0.3 metric tons and a high estimate of 0.7 metric tons per month.

Extrapolating these estimates across the four case study Member States considered, we conclude that retention in MMT may reduce overall pure heroin consumption by around 30 per cent. Assuming 221,452 PHUs from a wider population of 505,173 were in receipt of MMT across these four Member States, total monthly consumption of pure heroin is estimated to have reduced by between 0.28 and 0.69 metric tons, from an estimated total of between 0.9 and 2.3 metric tons consumed (see table 16).

**Table 15: Estimating averted monthly heroin consumption among PHUs retained within MMT**

Assumption	Conservative estimate			High estimate		
Frequency (days) of heroin use in the month pre-OST admission	21			24		
Frequency (days) of heroin use per month during OST (low, 'best' and high estimates of OST impact)	15.75	10.29	5.88	18.0	12.24	6.72
Amount (grams) used per day pre-OST	0.5			0.75		
Amount (grams) used per day during OST (low, 'best' and high estimates of OST impact)	0.5	0.305	0.115	0.75	0.46	0.17
Purity	17%			25%		
Pure grams of heroin consumed per month, per PHU not in OST <sup>17</sup>	1.79	4.5				
Pure grams of heroin consumed per month, per PHU in OST (low, 'best' and high estimates of OST impact)	1.34	0.53	0.11	3.38	1.41	0.29
Averted pure heroin consumption per PHU in OST, per month (grams)	0.45	1.26	1.68	1.12	3.09	4.21

<sup>15</sup> The relevant cut-offs for the simulation were set at 10% (0g reduction), 35% (1g reduction), 30% (2g reduction) and 25% (3g reduction).

<sup>16</sup> Gossop and colleagues (2000, p. 278) found that 85 per cent of the 478 NTORS participants accessing OST were retained in this treatment one-month after intake.

<sup>17</sup> Based on a 30-day month.

**Table 16: Estimated averted pure heroin consumption among PHUs retained within MMT per month across four case study Member States (N=505,173)**

	Estimated amount of pure heroin consumed per month (grams)	Total grams (g)	Total metric tons (mt)	Total grams (g)	Total metric tons (mt)
Total consumption (no MMT) N=505,173	1.79g	904259.67g	0.904mt		
	4.5g			2273278.5g	2.273mt
		Conservative estimate of MMT impact		High estimate of MMT impact	
Total consumption (no MMT) n=283,721	1.79g	507860.59g	0.507mt		
	4.5g			1276744.5g	1.276mt
n=221,452 (in MMT)	0.53g	117369.56g	0.117mt		
	1.41g			312247.32g	0.312mt
Averted consumption	Amount	279029.52g	0.279mt	684286.68g	0.685mt
	Percentage change		-30.9%		-30.1%

## 6 Caveats

Attempts to estimate the impact of MMT provision on avoided illicit heroin consumption in four Member States were constrained by a number of limitations which are important to consider when interpreting these results. The available POU estimates from each Member State and published by the EMCDDA, which form the basis of many calculations, used different definitions and methodologies, and covered variable time periods, for instance. For a more detailed discussion of the definitions and estimates used by the Czech Republic and England, for example, see report 3.2 Sizing national heroin markets in the EU, above.

The administrative data used to inform our estimates relating to both the frequency of illicit heroin use and the impact of OST, and MMT in particular, are largely derived from English sources. While these represent some of the largest and most consistently collated datasets available throughout the EU, care must clearly be taken in extrapolating the results from one country to other diverse contexts and settings. Yet the TOP data are particularly useful in this respect, since as Amato and colleagues have previously observed in relation to existing Cochrane reviews, “[r]eporting results of urinalysis was quite varied or heterogeneous among the original studies included...making overall meta-analysis of heroin use during treatment difficult to carry out” (2005, p. 324).

Nevertheless, self-report accounts of the frequency and amount of heroin consumed in the period prior to OST may be atypical, and represent an inflated pattern of use which peaked in the period immediately prior to treatment admission (e.g. see Turnbull et al. 2000, p. 67; cf. Ross et al 2005, p. 413). However, data from studies exploring self-reported patterns of heroin use over a longer 90-day recall period can produce mixed results in this regard, as illustrated in table 17 below.

**Table 17: Monthly heroin use days averaged over a 90-day recall period (N=645)**

Source	Treatment type	Sample	Country	Mean days heroin used in 90 days pre-OST	Average heroin use days per month
Cox, et al., 2007	Methadone (maintenance)	N=167	Ireland	49.8 (SD=35.9)	16.6
Gossop et al. 2000	Methadone (maintenance)	N=333	England	57.4 (SD=36.7)	19.1
	Methadone (reduction)	N=145		70.2 (SD=31.6)	23.4

The data sources themselves also have their own inherent limitations (see Marsden et al. (2002, p. 1269) for a discussion of some of the constraints associated with the use of TOP data, for example). And our primary interview data on the frequency and volume of heroin consumption were generated via (very) small, non-representative samples of treatment seekers.

Our analysis is also insensitive to important variations in OST provision within and between different Member States in relation to:

- The accessibility and implementation of MMT
- Differences in MMT dosage and duration
- Rates of retention, unplanned exit and planned discharge from MMT; and
- The affects of mortality, diversion and imprisonment.

## 6.1 The accessibility and implementation of MMT

In terms of the accessibility and implementation of OST, Cook, et al. have recently remarked that “even where OST is available, several factors influence the effective utilisation of services. Long waiting lists, limited treatment slots, strict adherence policies, and an unwillingness of general practitioners to prescribe OST” all impact upon the effectiveness of substitute prescribing options (2010, p. 49). The restrictions and inconvenience of daily dosing can also serve as a barrier to engagement for some PHUs.

Affects at an agency-level have also been shown to exert considerable influence over outcomes relating to continued heroin use. As Gossop and colleagues documented during the English National Treatment Outcome Research Study (NTORS), “clients in the ‘best’ performing agencies showed reductions in heroin use which were three times greater than those of the ‘worst’ performing agencies within the same modality...One...implication is that the variation in outcomes within the treatment modalities may be as great or even greater than the variation between different types of modalities” (1998, p. 45).

Concerns have also been raised about the extent to which MMT and methadone reduction regimes (MRT) are delivered as intended. NTORS again found no significant differences in mean dosage levels at intake and after one-year between those receiving MMT (48.5 vs. 52.3) and MRT (48.7 vs. 44.7) options (Gossop et al. 2000, p. 278).

## 6.2 Differences in dosage and duration

Following their assessment of the evidence assembled to inform five Cochrane reviews of OST, Amato and colleagues concluded that “*[h]igh doses of methadone are more effective than medium and low doses...[and] MMT at appropriate doses is the most effective in retaining patients in treatment and suppressing heroin use*” (2005, p. 321). Methadone doses ranging from 60 to 100 mg/day have been showed to be more effective than lower doses in retaining patients and reducing use of heroin during treatment (Faggiano et al. 2003; see also Rhoades et al. 1998).

Yet low or restricted dosage, poor induction regimes and the duration of OST have all been shown to have a detrimental effect on programme retention rates (Mattick et al. 2008, p. 3; Faggiano et al. 2003, p. 9). Again Amato et al have observed how “*[d]oses of methadone used in RCTs are probably higher than those used in routine clinical practice in some parts of the world, which might negatively affect the effectiveness of methadone treatment in clinical practice...For instance, in Italy, mean doses of maintenance therapy is 40 mg/day...whereas the best average dose and a dose where clinical effects are likely to be more obvious is 60 mg*” (2005, p. 326).

## 6.3 Rates of retention, unplanned exit and planned discharge from MMT

In all but one of the Member States considered were we able to locate routinely collated information on rates of retention, unplanned exit and planned discharge from forms of OST. In England, for example, two-thirds (67%, n=100,729) of those in continuous OST during 2011/12 (N=149,994) had been in receipt of this treatment for a year or more. Nearly one in four (23%, n=33,910) had received this OST for five years or longer (Roxburgh et al. 2012, p. 13).

Of the 181,504 heroin users who had accessed OST in England up to 1st April 2008, more than half (54%, n=98,211) had been retained in this treatment by 1st April 2011. Thirty per cent (n=55,161) were recorded on the national drug treatment monitoring system (NDTMS) as having had an unplanned exit from treatment during this time and 16 per cent (n=28,132) were discharged from treatment ‘successfully’, having been judged by a clinician not to be using illicit heroin (National Treatment Agency 2012, p. 12).

This level of 'successful' discharge was consistent with the annual remission rate (the proportion expected to become abstinent or non-dependent each year) for heroin misusers, which Calabria and colleagues estimated ranged from 9 per cent to 22 per cent, based on data from 10 international longitudinal studies (2010) (cf. Termorshuizen et al. 2005; Bloor et al. 2008; Grella and Lovinger 2011).

By contrast, Bell (2012) has recently reviewed findings from the TOPS (Treatment Outcome Prospective Study), NTORS and ATOS (Australian Treatment Outcome Study) research studies and described how across the three cohorts, 25 to 35 per cent of heroin users followed up reported continued use three to five years after beginning their index treatment, but with repeated episodes of treatment during this time being the norm.

## 6.4 Mortality

Though both treatment in its broadest sense and forms of OST delivered for a sufficient period of time (i.e. approaching or exceeding 12 months) have been shown to offer a protective effect against mortality among POUs (Kimber et al. 2010; Cornish et al. 2010; Degenhardt et al. 2011), the effect of OST dose on mortality is unclear (Faggiano et al. 2003, p. 9). And while "[m]ortality is rarely reported in RCTs of [OST] and is seldom taken into account to assess the efficacy of treatments" (Amato et al. 2005, p. 326), most cohort studies indicate mortality rates ranging from one to two per cent per year among POUs (EMCDDA 2011a).

## 6.5 Diversion

The extent and rationale for the diversion of OST, either to the illicit market or for personal use, are complex and varied (Fountain et al. 2000). The extent of diversion has been shown to vary markedly for different types of OST, with rates in one setting shown to be comparatively low for MMT clients versus those in receipt of buprenorphine, for example (Winstock et al. 2008; cf. Davis and Johnson 2008). Nevertheless diversion of this sort is considered an important contributory factor in both fatal and non-fatal poisonings and significantly diminishes the impact of approaches like MMT (see Duffy and Baldwin (2012) for a recent English case study).

## 6.6 Imprisonment

In one of the case study Member States it has been estimated that as many as one half of new receptions to prison each year are problem drug users (UKDPC 2008, p. 7). Persistence of heroin use is common while incarcerated: in one study 70 per cent of those using heroin in the month prior to imprisonment reported continued use while in custody (Strang et al. 2006). Disruption of OST continuity due to (often brief) periods of imprisonment has also been shown to result in very significant increases in harm (Larney 2010; Hedrich et al. 2012). And while forms of OST are provided in at least some prisons in 23 European jurisdictions (and in all four case study Member States considered here) (Cook et al. 2010, p. 44-45), problems relating to equivalence of access and standards of care persist (Larney and Dolan 2009). Delivered at appropriate doses in custodial settings, these interventions have been shown to reduce heroin consumption and deliver benefits commensurate with those observed in community settings, however (Hedrich et al. 2012).

None of these important influences are adequately captured by our estimates of the impact of OST on avoided illicit heroin consumption, and additional data and sensitivity analyses would therefore be required in order to further refine them. Simulations would prove particularly useful in this regard in order to produce more accurate bounds (see Chalmers et al. 2009) for a recent example of such work in an Australian context).

## 7 Conclusions

Using different sources we have developed and proposed a range of basic estimates for the amount of illicit heroin consumed by PHUs on an annual basis (21.5 - 54.0 pure grams). These in turn are broadly consistent with previous published estimates for annual consumption rates among European PHUs (30.0 - 58.0 pure grams).

Based upon a number of empirically informed assumptions about the impact of MMT on the nature and extent of illicit heroin use, and extrapolating to a PHU population of 221,452 assumed to be accessing MMT throughout four case study Member States, the magnitude of avoided (pure) heroin consumption attributable to retention in MMT for one month could, we conservatively estimate, be in the order of 0.3 metric tons (ranging from 0.1 to 0.9 tons).

Inevitably, given the level of uncertainty around many of our assumptions, the resulting estimates and their ranges are subject to considerable margins of error, and would thus require additional data and sensitivity analyses to further refine them. Nevertheless exercises of this sort can be particularly useful as the basis for informing further work around other important issues, such as undertaking comparative assessments of different policy options (Moore, et al. 2007). Relevant examples might include modelling averted pure heroin consumption attributable to OST as a share of pure heroin imported to EU markets, and/or seized by law enforcement agencies (cf. McKeganey et al. 2009). Such work could have important policy and practice implications against a backdrop of significant cuts to public sector budgets across the EU.

While undertaking comparative assessments of this sort was beyond the scope of the current paper, merely extrapolating our monthly estimates of averted heroin consumption over a 12-month period would inflate the impact of OST. This is due to the absence of reliable data with which to adjust for rates of retention, unplanned exit and planned discharge from OST over the longer term, both within and between countries, and uncertainties about the impact of these on illicit heroin consumption. Furthermore, with regards to estimating the share of pure heroin imported to EU markets, there remains considerable uncertainty about the amount of opium produced annually that is actually converted to heroin (EMCDDA and Europol 2013, p. 26).

Consistent with the arguments put forward by Killias and Aebi (2000) in relation to the impact of heroin prescribing on the Swiss heroin market, PHUs not engaged in MMT and other forms of OST will account for a disproportionate amount of the illicit heroin being consumed in a given market. Significantly curtailing their involvement in it via engagement with MMT and other evidence-based forms of OST, is likely to considerably undermine the market's viability and disrupt functionality by removing or displacing key players from it (see also Reuter and Pollack 2006).

Traditionally, demand and supply reduction activities have tended to operate in isolation in this regard, but there is a growing recognition that complimentary demand and supply reduction efforts could disrupt functionality to a greater extent (but care also needs to be taken to avoid unintended negative consequences and harms) (McSweeney, et al. 2008; Caulkins and Reuter 2009; McGallagly and McKeganey 2012).

Reductions in heroin consumption while exposed to OST will undoubtedly deliver benefits for the individual user. What is less clear is the wider impact, adverse or otherwise, this avoided heroin consumption will have on broader market dynamics (e.g. the price, purity and availability of heroin), and the implications of this for those still active as consumers within it.

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# Report 4

## Estimating the size of the EU cannabis market

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### Abstract

Estimates of the size of the EU cannabis market vary widely, with figures ranging from €15 billion to €35 billion per year. An important source of uncertainty is the limited information available about typical quantities consumed by different types of users. Indeed, some studies focused on the EU or specific Member States rely on studies of cannabis users outside of the EU. This report generates estimates of retail cannabis expenditure in the EU using new data about cannabis consumption and expenditures from a web survey conducted in seven Member States: Belgium, the Czech Republic, Italy, Netherlands, Portugal, Sweden, and the United Kingdom (n=4,156). Combining insights from these surveys with data collected by the EMCDDA about cannabis prevalence, frequency, and prices, this report suggests the market may be considerably smaller than previously estimated. Calculations here suggest a range of approximately €7 billion to €10 billion annually circa 2010 before accounting for the "consumption gap" that is created when data from general population surveys are used to measure substance use. Evidence from the alcohol literature suggests that true consumption can be as much as double that estimated from general population surveys. Thus, these estimates are likely low. Information about the type of cannabis consumed (herbal versus resin) across countries is scant, but if the new estimates published by the EMCDDA (2012) are correct, they suggest that roughly 50-65% of all cannabis consumed in the EU is resin. In addition to generating figures that should be of interest to policymakers, the analyses presented here make important methodological contributions. For example, we demonstrate that since consumption intensity (grams per day of use) is positively correlated with consumption frequency (days used per month), multiplying the average number of use days by the average number of grams consumed per use day generates consumption figures that are lower than the correct approach of multiplying each individual's days consumed and daily consumption figures and then averaging across individuals only after that multiplication.

## 1 Introduction

There are several reasons why decision makers want to know how much cannabis is used in the EU and how much users spend on it. First, information about expenditures helps put the trade in context compared to legal (e.g. alcohol, tobacco) and other illegal industries. Second, it provides insight about the revenues being generated by criminal traffickers. This is not only of interest to law enforcement agencies, but also to those who seek to implement drug policy reforms that could reduce criminal proceeds. Third, knowing cannabis expenditures and amounts consumed is necessary, but not sufficient, information for projecting the consequences of alternative regulatory regimes (e.g. tax revenues that might be collected if cannabis were legalised and regulated).

Estimating the size of an illegal market is challenging. Since it is impossible to pull figures from official financial statements, it is difficult to generate precise estimates. However, understanding of the EU cannabis market has improved greatly in the past decade as we have learned more about who uses cannabis and how much they use (UNODC 2006; EMCDDA 2009; EMCDDA 2012). Indeed, our web survey conducted in the seven sample Member States and introduced elsewhere (Van Laar et al, part I, report 1) pushes the frontier of our knowledge about cannabis consumption in the EU, and arguably elsewhere.

This report presents new estimates of the total amount of cannabis consumed in the EU circa 2010 and how much money was spent on that cannabis. These figures are based on information Member States report to the EMCDDA as well as insights from our survey of cannabis users. In addition to providing these estimates, the analyses presented here make a number of contributions to the literature. First, we find that if we place all past-month users into four frequency groups and then calculate the total amount of cannabis consumed by use group in each sample Member State, there are important similarities across a number of Member States. This has implications for imputing consumption for other Member States. Second, we show that consumption intensity (grams per day of use) is positively correlated with consumption frequency (days used per

month). Hence, multiplying the average number of use days by the average number of grams consumed per use day generates consumption figures that are lower than the correct approach of multiplying each individual's days consumed and daily consumption figures and then averaging.<sup>1</sup> The latter is preferred and can now be estimated using the data from our web survey; thus increasing what our estimates would have been if we used the other, more traditional method. Third, we observe that respondents' descriptions of the share of cannabis expenditures that is resin versus herbal varies considerably across the seven sample Member States, from near zero in Bulgaria to essentially half in Portugal and Sweden. Among individuals within any given country there is a positive association between herbal use and resin use, yet at the aggregate level, herbal consumption is essentially uncorrelated with aggregate resin consumption. Rather, resin versus herbal market share may be driven by other (e.g. supply) factors, so in producing the EU-wide consumption estimates we incorporate EMCDDA (2012) estimates of the resin versus herbal market split for each country.

This report begins with a brief review of previous estimates of the cannabis market in the EU and abroad<sup>2</sup>. Chapter 3 describes the data used in the analyses and justifies our focus on consumption by those who reported using cannabis in the past month. Chapter 4 presents our findings about total cannabis consumption and one estimate of cannabis expenditures circa 2010 in the EU, and chapter 5 presents an alternative estimate of expenditures.

## 2 Background

There are a growing number of studies sizing cannabis markets in Europe and abroad. Table 1 presents selected retail cannabis market estimates for individual countries, regions, and the world. Each study relies on idiosyncratic assumptions, which has led to dramatically different estimates even within the same country. The UNODC (2005) estimates that the world retail market for cannabis was about €125 Billion circa 2003; more than the retail markets for cocaine and opiates combined. UNODC's figure for Western and Central Europe was approximately €35 Billion, based on a calculation that the region consumed more than 6000 MT of cannabis each year; other studies find figures that are smaller (including updated figures from UNODC, table 1). Most of these figures appear in reports and monographs, but some have been published in journals (Wilkins et al. 2002; Wilkins et al. 2005; Hakkarainen et al. 2008; Legleye et al. 2008; Kilmer et al. 2011).

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<sup>1</sup> I.e. for each frequency group and country.  $E[\text{days}] * E[\text{grams per day}] < E[\text{days} * \text{grams per day}]$ , where  $E[\ ]$  stands for taking the average or expected value.

<sup>2</sup> Many of these studies are discussed at greater length in report 1 part I in this volume.

**Table 1: Previous estimates of cannabis consumption and expenditures\***  
(Estimates not directly comparable because of different populations and methods.)

Geographic focus	Source	Year	Metric Tons Consumed	Grams Per Capita**	Nominal Value in National Currency (Billions)	2012 Euros (Billions)	%GDP**
World (1)	UNDCP 1997	1995	-	-	US\$75	83.1	0.16%
World (2)	UNODC 2005	2003	35,663	5.6	US\$142	131.3	0.25%
World (3)	UNODC 2009	2008	8,611-50,901	3.1	-	-	-
W/Cent Europe	UNODC 2005	2003	6,501	11.5	€35 B	41.2	0.30%
Europe	UNODC 2009	2008	1,733-5,932	5.6	-	-	-
EU (1)	Van der Heijden 2007	2006	2,055-2,875	4.9	-	-	-
EU (2)	Van der Heijden 2007	2006	2,160-3,020	5.2	-	-	-
EU (3) +NO	Costes et al. 2009	~2005	1,781 (1,565-1,996)	3.6	-	-	-
EU (4)	Kilmer and Pacula 2009	2005	2,580 (1,153-5,368)	5.3	€13.5 (6-28)	6.8	0.03%
Finland	Hakkarainen et al. 2008	2004	1.7-4.3	0.6	-	-	-
France	Legleye et al. 2008	2005	186-208***	3.13***	€0.746-0.832	0.9	0.03%
UK (1)	Bramley-Harker 2001	1998	486	8.2	GBP 1.58	2.8	0.15%
UK (2)	Pudney et al. 2006	~2003	412+/-155	6.8	GBP 1.031+/-0.33	1.6	0.09%
Australia	Clements and Zhao 2005	1998	339	18.2	AU \$ 5.35	6.1	0.55%
NZ (1)	Wilkins et al. 2002	1998	-	-	NZ \$0.131-0.170 M	0.1	0.10%
NZ (2)	Wilkins et al. 2005	2001	-	-	NZ\$0.190 (0.131-0.249)	0.2	0.13%
N. America (1)	UNODC 2005	2003	6,034	18.7	US\$ 64	59.2	0.46%
N. America (2)	UNODC 2009	2008	1,876-6,252	10.1	-	-	-
US (1)	Abt Associates 2001	2000	1,047	3.7	US\$10.5	10.3	0.09%
US (2)	DEA, unpublished	2000	4,270	15.1	-	-	-
US (3)	Kilmer and Pacula 2009	2005	2,950 (1,300-6,510)	10.0	€14.2 (6-30)	-	-
US (4)	Kilmer et al. 2011	2009	3,771 (2,631-5,029)	12.3	-	-	-
US (5)	Abt Associates 2012	2006	4,285	14.4	US\$ 34 B	28.7	0.24%

**Notes:** \*This updates a table produced in Kilmer and Pacula (2009). ~ = approximately.

\*\*Based on the mid-point if consumption is given as a range is presented. Nominal values are inflated using the CPI published by the OECD and then converted to Euros using the conversion rate for July 1, 2012 from [xe.com/ict](http://xe.com/ict). GDP (Gross Domestic Product) figures were obtained from EconStats.com. Population figures were obtained from the U.S. Census Bureau, International Data Base.

\*\*\*Amount is not mentioned in the short report, but is in the introduction to "Le trafic de cannabis en France: Estimation des gains des dealers afin d'apprécier le potentiel de blanchiment."

Much of the variation in these estimates comes from the assumptions made about the quantity of cannabis consumed by individual users. That is, different authors can produce highly divergent estimates of quantity consumed by starting with the same or similar estimates of prevalence but then multiplying by very different estimates of quantities consumed per user. For example, UNODC calculations for Europe in 2008 multiplied the number of past-year users by a range of 60-200 grams per year. In a different study, Kilmer and Pacula distinguished those who used in the past month from those who used in the past year but not in the past month. The wide range in their estimates was largely driven by grams per use day for past month users (Low: 0.57g, High: 1.5g) and the assumption about the amount of underreporting that occurs in a general population survey (GPS). Another factor that limited many previous analyses was the lack of systematic, cross-national information about the frequency of cannabis use in the past month. These data are now tracked by the EMCDDA and combining them with new information about consumption and expenditures conditional upon use days drives this analysis.

## 3 General approach and data elements

### 3.1 Supply versus demand approaches to estimating the size of a cannabis market

Methods for estimating the size of an illicit drug market can be divided into supply- and demand- side approaches. Cannabis is widely used and less stigmatized than is use of heroin or cocaine, so demand-side methods are more credible than they are for other drugs. Hence, the methods and associated data here pertain primarily to surveys that estimate numbers of users and their consumption patterns, supplemented by data on prices to convert estimates of quantity consumed into amounts spent.

We also use estimates of the market shares of resin vs. herbal cannabis that come ultimately from seizure data, but we do not estimate total weight by dividing quantities seized by some assumed proportion of production that gets seized. That approach is always somewhat circular, to the extent that guesses about seizure rates may be rooted in dividing quantities seized by estimates of total market size<sup>3</sup>. Furthermore, with cannabis, much of what is seized by weight is plant material that would either not be used (e.g. leaves that would be discarded by an operation producing bud) or is not yet dried (the dry usable weight is considerably smaller, perhaps only one-quarter of the weight when the plant is growing).

The other principal supply-side estimation approach, production-based estimates, is challenged by the diffuse and heterogeneous nature of cannabis cultivation. Whereas a handful of countries account for the great bulk of poppy and coca cultivation, domestic production accounts for a considerable share of European cannabis consumption. Much of that domestic production is indoors, and so invisible to satellite imaging and other methods commonly used for supply-side estimates of heroin and cocaine production, and the enormous heterogeneity across producers – from hobbyists to large-scale commercial growers – complicates the task of getting a representative sample domestic growers.<sup>4</sup>

Chapter 4 and 5 detail our demand-side estimates of cannabis consumption and cannabis expenditures in the EU, respectively. The remainder of this chapter describes the data elements and sources used to generate these figures.

### 3.2 Past-month prevalence and frequency from general population surveys

The EMCDDA has been a rich source of information about drug use among general populations across European countries. In its function as a supra-national monitoring agency, it provides guidelines for survey research to its national counterparts and consolidates the individual results on the European level. Specifically, prevalence data for all Member States show the numbers of cannabis users as well as their development over time.

Consumption rates vary widely between daily and occasional users and the relative proportions of the various types of users can vary over time and location. Hence, while simple prevalence counts of past-year or past-month users are the traditional basis for monitoring drug use, they offer a weak foundation for estimating market size unless supplemented by information about the relative numbers of the different types of users.

Fortunately, there is now an EU-wide definition of user groups that divides current users according to their frequency of usage into four groups: 1-3 days in the past month, 4-9 days in the past month, 10-19 days in the past month, and 20+ days in the past month. While the EMCDDA started recommending this question in its guidelines as early as 2006, adoption is not yet universal.<sup>5</sup> Nevertheless, looking back to previous EMCDDA reports and using the newest available responses to categorize

<sup>3</sup> As noted by Kilmer et al. (2011): “Seizure-based estimates simply divide total seizures over a year by some assumed proportion of shipments or plants that are seized or eradicated (e.g. 10%). while this approach is easy to implement, it is unsettling, because no one has a systematic basis for estimating the seizure rate. Furthermore, seizures are not merely proportional to production. Seizures also depend on law enforcement efforts and the care taken by growers and traffickers to protect their products (Reuter 1995). They can also produce perverse results in policy analysis. For example, if enforcement agencies improve their performance and seize more of a drug. Analysts using these methods will infer that the production and the production net of seizures (i.e. consumption) have gone up, not down. Thus, any attempt to determine which period’s enforcement strategies had the most effect on reducing consumption would draw precisely the wrong conclusions.”

<sup>4</sup> Indeed, there has been a flurry of research on EU-cannabis production in recent years (e.g. Potter 2010; Decorte et al. 2011; EMCDDA 2012). Potter’s ethnographic study of cannabis growers in the UK highlights that not all producers are involved to make large amounts money; which is very different from those involved in international drug smuggling. Some grow for medical purposes, some grow for their own personal use, and others for more ideological reasons associated with the “ecological, spiritual, and agricultural benefits associated with the cannabis plant” (Potter 2010, p. 187).

<sup>5</sup> For more on this, see Decorte et al. 2009.

users provides reasonable break downs for roughly 80% of the European population. These rates are then multiplied by the country's population that is aged 15-64 (EUROSTAT, annual) to estimate the number of users of each type in each country.

Annex 1 explains our approach for estimating a nation's past-year consumption from individuals' descriptions of past-month activities.

### 3.3 Past-month consumption and expenditures from our internet survey

The strengths and weaknesses of general population surveys for estimating past-month prevalence are well-known, and will not be reviewed here. For present purposes, a salient limitation is that they generally either do not ask about quantities (meaning weights) consumed and/or amounts spent on the drug over the past-month, or they ask in ways that do not elicit reliable responses. For example, the survey might ask users to report their typical daily consumption in grams, when more than a few people have trouble describing precisely small weights, and not all use is sufficiently regular for a "typical day" to be a meaningful concept.

As a result, past estimates of consumption have often been forced to multiply more or less sound estimates of prevalence by more or less arbitrary guesses about quantities consumed per person-month of use, guesses that are often rooted in rules of thumb or convenience samples.

The principal methodological advance here relative to most of the extant literature is grounding estimates of quantities spent or consumed per person in a survey that reaches a broad population and which uses cutting edge methods for eliciting reliable estimates. In particular, we use a web survey conducted by Van Laar et al. (report 1, part I) to find these parameters for the seven countries covered by the survey: Bulgaria, the Czech Republic, Italy, the Netherlands, Portugal, Sweden, and the United Kingdom.

Of course web-based surveys have their own set of widely-recognized limitations, including a tendency to over-sample the young, educated, and affluent and, hence, perhaps to under-sample problem users. We fully acknowledge those limitations, but try to sidestep them at least partially by using the strengths of each survey type to compensate for the limitations of the other. In particular, we only use the web-based survey to estimate quantities consumed conditional on being a user of a particular type, with type defined by frequency of use. The relative proportions of each type of user and the total number of past-month users are taken from GPS, not web-based surveys. Naturally this approach is still problematic relative to the (unattainable) ideal of having a true random sample of (honest and cooperative) users, but we believe it is a notable improvement on the standard approaches taken to date.

Although recruitment strategies for sample respondents differed somewhat among the seven participating Member States, most countries focused mainly on online recruitment. Given the high internet penetration rates across EU Member States, this sampling method reaches a large share of the population. Nevertheless, the lower a country's internet penetration rate, the more selection bias may occur in its web survey.

Recruitment in all countries also included:

1. Advertisements on drug information websites and other drug related media and
2. Outreach via social media, such as Face book and Twitter.

Typically, younger age groups are overrepresented on internet-based social media and, hence, the sample composition is likely to be younger than the general population (report I, part I).

The survey questions were selected by a team of experts from the seven Member States. Once the content of the survey was determined, a prototype survey was created in English, tested by a panel including lay and experts for intelligibility, programming errors, and completion time. The text of the resulting final survey was then translated from English into each of the other Member States' languages by a native speaker. Each national survey received its own web address (e.g. [www.surveymonkey.net/s/eudrugmarket\\_uk](http://www.surveymonkey.net/s/eudrugmarket_uk)), and a central webpage ([www.drugmarket.eu](http://www.drugmarket.eu)) containing links to the country surveys was created. The web surveys were live for ten weeks in 2012.<sup>6</sup>

We use this survey mainly because in the past, estimating the grams of use has been a difficult task for respondents and the results have been suspect. The present survey sought to cope with this by presenting respondents with picture cards, visually

<sup>6</sup> For additional information about the sampling frame and methodology, see report 1, part I.

contrasting various amounts of cannabis with both a ruler and a credit card. We believe that the credit card in particular can help as it serves as a familiar reference point that users can relate to more easily than the classically employed ruler. Nevertheless, self-reports are still imperfect, and we expect some under-reporting, as will be discussed later in the explanation of our results, along with a discussion of units shared among multiple users. Likewise, the prevalence estimates that get multiplied by these per-person consumption and spending estimates are subject to the sorts of under-reporting familiar in prevalence estimation.

Understandably, while our survey is broad-based, it is not a GPS, so there remains the question of whether the estimates of consumption intensity derived from our survey can be married with GPS-derived estimates of prevalence. The answer is “clearly no” with respect to past-month users overall. A cursory comparison of past month days of use shows that a larger proportion of past-month users detected in a GPS report only light use (< 4 days per month) than in the web-based survey. That is, as one might expect, a voluntary web-based survey attracts a disproportionate number of people who use cannabis frequently. So the merging of the data sources needs to be done conditional on the type of past-month user (light, regular, heavy, etc.), not just on past-month use.

### 3.4 Retail prices from data submitted to EMCDDA

Member States regularly report information about retail resin and herbal cannabis prices to the EMCDDA. This information is usually generated from law enforcement sources, and some combination of the minimum value, maximum value, mean, mode, and median is reported. It is usually unclear whether Member States are reporting information about the amount paid for one single gram of cannabis, or the average price of 1g based on a multi-gram purchase (which is not uncommon and may be the norm in some countries). There are also questions about the potency of the cannabis being priced. While detailed footnotes are included for some countries (e.g. the UK and NL exclude sinsemilla/nederwiet in their main calculations but footnote the price of these more potent products), the lack of systematic potency information can complicate comparisons across countries. That said, these data still provide useful information, especially when combined with insights about cannabis expenditures from users. Furthermore, we present the analysis in such a way that if better price information should become available in the future, readers could re-compute the spending estimate with those revised or updated price figures.

## 4 Estimating quantity consumed

This chapter builds an estimate of the total quantity of cannabis consumed in the EU. It begins with an analytic framework which does not multiply average number of days of use by average quantity consumed per day of use—a common but potentially flawed approach which can underestimate consumption—. Instead we focus on the mean consumption and expenditure amounts for four types of users (based on EMCDDA definitions) in each country: Those who used 1-3 days of cannabis use in the past month, 4-9 days in the past month, 10-19 days in the past month, and 20+ days in the past month. The chapter then addresses the issue of underreporting in GPS and introduces readers to the broader concept of a “consumption gap.” It then describes how we connect the prevalence data from GPS with the consumption and expenditure data from the web survey. This is not straightforward since the web survey does not ask about the total number of days cannabis was consumed in the past month (the question is asked separately for resin and herbal, and simply adding the days for both is problematic). After discussing some other issues associated with addressing outlier observations, we generate consumption estimates for the sample Member States. The chapter concludes by using these insights to extrapolate to consumption estimates for the EU.

### 4.1 Analytic framework

Our basic approach is to estimate annual cannabis consumption for four types of users in each sample Member State. Summing these values generates an estimate of total cannabis consumed in the EU for a given year. More formally, we are calculating:

$$(1) \sum_{T=1}^4 \sum_{M=1}^{27} (N_{TM} * U) * (Q_{TM,Herbal} + Q_{TM,Resin}) * 12$$

here:

T = Type of User

M = Member State (Currently 27)

$N_{TM}$  = Number of users of type T in Member State M

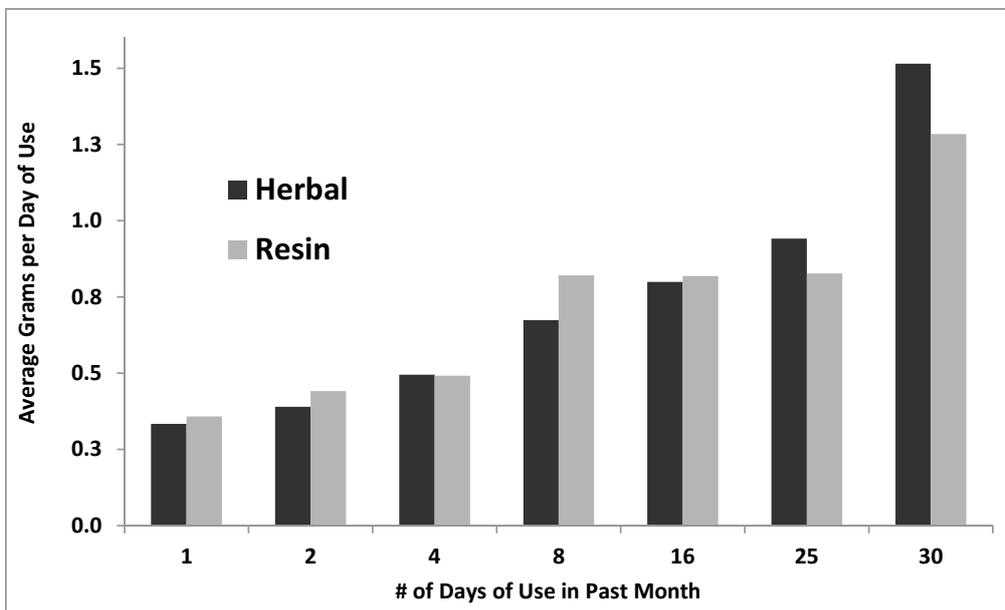
U = Underreporting adjustment

$Q_{TM,X}$  = Quantity of cannabis of type X (Herbal or Resin) consumed in last month by users of type T in Member State M.

Note that we do not multiply average number of days of use by average quantity consumed per day of use. Since those quantities are positively correlated, that product will tend to under-estimate consumption, potentially to an appreciable degree.

Figure 1 depicts this positive correlation graphically using our web survey data. It shows how the average number of grams consumed per day (i.e., the product of units per day and grams per unit) increases with increasing frequency of use.

Figure 1: Average grams per day of use vs. # of days of use in past month



Note: Computed separately for herbal and resin and plotted on the same graph.

## 4.2 The “consumption gap”

When surveying respondents about sensitive behaviours, under-reporting is a perennial concern. Thus, when estimating marijuana consumption from general population surveys, some researchers make adjustment to the estimates. Kilmer et al. (2011) note that a variety of studies suggest that perhaps 80% of those surveyed honestly report their marijuana use, so their estimates of cannabis consumption in the US and Europe used an adjustment of factor 1.25 (the reciprocal of 0.8). This 1.25 figure has been used elsewhere in the literature (Kilmer et al. 2009; EMCDDA 2012) and others have used even larger adjustment factors (e.g. Gettman 2007; ONDCP 2012). It is important to note, however, that at least one validity study focused on a European population suggests lying about cannabis use may not be as big of a problem as it is believed to be in the U.S. (Taylor and Bennett 1999).

Sometimes under-reporting is thought of only in terms of survey respondents’ under-reporting of their activity, but we are interested in a more general concept: How much do respondents’ self-reports under-estimate true consumption by the entire population? That under-estimate governs the size of the “multiplier” that should be applied here to adjust GPS-based estimates upward when estimating national consumption.

It is useful to distinguish four components of such a multiplier or adjustment (Kilmer et al. forthcoming):

1. Use by people outside the GPS's sampling frame ( e.g. homeless who are not in shelters)
2. Use by people who are in the sampling frame but nonetheless are not surveyed, e.g. because they were never home.
3. Under-reporting of past-month use by people who are successfully surveyed, and
4. Under-reporting of quantities consumed (e.g. days used in the past month) even if some use is acknowledged.

The multipliers mentioned above, e.g. the 1.25, respond primarily just to component #3. So one would expect the multiplier relevant here to be larger. To keep the combined effect of these factors distinct from what is usually referred to as under-reporting (i.e., did the respondent admit use?), we refer here to the aggregate effects of these four phenomena as the "consumption gap."

It is unclear what data should be used to estimate this "consumption gap". Indeed, it is hard enough to find data about cannabis frequency and quantity consumed, let alone studies attempting to validate these measures conditional upon respondents admitting use. Much more work has been done on estimating quantities consumed of tobacco and alcohol, and some studies have compared these figures with official "supply-side estimate" (i.e., information based on taxes and sales receipts). One study which compared cigarette consumption in the U.S. general population with estimates from the Federal Trade Commission and other sources suggested that underreporting ranged from 10-40% (ONDCP 2012).<sup>7</sup> This same study also found that demand-side alcohol estimates can either account for less than half of supply-side estimates or approximate them reasonably well, depending on the source of the official supply statistics. Similarly, an international literature review suggests it is reasonable to assume that general population surveys only account for roughly 50% of total alcohol consumption (Gmel and Rehm 2004):

Survey-based estimates usually cover only 30%-70% of per capita consumption derived from aggregate estimates such as sales statistics (e.g. Knibbe and Bloomfield 2001; Rehm 1998b). This has commonly been interpreted to mean that survey estimates are underestimates of true consumption (Alanko 1984; Midanik 1982). Sometimes coverage rates may be higher- e.g. in the European Comparative Alcohol Study (Leifman et al. 2002), where coverage rates of over 90% were found for the U.K. Recently, for New Zealand, high coverage rates were reported (Casswell et al. 2002). Another example is the survey by the Mexican Institute of Psychiatry, which was analyzed for the comparative risk analyses of the Global Burden of Disease Study. The volume of drinking calculated on the basis of this survey provided a higher per capita estimate for Mexico compared with a per capita estimate from sales and production data plus the estimate of unrecorded consumption (Rehm et al. in press). Coverage rates are generally high in Mexico, at around 85%-95% (Caetano 2001). However, survey estimates that are close to or higher than estimates from sales and production statistics are still the exception rather than the rule. For most surveys, a coverage of 40%-60% can be assumed (Caetano 2001).

Large gaps between estimated and actual consumption are not even limited to intoxicants; the New York Times reported recently that U.S. sugar consumption estimates had been revised downward by 20% overnight when better information became available about the proportion of purchased food that is eaten as opposed to discarded (Strom 2012).

This report does not advocate for the use of a particular "consumption gap". Indeed, we would not be surprised if this gap varied, perhaps dramatically, across the Member States. We instead offer a range of unadjusted estimates that readers can then adjust using the factor(s) they think are most appropriate.

### 4.3 Connecting our surveys and GPSs

Our web survey data set had 4,156 observations, but 1,626 of the respondents did not sufficiently answer the questions about quantity consumed (days per month, units per day, and grams per unit). The remaining 2,530 individuals spread across use categories for herbal cannabis and resin use in the following manner table 2. The table clearly suggests that it is not uncommon for past-month cannabis users to consume both herbal cannabis and resin in the same month.

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<sup>7</sup> A quick but similar calculation using the U.S. household drug use survey in particular suggests that it captures about two-thirds of U.S. cigarette consumption.

**Table 2: Number of respondents by intensity of use (using mid-points of ranges)**

	Days used resin in past month									Total
	0	1	2	3-5	6-10	11-20	21-29	30		
Days used herbal in past month	0	0	78	29	46	24	19	15	19	230
	1	193	75	20	28	15	8	5	6	350
	2	138	25	44	18	9	13	6	7	260
	3-5	193	37	29	53	15	24	28	21	400
	6-10	121	16	31	39	35	35	18	11	306
	11-20	143	33	38	34	26	46	13	8	341
	21-29	149	40	27	45	19	15	43	3	341
	30	116	44	29	40	21	7	11	34	302
	Total	1,053	348	247	303	164	167	139	109	2,530

Combining the EMCDDA data on prevalence – i.e., the number of individuals in each user group – with our web survey data on intensity of use, meaning average grams consumed per person presents two basic challenges:

- The web-survey was conducted in just 7 European countries, and for a few of those seven the sample sizes are on the small side. So intensities of use for other countries have to be imputed. Fortunately, intensities of use conditional on user type do not seem to vary radically across the seven countries for which we have data, suggesting that rather simple imputation methods may be workable.
- The web-survey asks two separate questions about past-month days of use of herbal cannabis and resin (categorical, with answers of 0, 1, 2, 3-5, 6-10, 11-20, 21-29, and 30 possible), but never asks about total past-month days of cannabis use [combined, all types].

Obviously for respondents who never used resin in the past-month, their answers for past-month days of cannabis use would necessarily be the same as their answers for past-month days of herbal use, and vice versa for resin. Likewise, suppose they reported using herbal twice in the past month and resin once. Then the total number of days of cannabis use is either two (if they used resin on one of the days they used herbal) or three (otherwise), and in either case that places them in the light category for past-month use (< 4 days).

Sometimes, however, the categorization with respect to days of cannabis use is ambiguous. If a respondent reported using herbal on 11-20 days and resin on 3-5 days, then the number of cannabis use days can be anywhere between 11 (low-end herbal and only used resin on days on which herbal was also used) to 25 (high-end of both ranges and zero overlap).

Ambiguity comes from two sources: lack of specificity with the categorical variables and lack of information about the extent of overlap between herbal and resin days. The former is the bigger challenge. If all of the categorical variables are replaced by their midpoints, so, e.g. someone who reported using herbal cannabis on 3-5 days is credited with having used it on 4 days, then about 87% of the individuals can be classified unambiguously, and another 5% can be classified unambiguously unless there was literally zero overlap. So we consider three scenarios.

User Type Classification Strategy A (abbreviated as User Type A) assumes the overlap is sufficient to place the user in the category defined by the frequency of use of the form used most often, e.g. someone who used herbal on 8 days and resin on 4 would be placed in the category of having used cannabis on 4-9 days in the past month.

User Type B assumes there is at least one day of overlap so, e.g. the respondent with 16 days of herbal and 4 days of resin would be placed in the 10-19 days of past-month cannabis use, but if the sum of the midpoints of days of herbal use + days of resin use is greater than the extreme lower end of the range of cannabis use days, then the use of the 2nd form of cannabis “promotes” them into the higher use category.

User Type C assumes there is no overlap so the number of days of cannabis use is simply the sum of the number of herbal days plus the number of resin days (based on midpoints and capped, of course, at a maximum of 30 days per month).

We produce total consumption and spending estimates using all three user type classification strategies, and the results are similar, differing from one classification strategy to the next by roughly 10%, with the most pronounced effects in the intermediate use categories (light and regular), as one would expect. Most results presented below are for the Type B categorization.

Although it might seem counterintuitive, classification strategy A generally gives the highest estimates. The reason is that when an individual is on the fence between a higher or a lower cannabis frequency category, their reported grams consumed per month will tend also to be intermediate, a little higher than is typical of the lower frequency users and a little lower than is typical of respondents who are firmly in the higher frequency group. Hence, moving them from the higher to the lower frequency category will tend to raise the average for both groups. (The raising of the lower frequency group's average is obvious, but it can raise the average for the higher frequency group as well by not "diluting" that average with a lower value.)<sup>8</sup>

Table 3 shows explicitly how respondents in the ambiguous categories are placed by each of the three classification schemes. There are three pairs of tables; the top pair describes strategy A, the middle pair describes strategy B, and the bottom pair, strategy C. The left hand tables highlight how the ambiguous groups are placed; the white cells are for respondents' whose answers left no ambiguity. The right hand tables show the full categorization for all respondents under the respective classification strategies.

**Table 3: Three approaches to placing our web survey participants into EMCDDA cannabis user categories**

**Panel A. The variables "User Type (A)" puts the ambiguous users in the following categories**

	# of Days Used Hash in Past Month																	
	0	1	2	4	8	15.5	25	30	0	1	2	4	8	15.5	25	30		
# of	0								0	Non-User	1-3	1-3	4-9	4-9	10-19	20+	20+	
Herbal	1								1	1-3	1-3	1-3	4-9	4-9	10-19	20+	20+	
Days in	2		1-3		4-9				2	1-3	1-3	1-3	4-9	4-9	10-19	20+	20+	
Past	4				4-9	10-19			4	4-9	4-9	4-9	4-9	4-9	10-19	20+	20+	
Month	8		4-9	4-9	4-9	10-19			8	4-9	4-9	4-9	4-9	4-9	10-19	20+	20+	
	15.5			10-19	10-19	10-19			15.5	10-19	10-19	10-19	10-19	10-19	10-19	20+	20+	
	25								25	20+	20+	20+	20+	20+	20+	20+	20+	
	30								30	20+	20+	20+	20+	20+	20+	20+	20+	

<sup>8</sup> This is sometimes called the "Will Rogers phenomenon" for his supposedly having quipped that when Oklahomans whose farms failed in the 1930s moved to California, it raised the average IQ in both states.

**Panel B. The variable “User Type (B)” “promotes” the ones for which it seems reasonably likely they could be in the higher category (i.e. unless sum would just barely put them in higher category)**

		# of Days Used Hash in Past Month																	
		0	1	2	4	8	15.5	25	30			0	1	2	4	8	15.5	25	30
# of	0									0	Non-User	1-3	1-3	4-9	4-9	10-19	20+	20+	
Herbal	1									1	1-3	1-3	1-3	4-9	4-9	10-19	20+	20+	
Days in	2			1-3		4-9				2	1-3	1-3	1-3	4-9	4-9	10-19	20+	20+	
Past	4					10-19	10-19			4	4-9	4-9	4-9	4-9	10-19	10-19	20+	20+	
Month	8			4-9	10-19	10-19	20+			8	4-9	4-9	4-9	10-19	10-19	20+	20+	20+	
	15.5				10-19	20+	20+			15.5	10-19	10-19	10-19	10-19	20+	20+	20+	20+	
	25									25	20+	20+	20+	20+	20+	20+	20+	20+	
	30									30	20+	20+	20+	20+	20+	20+	20+	20+	

**Panel C. The variable “User Type (C)” places everyone in the highest possible use category**

		# of Days Used Hash in Past Month																	
		0	1	2	4	8	15.5	25	30			0	1	2	4	8	15.5	25	30
# of	0									0	Non-User	1-3	1-3	4-9	4-9	10-19	20+	20+	
Herbal	1									1	1-3	1-3	1-3	4-9	4-9	10-19	20+	20+	
Days in	2			4-9		10-19				2	1-3	1-3	4-9	4-9	10-19	10-19	20+	20+	
Past	4					10-19	20+			4	4-9	4-9	4-9	4-9	10-19	20+	20+	20+	
Month	8			10-19	10-19	10-19	20+			8	4-9	4-9	10-19	10-19	10-19	20+	20+	20+	
	15.5				20+	20+	20+			15.5	10-19	10-19	10-19	20+	20+	20+	20+	20+	
	25									25	20+	20+	20+	20+	20+	20+	20+	20+	
	30									30	20+	20+	20+	20+	20+	20+	20+	20+	

### 4.4 Addressing outliers and missing values in the web survey data set

Classifying respondents into user groups and imputing use intensities for the other European countries are the central and interesting challenges, but there is also the perennial issue of what to do with respondents whose answers strain credulity because of the very large quantities they report consuming.

The extreme example is a 29 year old UK male who reported using 20 units of herbal and 20 units of resin on each and every one of the past 30 days, and for both herbal and resin he described his unit sizes as being of the largest possible value (0.4 grams), for total cannabis consumption of  $2 * 30 * 20 * 0.4 = 480$  grams per month. Although that is presumably humanly possible, and – in contrast with heroin market estimation exercises – there is no well-established lethal dose that can form the basis for top coding – it seems plausible that this respondent was indulging in a bit of exaggeration.

It is not at all clear, however, where to draw the line between those who were legitimately very heavy users and those who might have been having a bit of fun with the survey. The frequency distribution of past-month quantities consumed is not bimodal, with a majority of “reasonable” responses and a separate cluster of “exaggerators”; rather the frequency distribution

tails off continuously, with a more or less exponential decline in frequency as one moves to larger quantities.<sup>9</sup>

To address such extreme reports, we “top coded” suspiciously high values (meaning, replacing values above a threshold by that threshold). In particular, for the 17 respondents who report consuming more than 150 grams per month (in total, combining resin and herbal), we scaled down their resin and herbal consumption rates proportionately until their total was 150 grams.

Note that 150 grams per month matches Legget’s (2006) highest consumption rate of 5 grams per day (chronic daily users), and at 0.2 grams per “unit” (joint, dry chillum), 150g per month is 750 units per month or 25 a day, more than enough to maintain acute intoxication for every waking hour, every day.

We likewise top coded consumption per day for each type of cannabis at 5 grams per day.<sup>10</sup> Figure 2 shows this top-coding has only a slight effect on the overall averages, although it can have a bigger effect on the average within a smaller group (such as the average for a particular country).<sup>11</sup>

As a sensitivity analysis, we also ran the analyses dropping from the data set entirely the 17 individuals who reported consuming more than 150 grams per month; that reduces average consumption rate by another step, of roughly the same magnitude as the reduction created by the top coding just described.

**Figure 2: Top coding reported quantities consumed per day has a modest effect on average monthly consumption**

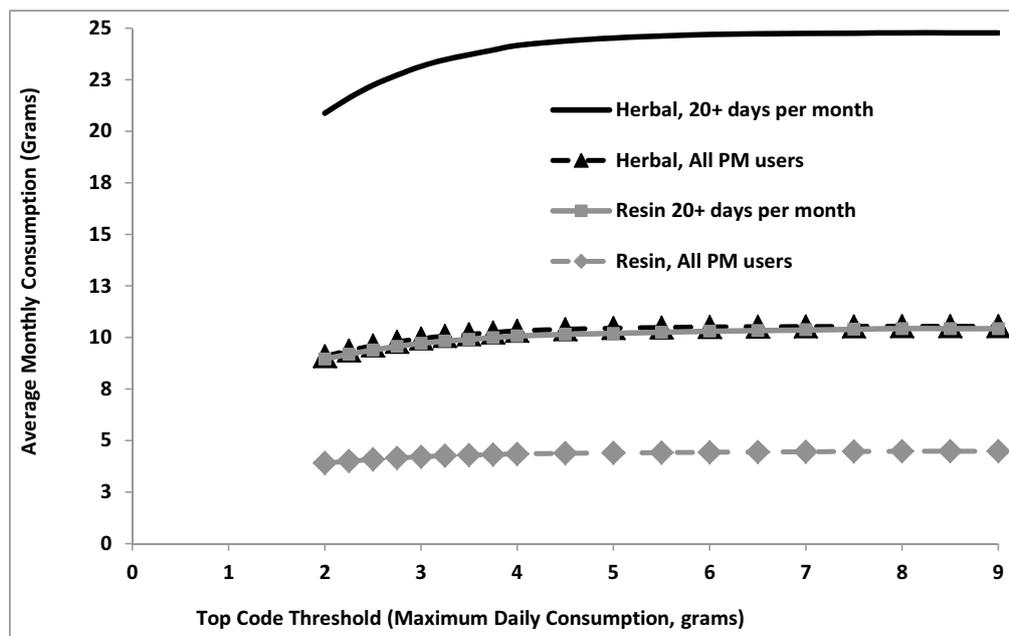


Table 4 presents information about how 2,530 respondents in our analytic sample usually obtained cannabis. Approximately two-thirds usually purchased while the others mostly obtained cannabis by getting it for free or growing their own. However, only those individuals who reported that they usually purchased cannabis were asked how much they spent on cannabis in the previous month. If we restrict the analysis to those who reported purchasing, we would then overestimate average spending for past month users since a lot of them do not pay for their cannabis. On the other hand, if we impute €0 spending for those who reported usually getting it for free or growing it themselves, then we would likely underestimate average spending since some of them probably made purchases, too, even if that is not their usual practice. Thus, we generate values under both assumptions; focusing on the latter in the body of the report and the former in annex 2.

<sup>9</sup> Technically, the distribution is fit by a Weibull distribution.

<sup>10</sup> This is not redundant: there were a handful of respondents who reported very high quantities consumed per day, but on a small enough number of days to not trigger the 150 gram cut-off.

<sup>11</sup> By coincidence the overall average grams per user for herbal lies almost on top of the corresponding line for heavy resin users: no meaning should be attached to that coincidence.

**Table 4: How our analytic sample usually obtained cannabis, by user type**

	Hash only	Herb only	Both	Total
I buy it	83	457	1,123	1,663
People give or share it with me for free	41	227	247	515
I grow it	41	79	129	249
Other	2	27	70	99
Missing	1	21	23	45
<b>Total</b>	<b>127</b>	<b>811</b>	<b>1,592</b>	<b>2,530</b>
<b>% Buy</b>	<b>65.4%</b>	<b>56.4%</b>	<b>70.5%</b>	<b>65.7%</b>

## 4.5 Result for the seven countries in the web survey data set

The core piece of information we need is the MS-specific quantity for cannabis consumed for each user group (QTM). Table 5 gives the simple averages for herbal cannabis and resin and the number of observations for the seven countries surveyed. Table 5 makes clear that the data are abundant for some countries (e.g. Italy, Sweden, and Netherlands) and scarce for some others (notably Bulgaria), and of course are entirely unavailable for the countries not surveyed.

**Table 5: Average past month cannabis consumption (herbal, resin, and combined) by country and EMCDDA use category (in grams and for user type classification B)**

	BG	CZ	IT	NL	PT	SE	UK	Total
Average gms of <b>Herbal</b> per month								
1-3	0.3	0.3	0.3	0.3	0.2	0.4	0.4	0.3
4-9	1.5	2.1	1.8	1.7	1.2	1.9	2.9	1.9
10-19	6.7	8.7	6.9	7.3	2.5	7.5	4.6	7.1
20+	14.3	29.6	23.9	27.1	10.2	18.1	32.5	24.1
<b>Total</b>	<b>5.1</b>	<b>11.7</b>	<b>13.6</b>	<b>9.7</b>	<b>4.5</b>	<b>6.7</b>	<b>12.8</b>	<b>10.3</b>
Average gms of <b>Resin</b> per month								
1-3	0.0	0.0	0.2	0.2	0.1	0.3	0.1	0.2
4-9	0.0	0.1	1.1	0.8	1.5	1.7	0.1	0.9
10-19	0.0	0.2	3.2	1.9	3.9	6.9	0.3	3.1
20+	0.0	1.6	12.4	5.5	11.0	19.3	5.5	9.9
<b>Total</b>	<b>0.0</b>	<b>0.6</b>	<b>7.1</b>	<b>2.2</b>	<b>5.0</b>	<b>6.8</b>	<b>2.0</b>	<b>4.3</b>
Average gms of <b>Cannabis</b> in total (Herbal + Resin) per month								
1-3	0.3	0.4	0.5	0.4	0.3	0.8	0.4	0.5
4-9	1.5	2.2	2.8	2.5	2.8	3.6	3.0	2.8
10-19	6.7	8.9	10.1	9.2	6.4	14.4	4.9	10.1
20+	14.3	31.1	36.3	32.6	21.3	37.4	38.0	34.0
<b>Total</b>	<b>5.1</b>	<b>12.3</b>	<b>20.7</b>	<b>11.8</b>	<b>9.5</b>	<b>13.5</b>	<b>14.8</b>	<b>14.6</b>
# of Respondents								
1-3	28	62	113	199	31	128	41	602
4-9	30	99	124	163	15	145	44	620
10-19	17	53	121	87	15	86	22	401
20+	23	102	370	193	37	125	57	907
<b>Total</b>	<b>98</b>	<b>316</b>	<b>728</b>	<b>642</b>	<b>98</b>	<b>484</b>	<b>164</b>	<b>2,530</b>

Table 6 marries that information about Q<sup>TM</sup> with GPS-based and EMCDDA-provided data on the numbers of past-month users, and their distributions across the four categories of past-month users (for the five countries for which such data are available). The resulting weighted averages of grams consumed per past-month user vary by a factor of 2.5 from a low of 5.1 in the Czech Republic to a high of 12.9 in the Netherlands. There is considerably greater variation across the countries in proportions of PM users who are heavy than in rates of consumption by each type of PM user.

**Table 6: Annual cannabis consumption for five Member States**

	Past month users (Most recent data submitted to EMCDDA)		Distribution of use days among past month users (Most recent data submitted to EMCDDA)				Mean past month cannabis consumption for past month users (Grams)				Weighted mean of past month consumption (Grams)	Implied annual consumption (Metric Tons)	
	Year	#	Year	1-3 d	4-9 d	10-19 d	20+ d	1-3 d	4-9 d	10-19 d			20+ d
BU	2008	74,111					N/A	0.3	1.5	6.7	14.3		
CZ	2010	333,610	2008	42.9	31.9	16.1	9.1	0.4	2.2	8.9	31.1	5.1	21*
IT	2008	2,712,132	2005	47.6	24.5	10.2	17.6	0.5	2.8	10.1	36.3	8.3	271
NL	2009	465,818	2009	23.8	21.0	24.8	30.5	0.4	2.5	9.2	32.6	12.9	72
PT	2007	171,188	2007	18.5	14.0	23.4	44.1	0.3	2.8	6.4	21.3	11.3	23
SE	2010	59,822					N/A	0.8	3.6	14.4	37.4		
UK**	2010	1,560,350	2010	52.7	15.4	15.4	16.5	0.4	3.0	4.9	38.0	7.7	144
<b>Unweighted average across countries</b>								0.5	2.6	8.7	30.1		
<b>Weighted average (by past month users)</b>								0.4	2.8	8.3	35.4		

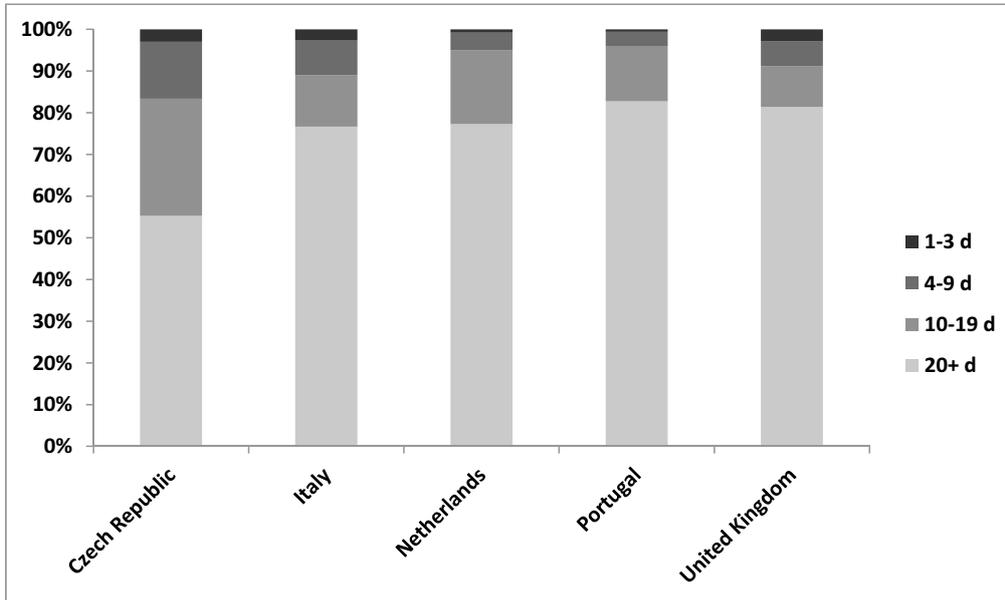
**Note:** These estimates are a result of a methodology which uses the most recent information about prevalence and frequency from the EMCDDA and quantity consumed estimates from our user surveys in seven Member States. For Member States' missing frequency information, the European average is imputed. These raw figures have not been adjusted for differences in survey years, differences in survey methods, under/over reporting, non-response, or users who are not in the GPS sampling frame. They differ from the consumption figures presented in van Laar et al. (this volume) because they are based on a different methodology and, for some countries, different data sources.

\* For example, the estimates for the Czech Republic would be larger and roughly similar to Van Laar et al. (report 1, part I) if we either 1) used prevalence data from 2008 as they do or 2) imputed the European average for frequency instead of what was reported to the EMCDDA. (The share of past-month users in the CR who used daily/near daily was much lower than the European average). This speaks to a larger insight: Consumption and expenditure estimates are fairly sensitive to estimates of the proportion of past-month users who are 20+ day per-month users.

\*\* UK frequency data reported to the EMCDDA do not add to 100%: 48, 14, 14, 15 = 91%. Team members contacted the EMCDDA and they indicated it was a weighting error that had not yet been fixed. To remedy this, we multiplied each value by 1.098. They now add to 99.9.

Figure 3 justifies the focus of this discussion on heavy (20+ day per month) users. In all five countries for which the calculation is possible, heavy uses dominate total consumption.

**Figure 3: Proportions of consumption by user type in five of the sample Member States**

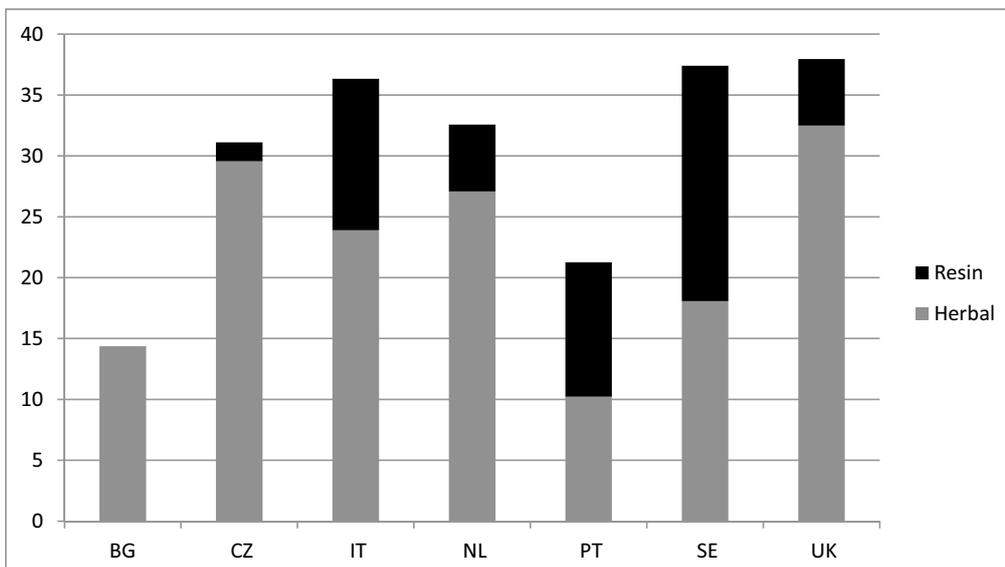


## 4.6 Projecting to the rest of the EU

We have complete information on  $Q_T$  for only 5 of the 27 Member States. So we need to do some extrapolation to estimate that parameter for the other 24 countries. Fortunately once one conditions on the user type, there is not an enormous amount of variation across the surveyed countries in this parameter (see Figure 4 below.) There is even less variation in units as opposed to grams used per month (figure not shown).

That takes some of the pressure off what would otherwise be a rather tricky exercise, because countries that are close geographically may not be the same culturally, and there can be very different cannabis policies even in countries that are similar with respect to overall income, etc. (Netherlands vs. Germany, e.g.)

**Figure 4: Average past month cannabis consumption for heavy cannabis users (20+ days per month)**



Fortunately, it is easier to extrapolate to the EU total than to all of the individual Member States because a relative handful of states dominate EU cannabis consumption, and three of them are among the countries covered by the web survey.

Italy, the Netherlands, and the UK alone account for approximately 40% of all past-month users in the EU. France, Germany, and Spain account for almost half (see Figure 5.) Hence, if sensible estimates can be produced for those 3 additional countries, then a reasonable estimate for the EU total can be obtained, even if the considerable difference observed between, say, the Czech Republic and Bulgaria, let alone between Bulgaria and Portugal, are cautionary with respect to the ability to estimate consumption in each individual country.

**Figure 5: Past-month EU cannabis use is dominated by 7 countries, 4 of which were covered by the web survey**

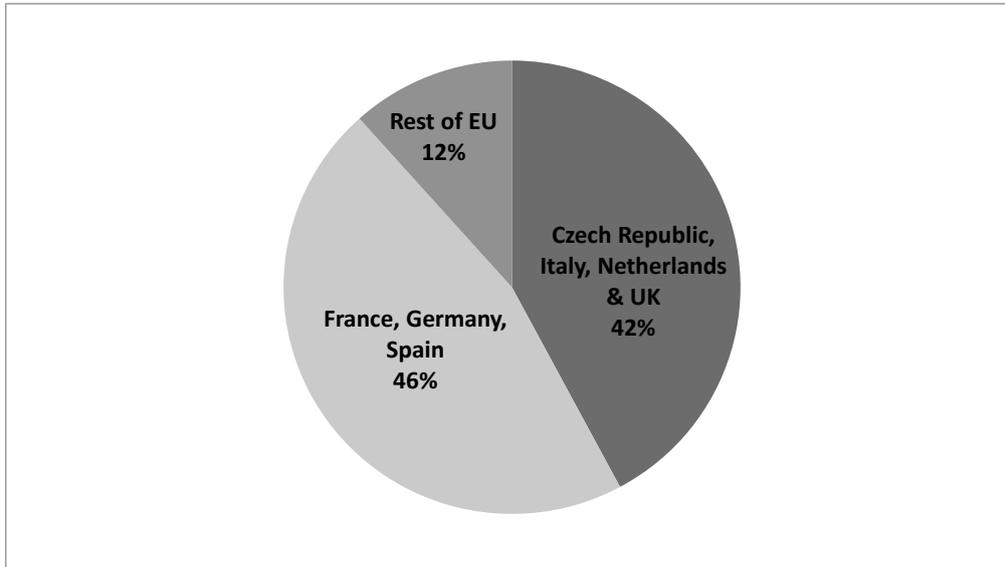


Table 7 extends the estimates from the five sample Member States with the past-month prevalence data breakdown to the other 22 countries. For the countries lacking data on the distribution of past-month user types, including Bulgaria and Sweden, we use the population-weighted average distribution based on the countries with that breakdown. Specifically, that weighted average is 42.5% for those using 1-3 days in the past month, 19.4% for those using 4-9 days in the past month, 13.7% for those using 10-19 days in the past month, and 24.4% for those using 20+ days in the past month.

For the 20 countries lacking data on past-month quantities consumed by user type, we use the population weighted average across the seven sample Member States. Specifically, that is past-month consumption rates of 0.4, 2.8, 8.3, and 35.4 grams per month, for the four user types, respectively.

Table 7: Estimates of annual cannabis consumption in the EU (Based on user type B)

	Past month users		Distribution of use days among past month users					#1. Six Member States with most PM users	#2. EU, with imputes for 22 Member States
	Year	# Users	Year	1-3 d	4-9 d	10-19 d	20+ d		
Bulgaria	2008	74,111	--	--	--	--	--		4
Czech Republic	2010	333,610	2008	42.9	31.9	16.1	9.1		21*
Italy	2008	2,712,132	2005	47.6	24.5	10.2	17.6	271	271
Netherlands	2009	465,818	2009	23.8	21.0	24.8	30.5	72	72
Portugal	2007	171,188	2007	18.5	14.0	23.4	44.1		23
Sweden	2010	59,822	--	--	--	--	--		9
United Kingdom**	2010/11	1,560,350	2010/11	52.7	15.4	15.4	16.5	144	144
Spain	2009	2,389,333	2009	34.1	19.2	12.8	33.9	394	394
France	2010	1,930,446	2010	34.6	16.1	16.0	33.3	318	318
Germany	2009	1,238,155	2009	54.3	15.8	13.0	16.8	115	115
Poland	2006	242,029	--	--	--	--	--		31
Belgium	2008	218,447	2008	48.0	16.2	6.4	29.4		30
Austria	2008	95,473	2004	48.6	16.7	9.0	25.7		12
Ireland	2010	85,533	2006/7	37.0	28.3	10.3	24.4		11
Slovenia	2007	82,000	--	--	--	--	--		10
Denmark	2010	81,834	2010	48.3	18.5	12.6	20.6		9
Hungary	2007	78,683	--	--	--	--	--		10
Slovakia	2006	77,245	--	--	--	--	--		10
Greece	2004	67,236	2004	62.1	6.7	18.9	12.3		5
Finland	2010	49,737	2010	39.1	39.1	8.7	13.0		4
Latvia	2007	28,312	2003	57.1	24.2	13.3	5.4		1
Lithuania	2008	27,794	--	--	--	--	--		4
Romania	2010	15,004	--	--	--	--	--		2
Cyprus	2009	13,975	2009	50.0	20.2	7.1	22.6		2
Estonia	2008	12,762	--	--	--	--	--		2
Luxembourg	2005	9,000	--	--	--	--	--		1
Malta	2001	1,243	--	--	--	--	--		0.2
	<b>Total</b>	<b>12,121,273</b>					<b>Total in Thousand MT</b>	<b>1.31</b>	<b>1.51</b>

**Note:** These estimates are a result of a methodology which uses the most recent information about prevalence and frequency from the EMCDDA and quantity consumed estimates from our user surveys in seven Member States. For Member States' missing frequency information, the European average is imputed. These raw figures have not been adjusted for differences in survey years, differences in survey methods, under/over reporting, non-response, or users who are not in the GPS sampling frame. They differ from the consumption figures presented in Van Laar et al. (this volume) because they are based on a different methodology and, for some countries, different data sources.

\* For example, the estimates for the Czech Republic would be larger and roughly similar to Van Laar et al. (report 1, part I) if we either 1) used prevalence data from 2008 as they do or 2) imputed the European average for frequency instead of what was reported to the EMCDDA. (The share of past-month users in the CR who used daily/near daily was much lower than the European average). This speaks to a larger insight: Consumption and expenditure estimates are fairly sensitive to estimates of the proportion of past-month users who are 20+ day per-month users.

\*\* UK frequency data reported to the EMCDDA do not add to 100%: 48, 14, 14, 15 = 91%. Team members contacted the EMCDDA and they indicated it was a weighting error that had not yet been fixed. To remedy this, we multiplied each value by 1.098. They now add to 99.9.

The basic estimate of EU cannabis consumption (far right-hand column) is 1,510 MT, of which 1,310 MT (87%) comes from the six countries highlighted in Column #1 (Spain, France, Italy, UK, Germany and the Netherlands, listed in decreasing order).

Table 8 combines this country-by-country information with data on herbal cannabis and resin prices and the EMCDDA's low, mid-, and high estimates for herbal cannabis' market share (mid value was imputed from a range). The uncertainty about market share in each country implies there is considerable uncertainty about what proportion of the 1,510 MT of cannabis consumption is herbal (560-740 MT) as opposed to resin (770-960 MT), but that translates into almost no uncertainty about the monetary value of the market (€9.8 billion under each of the low, mid-, and high EMCDDA scenarios).<sup>12</sup>

The primary reason for this is that resin is more expensive than herbal in some countries (including Italy and the Netherlands), whereas herbal is more expensive in others (including France), and these effects roughly cancel. Furthermore, some of the countries with the biggest differences in price have small markets (e.g. Malta), and some of the countries with big markets report no difference in price (e.g. the UK) or no variation in the EMCDDA market share estimates (e.g. Germany).

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<sup>12</sup> Note that we do not attempt to convert this into units of THC. While important, addressing this issue is beyond the scope of this analysis.

**Table 8: Estimates of annual herbal and resin consumption in the EU**

	Estimated cannabis consumption from Table 7 (MT)	EMCDDA Estimates of Herbal's Share of Cannabis Market			Euro per gram reported to EMCDDA		Average Euros per gram of cannabis, by EMCDDA Market Share Assumption		
		Low	Mid	High	Herbal	Resin	Low	Mid	High
Austria	12	75	77.5	80	7.1	7.1	7.1	7.1	7.1
Belgium	30	80	80.0	80	7.5	7.2	7.4	7.4	7.4
Bulgaria	4	85	90.0	95	7.0	11.5	7.7	7.5	7.2
Cyprus	2	85	87.5	90	22.4	24.5	22.7	22.6	22.6
Czech Republic	21*	90	92.5	95	7.8	8.6	7.9	7.9	7.8
Denmark	9	5	7.5	10	6.8	6.8	6.8	6.8	6.8
Estonia	2	80	87.5	95	18.8	17.4	18.5	18.6	18.7
Finland	4	65	65.0	65	17.3	11.0	15.1	15.1	15.1
France	318	15	27.5	40	7.0	4.7	5.1	5.4	5.6
Germany	115	70	70.0	70	8.7	7.1	8.2	8.2	8.2
Greece	5	95	97.0	99	8.7	22.9	9.4	9.1	8.8
Hungary	10	90	92.5	95	8.2	8.6	8.2	8.2	8.2
Ireland	11	40	45.0	50	7.1	7.1	7.1	7.1	7.1
Italy	271	25	30.0	35	8.5	11.2	10.5	10.4	10.3
Latvia	1	80	85.0	90	9.9	9.9	9.9	9.9	9.9
Lithuania	4	90	90.0	90	10.1	9.9	10.1	10.1	10.1
Luxembourg	1	90	90.0	90	11.6	8.3	11.3	11.3	11.3
Malta	0	20	20.0	20	24.5	17.0	18.5	18.5	18.5
Netherlands	72	60	65.0	70	4.2	7.8	5.6	5.5	5.3
Poland	31	90	94.0	98	6.5	8.2	6.7	6.6	6.5
Portugal	23	10	12.5	15	3.6	3.6	3.6	3.6	3.6
Romania	2	60	72.5	85	13.4	16.5	14.6	14.3	13.9
Slovakia	10	96	96.5	97	8.0	8.0	8.0	8.0	8.0
Slovenia	10	95	97.5	99	6.0	11.0	6.3	6.1	6.1
Spain	394	20	25.0	30	4.1	5.2	5.0	4.9	4.9
Sweden	9	20	25.0	30	10.9	9.7	9.9	10.0	10.1
United Kingdom**	144	70	77.5	85	3.3	3.3	3.3	3.3	3.3
<b>Totals</b>	<b>Quantity (MT)</b>							<b>Spending (M Euros)</b>	
<b>All Cannabis</b>	<b>1,513</b>						<b>9,764</b>	<b>9,776</b>	<b>9,789</b>
<b>Herbal</b>		<b>555</b>	<b>647</b>	<b>740</b>			<b>3,521</b>	<b>4,085</b>	<b>4,649</b>
<b>Resin</b>		<b>958</b>	<b>866</b>	<b>773</b>			<b>6,244</b>	<b>5,691</b>	<b>5,140</b>

**Note:** These estimates are a result of a methodology which uses the most recent information about prevalence and frequency from the EMCDDA and quantity consumed estimates from our user surveys in seven Member States. For Member States' missing frequency information, the European average is imputed. These raw figures have not been adjusted for differences in survey years, differences in survey methods, under/over reporting, non-response, or users who are not in the GPS sampling frame. They differ from the consumption figures presented in Van Laar et al. (this volume) because they are based on a different methodology and, for some countries, different data sources.

\* For example, the estimates for the Czech Republic would be larger and roughly similar to Van Laar et al. (report 1, part I) if we either 1) used prevalence data from 2008 as they do or 2) imputed the European average for frequency instead of what was reported to the EMCDDA. (The share of past-month users in the CR who used daily/near daily was much lower than the European average). This speaks to a larger insight: Consumption and expenditure estimates are fairly sensitive to estimates of the proportion of past-month users who are 20+ day per-month users.

\*\* UK frequency data reported to the EMCDDA do not add to 100%: 48, 14, 14, 15 = 91%. Team members contacted the EMCDDA and they indicated it was a weighting error that had not yet been fixed. To remedy this, we multiplied each value by 1.098. They now add to 99.9.

## 5 Estimating expenditures on cannabis directly

The previous chapter estimated spending as consumption multiplied by price. A significant limitation of that approach is that users do not always pay the price as estimated and reported in the official documents. There can be considerable variation in price across regions within a country (Caulkins 1995), and perhaps more importantly, large discounts for purchasing in quantity (Caulkins and Padman 1993). Furthermore, respondents typically have an easier time answering questions about amounts spent rather than quantities; Euros are easier to count than grams. Hence, it is of equal interest to estimate national spending from individuals' reports of their own spending, a method pursued in this chapter.

This alternative approach has its own challenges. Reports of spending are complicated by the frequency of sharing, gifting, etc. (table 4; Caulkins and Pacula 2006). Many past-month users have not bought at all, so one could grossly over-estimate total market spending if one multiplied average spending by those who spent a positive amount by the total prevalence of past-month use. Likewise, some of what individuals purchase they then resell, either at cost (when they act as an "alpha buyer" purchasing for friends) or for profit (if they are a user-seller). So neither estimate is obviously superior a priori; both have value.

For the most part, the method for estimating spending here is entirely straightforward. Sum over countries and user groups the amounts spent on cannabis herb and resin, where by user groups we mean the standard EMCDDA four-part classification into 1-3 days, 4-9 days, 10-19 days, and 20+ days in the past month and where data from the seven sample Member States are used to impute spending rates for the other countries.

Table 9 is the analogue to table 5 above, showing average monthly cannabis spending by country and user type. (The results are nearly identical when top coding monthly spending at €1,000 per month, since that only affected two individuals – who each had reported spending €1,500 per month.)

**Table 9: Average monthly cannabis spending reported in our web survey by country and user type (averages included those who used but did not spend)**

	BG	CZ	IT	NL	PT	SE	UK	Total
<b>Average of spending on Herbal cannabis per month</b>								
1-3	2.3	1.4	10.4	3.5	2.9	14.3	13.1	7.4
4-9	13.2	7.1	18.8	18.2	8.0	32.3	20.5	19.5
10-19	19.7	30.1	33.8	33.7	7.7	92.4	48.8	45.1
20+	50.4	34.7	69.0	103.0	20.1	91.2	121.1	76.2
<b>Total</b>	<b>19.9</b>	<b>18.8</b>	<b>45.5</b>	<b>41.2</b>	<b>10.9</b>	<b>53.4</b>	<b>57.4</b>	<b>41.0</b>
<b>Average spending on Resin per month</b>								
1-3	0.0	0.0	7.4	2.2	10.5	8.4	1.8	4.6
4-9	0.8	0.4	15.1	7.4	4.0	21.8	2.1	10.4
10-19	0.0	2.0	17.6	10.3	13.0	79.9	7.8	25.9
20+	0.0	3.9	42.8	17.8	28.2	120.6	12.6	40.2
<b>Total</b>	<b>0.3</b>	<b>1.7</b>	<b>28.4</b>	<b>9.3</b>	<b>16.6</b>	<b>54.1</b>	<b>6.4</b>	<b>22.2</b>
<b>Average spending on Cannabis in total (Herbal + Resin) per month</b>								
1-3	2.3	1.4	17.8	5.7	13.4	22.7	14.9	12.0
4-9	14.0	7.5	33.8	25.6	12.0	54.1	22.6	29.9
10-19	19.7	32.1	51.4	44.0	20.7	172.4	56.6	71.0
20+	50.4	38.6	111.7	120.9	48.4	211.8	133.8	116.5
<b>Total</b>	<b>20.2</b>	<b>20.4</b>	<b>73.9</b>	<b>50.6</b>	<b>27.5</b>	<b>107.6</b>	<b>63.9</b>	<b>63.2</b>

Table 10 then combines these user-type specific spending estimates with the EMCDDA data on proportions of past-month users who fall into each user type to produce composite spending estimates – both averages per past-month user and totals for the 5 sample Member States for which the EMCDDA break down by user type is available.

**Table 10: Composite spending estimates for the five sample Member States for which the EMCDDA break down by user type is available**

	Past month users (Most recent data submitted to EMCDDA)		Distribution of use days among past month users (Most recent data submitted to EMCDDA)				Mean past month cannabis spending for past month users (Euros)				Weighted mean of past month spending (Euros)	Annual spending for the country (Million Euros)	
	Year	#	Year	1-3 d	4-9 d	10-19 d	20+ d	1-3 d	4-9 d	10-19 d			20+ d
BU	2008	74,111					N/A	2.3	14.0	19.7	50.4		
CZ	2010	333,610	2008	42.9	31.9	16.1	9.1	1.4	7.5	32.1	38.6	11.6	47
IT	2008	2,712,132	2005	47.6	24.5	10.2	17.6	17.8	33.8	51.4	111.7	41.7	1,356
NL	2009	465,818	2009	23.8	21.0	24.8	30.5	5.7	25.6	44.0	120.9	54.5	305
PT	2007	171,188	2007	18.5	14.0	23.4	44.1	13.4	12.0	20.7	48.4	30.3	62
S	2010	59,822					N/A	22.7	54.1	172.4	211.8		
UK	2010	1,560,350	2010	52.7	15.4	15.4	16.5	14.9	22.6	56.6	133.8	42.0	787
								<b>14.6</b>	<b>27.5</b>	<b>51.0</b>	<b>112.6</b>		

**Note:** These estimates are a result of a methodology which uses the most recent information about prevalence and frequency from the EMCDDA and quantity consumed estimates from our user surveys in seven Member States. For Member States' missing frequency information, the European average is imputed. These raw figures have not been adjusted for differences in survey years, differences in survey methods, under/over reporting, non-response, or users who are not in the GPS sampling frame. They differ from the consumption figures presented in Van Laar et al. (this volume) because they are based on a different methodology and, for some countries, different data sources.

\* For example, the estimates for the Czech Republic would be larger and roughly similar to Van Laar et al. (report 1, part I) if we either 1) used prevalence data from 2008 as they do or 2) imputed the European average for frequency instead of what was reported to the EMCDDA. (The share of past-month users in the CR who used daily/near daily was much lower than the European average). This speaks to a larger insight: Consumption and expenditure estimates are fairly sensitive to estimates of the proportion of past-month users who are 20+ day per-month users.

\*\* UK frequency data reported to the EMCDDA do not add to 100%: 48, 14, 14, 15 = 91%. Team members contacted the EMCDDA and they indicated it was a weighting error that had not yet been fixed. To remedy this, we multiplied each value by 1.098. They now add to 99.9.

As noted in the previous chapter, the EMCDDA does not report a breakdown of past-month users across user types for Sweden or Bulgaria. On the one hand, this is not a major concern since these countries account for a very small number of users (table 6). For example, Sweden only accounts for 0.5% of all past-month users in the EU (about 60,000 out of 12 million). On the other hand, the survey-based estimates of spending per user in Sweden are 2 – 3 times greater than the average for countries such as Italy and the Netherlands, which challenges the idea that users in wealthy countries all spend about the same amount, conditional on their frequency of use.

There are important issues to consider when assessing the findings in table 9. One contributor to the variation is the difference in price (and likely average potency) across countries. For example, the price for herbal cannabis in Sweden is more than twice that reported for the Netherlands.

Contrasting Italy and Sweden highlights another issue. Prices are very roughly similar, but there is a large difference in prevalence. Past-month prevalence is almost seven times higher in Italy than in Sweden (6.9% vs. 1.0%), but the spending per past month user appears – based on the web-survey – to be about twice as high in Sweden.

This complexity is a useful reminder that there are important differences in consumption and spending patterns across countries, so the interpolation strategy for filling in consumption and spending estimates for countries not covered by the survey does matter, even if the extent of variation across countries is perhaps not as great as one might have initially expected.

Nevertheless, a crude approach to translate the information from table 10 to the other Member States is to compute average past-month cannabis spending by taking a weighted average of the by user type spending figures at the bottom of the table (€14.6, €27.5, €51.0, and €112.6), weighting by the average proportions of past-month users in the EMCDDA surveys

(the 42.5% 1-3 days, 19.4% 4-9 days, 13.7% 10-19 days, and 24.4% 20+ days figures used above). The result is €46 per month or €550 per year. Multiplying by the estimated 12.1 million PM cannabis users in Europe gives a rough estimate of €6.7 billion spent on cannabis each year. If we limit the analysis to the 1,614 respondents who reported usually obtaining cannabis via purchase and provided complete information for about frequency and consumption, we generate an estimate closer to €9.7 billion (see annex 2).

A more careful analysis would proceed country-by-country as in table 6 above. We do this in table 11 and it turns out to produce the exact same result to within two digits of precision, namely, €6.7 billion per year.

**Table 11: Annual cannabis expenditures in the EU**

	Past month users		Distribution of use days among past month users					#1. Six Member States with most PM users (€M)	#2. EU, with imputes for 22 Member States (€M)
	Year	# Users	Year	1-3 d	4-9 d	10-19 d	20+ d		
Bulgaria	2008	74,111	--	--	--	--	--		17
Czech Republic	2010	333,610	2008	42.9	31.9	16.1	9.1		47
Italy	2008	2,712,132	2005	47.6	24.5	10.2	17.6	1,356	1,356
Netherlands	2009	465,818	2009	23.8	21.0	24.8	30.5	305	305
Portugal	2007	171,188	2007	18.5	14.0	23.4	44.1		62
Sweden	2010	59,822	--	--	--	--	--		69
United Kingdom	2010/11	1,560,350	2010/11	52.7	15.4	15.4	16.5	787	787
Spain	2009	2,389,333	2009	34.1	19.2	12.8	33.9	1,575	1,575
France	2010	1,930,446	2010	34.6	16.1	16.0	33.3	1,277	1,277
Germany	2009	1,238,155	2009	54.3	15.8	13.0	16.8	563	563
Poland	2006	242,029	--	--	--	--	--		134
Belgium	2008	218,447	2008	48.0	16.2	6.4	29.4		125
Austria	2008	95,473	2004	48.6	16.7	9.0	25.7		52
Ireland	2010	85,533	2006/7	37.0	28.3	10.3	24.4		47
Slovenia	2007	82,000	--	--	--	--	--		45
Denmark	2010	81,834	2010	48.3	18.5	12.6	20.6		41
Hungary	2007	78,683	--	--	--	--	--		43
Slovakia	2006	77,245	--	--	--	--	--		43
Greece	2004	67,236	2004	62.1	6.7	18.9	12.3		28
Finland	2010	49,737	2010	39.1	39.1	8.7	13.0		21
Latvia	2007	28,312	2003	57.1	24.2	13.3	5.4		9
Lithuania	2008	27,794	--	--	--	--	--		15
Romania	2010	15,004	--	--	--	--	--		8
Cyprus	2009	13,975	2009	50.0	20.2	7.1	22.6		7
Estonia	2008	12,762	--	--	--	--	--		7
Luxembourg	2005	9,000	--	--	--	--	--		5
Malta	2001	1,243	--	--	--	--	--		0.7
	<b>Total</b>	<b>12,121,273</b>					<b>Total €B</b>	<b>5.86</b>	<b>6.69</b>

**Note:** These estimates are a result of a methodology which uses the most recent information about prevalence and frequency from the EMCDDA and quantity consumed estimates from our user surveys in seven Member States. For Member States' missing frequency information, the European average is imputed. These raw figures have not been adjusted for differences in survey years, differences in survey methods, under/over reporting, non-response, or users who are not in the GPS sampling frame. They differ from the consumption figures presented in Van Laar et al. (this volume) because they are based on a different methodology and, for some countries, different data sources.

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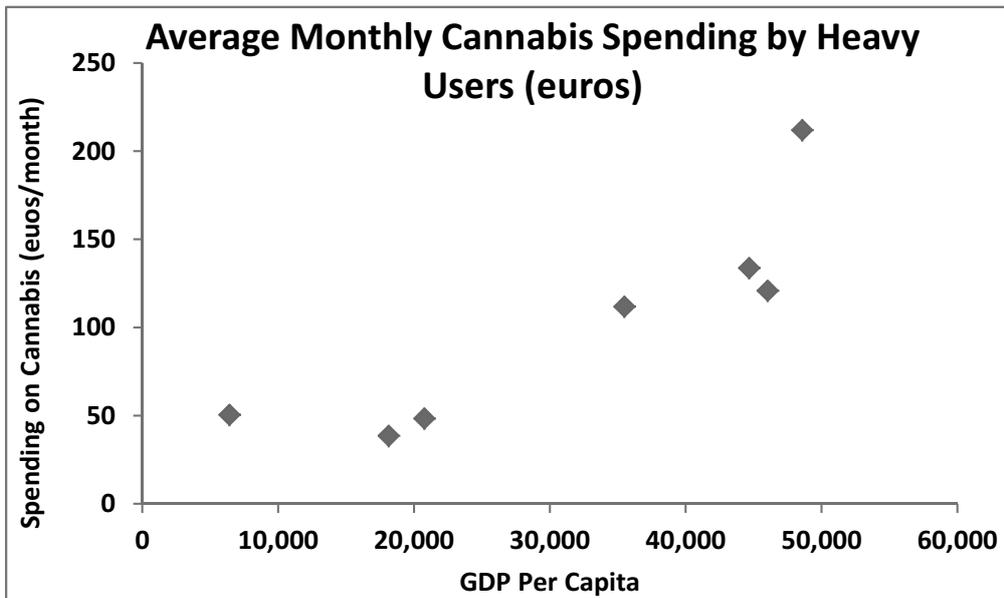
\*\* UK frequency data reported to the EMCDDA do not add to 100%: 48, 14, 14, 15 = 91%. Team members contacted the EMCDDA and they indicated it was a weighting error that had not yet been fixed. To remedy this, we multiplied each value by 1.098. They now add to 99.9.

The estimate could be refined. A glance at table 12 shows that cannabis spending rates are strongly associated with overall level of income (Figure 6 presents the scatterplot). The correlation between past-month spending by heavy users and GDP per capita is very high (0.87). Much of the remaining variation can be explained by cannabis prices; herbal cannabis prices are positively correlated with spending (0.38) but uncorrelated with GDP per capita (0.07). With country-specific spending estimates for just seven countries, it is not possible to calibrate a precise model, but one could make some adjustment. The effects would likely not be large however, since the weighted average GDP of the sample Member States; weighting by number of PM cannabis users is nearly identical to the corresponding weighted average for Europe as a whole.

Table 12: Cannabis spending rates are strongly associated with overall level of income

Country	Average Monthly Cannabis Spending by Heavy Users (€)	GDP per Capita, WB (USD)	Herbal Price per Gram	Resin Price per Gram
Bulgaria	50.4	6,423	7	11.5
Czech Republic	38.6	18,139	7.8	8.6
Italy	111.7	35,494	8.5	11.2
Netherlands	120.9	46,041	4.2	7.8
Portugal	48.4	20,762	3.6	3.59
Sweden	211.8	48,584	10.9	9.7
United Kingdom	133.8	44,693	3.32	3.32
Correlation with Cannabis Spending		0.87	0.38	0.07

Figure 6: Scatterplot on monthly cannabis spending and per capita GDP



Hence, in all likelihood there would remain a considerable gap between the spending estimate obtained by multiplying quantity consumed (roughly 1,500 MT) by the average retail price per gram (quantity weighted averages across countries of €6.23 and €6.69 for herbal and resin, respectively), and the estimate obtained from the respondents statements about spending. The latter (€6.7 billion) is about two-thirds of the former (€9.8 billion).

There is any number of reasons why there could be a discrepancy, but the most obvious is that cannabis consumption is dominated by heavy users, and heavy users often buy more than a gram at a time, so they benefit from quantity discounts. Indeed, it is not altogether unreasonable to think of the ratio of the two estimates as a very rough estimate of the average quantity discount relative to retail that cannabis purchasers obtain.

## 6 Conclusions

Past estimates of the size of the EU cannabis market vary dramatically, with figures ranging from approximately €15 billion to €35 billion per year. An important source of uncertainty is the limited information available about typical quantities consumed for different types of users. Combining insights from our surveys with data collected by the EMCDDA about cannabis prevalence, frequency, and prices, this chapter suggests the market may be considerably smaller. Calculations here suggest a range of €6.7 billion to €9.8 billion annually circa 2010, before adjusting for the “consumption gap” – meaning the difference between actual consumption and what would be estimated based on surveys. This paper does not calculate or advocate for the use of a particular “consumption gap” adjustment; we think this is best done ex post in a judgmental way, not via some calculation that creates an artificial sense of precision. If one believes that these survey-based estimates only capture half of the market (an estimate that is not uncommon in the alcohol literature, but generally larger than the figures typically used for cannabis), then the market would be €13.4 billion to €19.6 billion—still lower than UNODC’s estimate (2005) and the upper bound offered by Kilmer and Pacula (2009). Those comfortable with the more conventional adjustment of bumping up by 25% would estimate the range to be €8.4 billion to €12.1 billion.

The main reason our estimates are lower is because our web survey suggests lower rates of consumption and spending than the rules of thumb from the past. However, this is just one survey. If our estimates are wrong, it will likely be because our web-based survey did not capture the really heavy dependent users, or because of the general “consumption gap” that also appears for alcohol and tobacco.

Finally, the analyses presented in this chapter make methodological contributions that should improve future attempts to size illegal drug markets. Most importantly, we demonstrate that since consumption intensity (grams per day of use) is positively correlated with consumption frequency (days used per month), multiplying the average number of use days by the average number of grams consumed per use day generates consumption figures that are lower than the correct approach of multiplying each individual’s days consumed and daily consumption figures and then averaging across individuals only after that multiplication. We hope this will be incorporated into future sizing exercises and motivates the collection of additional data about quantities consumed and expenditures.

## 7 References

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# Annex 1: Estimating a nation's past-year consumption from individuals' descriptions of past-month activities

There are two obvious approaches to estimating past-year consumption: asking past-month users how much they used in the last 30 days and multiplying by 12 (or by  $365 / 30$ ) and asking past-year users how much they used in the last year. The results are likely to be similar, but can differ for at least three reasons.

- In the early, explosive growth stage of a drug epidemic, the current rate of consumption might exceed that of a year ago by a considerable margin, so multiplying past-month use by 12 could over-estimate consumption over the previous 365 days (although still perhaps under-estimate consumption for the coming year).
- If drug use is highly seasonal and all of the past-month data were collected in one particular season (e.g., summer), then that seasonality could distort annual estimates.
- Self-reported use can differ from actual use, and the extent of the discrepancy may differ for past-month as opposed to past-year reporting. E.g. memories may simply be more reliable for past-month use, or, on the other hand, respondents might under-report recent deviant behaviour more severely than they under-report deviant behaviour from the distant past.

We believe that, on balance, these competing considerations favour focusing on past-month reports of cannabis use and expenditures. Cannabis use is well-established throughout Europe, so the first consideration is irrelevant. We would prefer the surveys asking about past-month consumption be conducted throughout the year, not just within a ten-week span, but in our view the trumping consideration is simply the greater ability of respondents to remember and describe what they did over the last month as opposed to the last year.

Omitting consumption by past-year but not past-month users is not a problem with the approach of multiplying past-month use by 12. To simplify, there are two types of individuals who have used in the last year but not in the last month. The first are extremely light users, say, someone who uses on a half-dozen days randomly sprinkled throughout the year, none of which happen to fall within the past 30 days. While that person's consumption may be omitted, their "twin" who also uses only a half dozen times and does happen to have one of those days fall within the last month will get counted, and multiplying the "twin's" past-month consumption by 12 will over-estimate that individual's consumption by enough to compensate for omitting the first person. Furthermore, total consumption is dominated by daily and near-daily users; consumption by "ultra-light" users who use on only a handful of days a year is lost in the round-off error of estimates of consumption by heavy users.

The second type of past-year user missed when focusing on past-month use is a "de-escalator" – someone who perhaps used daily from 12 months ago until 6 months ago but then quit and has abstained since. If consumption of the drug were plummeting, with larger numbers of "quitters" than initiators, this might pose a problem. But if overall consumption is relatively stable over time, then de-escalators must be matched by escalators, and, via an argument similar to that just given for the ultra-light users, multiplying recent escalator's past-month consumption by twelve will compensate for over-looking the de-escalators.

Note: neither of these arguments applies at the individual level. Any given individual's consumption may not be estimated reliably by multiplying past-month use by 12; but our goal here is to estimate aggregate not individual consumption.

## Annex 2: Sample Member States' expenditure calculations for those with complete information

This annex replicates the analyses described in chapter 5 with a subset of the sample Member States respondents who 1) reported usually obtaining cannabis via purchase and 2) provided complete information for about frequency and consumption. The earlier analysis was based on all 2,540 observations who reported information about quantity consumed, including those who reported that they usually received cannabis for free, grew their own, or obtained via another method that was not a purchase. Those who reported not usually purchasing cannabis were not asked how much they spent. Chapter 5 assumed these individuals did not spend any money on cannabis in the previous month. That approach yielded an EU-wide estimate of €6.7 billion. This chapter effectively assumes that those who do not usually purchase cannabis nevertheless spend as much on cannabis as those who do regularly purchase by restricting the analysis to the 1,614 respondents who say they do regularly purchase cannabis. This generates an estimate closer to €10 billion. Presumably the true figure lies somewhere between these two extremes, since those who do not regularly purchase may nevertheless occasionally spend some money on cannabis, but presumably do not spend as much as those who regularly purchase cannabis.

**Table A1: Respondents reporting complete information about cannabis expenditures and past month resin and herbal use in the past month, by frequency of use**

		Days used resin in past month								
		0	1	2	4	8	15.5	25	30	Total
Days used herbal in past month	0	0	38	18	37	21	19	13	15	161
	1	84	39	11	17	11	9	3	7	181
	2	65	13	23	14	9	9	5	5	143
	4	112	22	14	27	10	21	24	17	247
	8	74	11	21	27	24	24	15	7	203
	15.5	95	26	27	24	21	33	11	5	242
	25	115	29	20	35	14	10	38	1	262
	30	69	23	20	18	12	4	8	21	175
	Total	614	201	154	199	122	129	117	78	1,614

**Figure A1: Respondents reporting complete information about cannabis expenditures and past month resin and herbal use in the past month, by country (n=1614)**

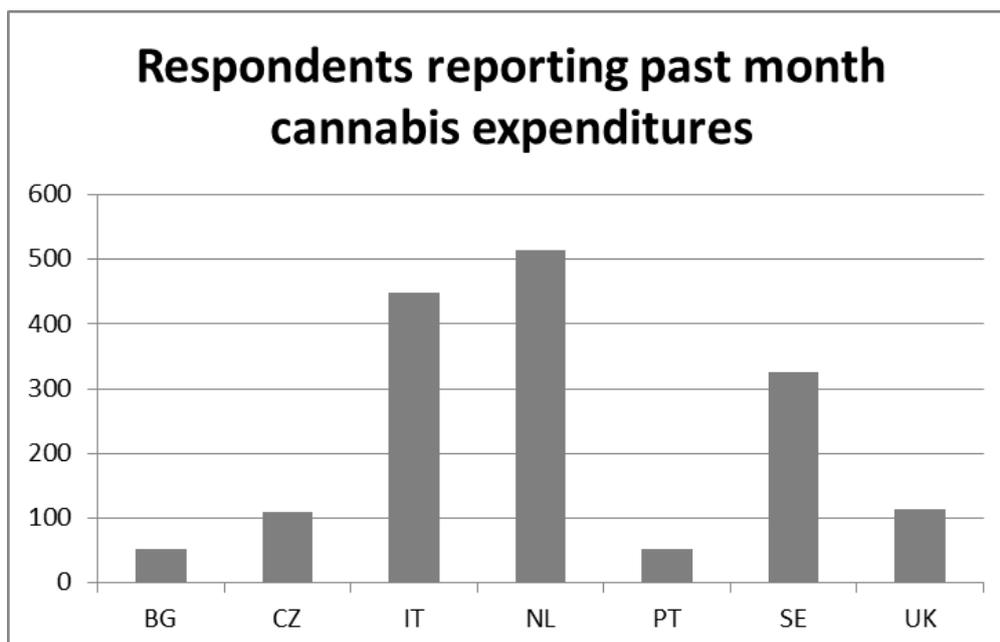


Figure A2: Histogram of past month spending on cannabis for these 1,614 individuals

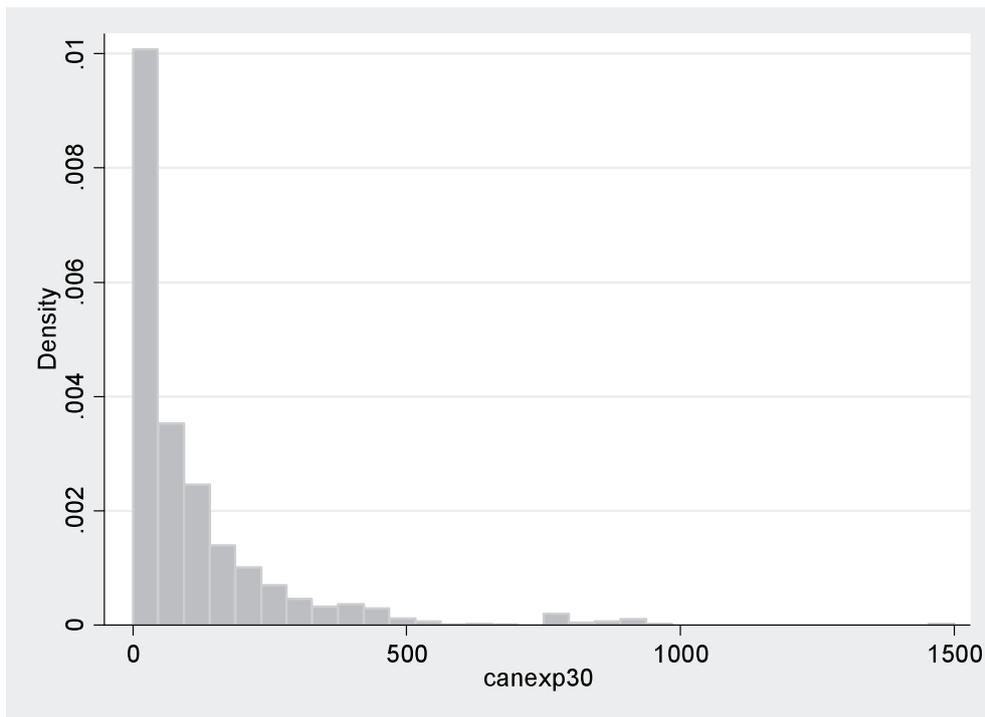
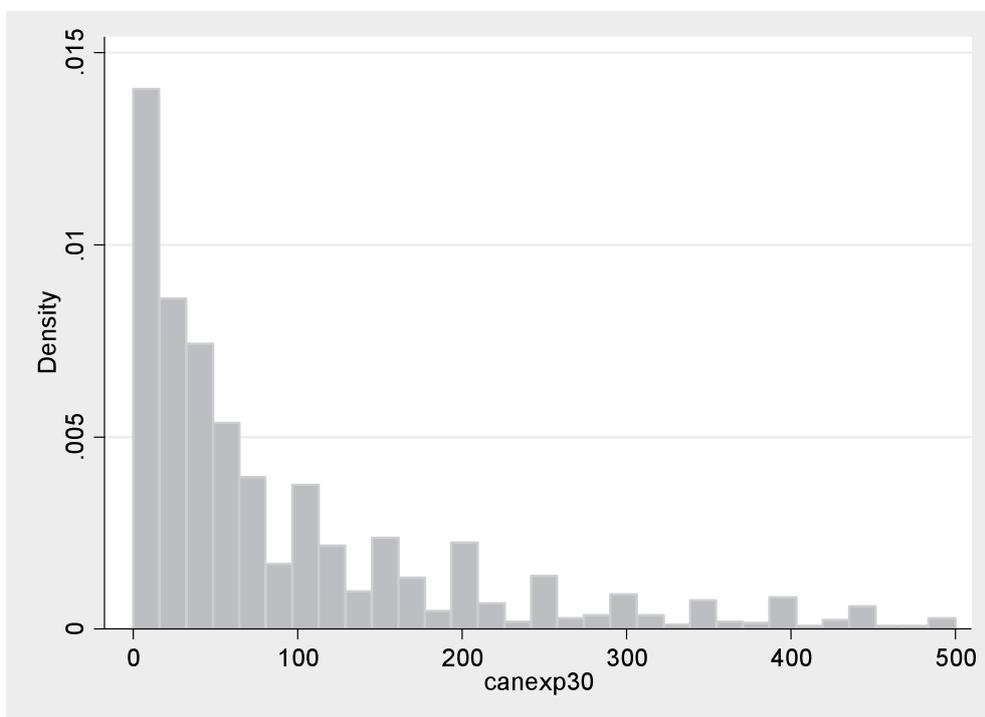


Figure A3: Histogram of past month spending on cannabis for those spending less than €500 per month



**Table A2: Past month expenditures on cannabis by EMCDDA user category and country**

	Group A				Group B				Group C					
	Cat 1	Cat 2	Cat 3	Cat 4	Cat 1	Cat 2	Cat 3	Cat 4	Cat 1	Cat 2	Cat 3	Cat 4		
CZ	€11.25	€23.71	€70.38	€86.25	CZ	€11.25	€22.58	€68.39	€86.25	CZ	€11.25	€21.50	€63.06	€86.25
sd	€16.85	€18.99	€57.11	€65.70	sd	€16.85	€18.88	€55.48	€65.70	sd	€16.85	€17.48	€49.59	€65.70
n	8	35	26	40	n	8	33	28	40	n	8	30	31	40
IT	€27.38	€44.38	€97.03	€168.52	IT	€27.38	€38.92	€81.20	€157.78	IT	€16.75	€40.07	€75.94	€152.40
sd	€39.71	€32.06	€58.92	€110.58	sd	€39.71	€32.01	€47.85	€102.40	sd	€19.63	€32.78	€43.82	€101.88
n	42	96	101	210	n	42	74	83	250	n	40	69	69	271
NL	€10.39	€33.48	€60.66	€147.23	NL	€10.39	€31.88	€53.31	€144.94	NL	€9.45	€29.66	€53.54	€139.06
sd	€9.73	€22.43	€38.67	€96.11	sd	€9.73	€21.75	€32.75	€94.45	sd	€8.62	€21.30	€34.68	€92.62
n	128	145	76	166	n	128	130	80	177	n	118	131	79	187
SE	€25.97	€91.92	€282.00	€302.95	SE	€25.97	€70.61	€233.77	€319.04	SE	€18.99	€73.83	€203.31	€317.53
sd	€31.68	€100.11	€237.74	€242.49	sd	€31.68	€71.00	€34.00	€261.88	sd	€20.50	€78.87	€174.99	€259.53
n	77	117	65	66	n	77	98	61	89	n	69	98	59	99
UK	€28.71	€35.62	€103.06	€161.25	UK	€28.71	€37.23	€90.86	€161.90	UK	€23.18	€38.84	€86.68	€160.47
sd	€31.90	€28.49	€61.37	€108.49	sd	€31.90	€28.58	€64.33	€108.34	sd	€22.14	€29.99	€66.81	€107.68
n	17	31	19	46	n	17	29	19	48	n	15	30	19	49

**Table A3: Annual expenditures based on responses to questions about cannabis expenditures in the past month (sample Member States)**

	Type of PM User			
	1-3 d	4-9 d	10-19 d	20+ d
<b>Monthly Spending from sample Member States</b>	24.5	36.8	83.6	154.6
<b>Prevalence share from EMCDDA</b>	42%	19%	14%	24%
<b>66.7</b>	Weighted average PM spending by PM user			
<b>800</b>	Annual Spending (monthly figure*12)			
<b>12,121,273</b>	Total # of PM users in Europe			
<b>9.7</b>	Implied annual cannabis spending (B of Euros)			

**Note:** These estimates are a result of a methodology which uses the most recent information about prevalence and frequency from the EMCDDA and quantity consumed estimates from our user surveys in seven Member States. For Member States' missing frequency information, the European average is imputed. These raw figures have not been adjusted for differences in survey years, differences in survey methods, under/over reporting, non-response, or users who are not in the GPS sampling frame. They differ from the consumption figures presented in van Laar et al (this volume) because they are based on a different methodology and, for some countries, different data sources.

For example, the estimates for the Czech Republic would be larger and roughly similar to Van Laar et al. (report 1, part I) if we either 1) used prevalence data from 2008 as they do or 2) imputed the European average for frequency instead of what was reported to the EMCDDA. (The share of past-month users in the CR who used daily/near daily was much lower than the European average). This speaks to a larger insight: Consumption and expenditure estimates are fairly sensitive to estimates of the proportion of past-month users who are 20+ day per-month users.

UK frequency data reported to the EMCDDA do not add to 100%: 48, 14,14,15 = 91%. Team members contacted the EMCDDA and they indicated it was a weighting error that had not yet been fixed. To remedy this, we multiplied each value by 1.098. They now add to 99.9.



## Part II: Drugs market: selected features

- 1 Opioid consumption and substitution treatment in Finland and Sweden: a similar path with different outcomes?**  
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# Report 1

## Opioid consumption and substitution treatment in Finland and Sweden: a similar path with different outcomes?

Andrés Villaveces, Jirka Taylor and Beau Kilmer

### Abstract

While heroin use is on the decline in some Member States, heroin and other opioids still account for most of the drug-related morbidity and mortality in the European Union. This case study looks at two Nordic neighbours that are quite similar by a number of socio-economic measures, but have had different experiences with opioids over the past two decades: Finland and Sweden. Indicators from both countries suggest heroin use has decreased since the late 1990s; however, the size of the decline in heroin use has differed considerably. In Finland, problem heroin use, which has always been comparatively low in European terms, is nowadays extremely rare, whereas in Sweden, its abuse continues to be much more frequent than in Finland. Both countries started prescribing buprenorphine to treat heroin dependence in the late 1990s, but with different consequences. In Finland, buprenorphine abuse largely replaced heroin abuse and is now the main reason for individuals seeking treatment as well as the leading cause of drug-related death. This has not been the case in Sweden, where mortality figures attributable to buprenorphine are lower than in Finland, even though the extent to which buprenorphine is abused in Sweden could be somewhat underreported, as abusers of this drug do not usually qualify for OST programs. This chapter seeks to develop plausible hypotheses to account for the observed differences in opioid-consumption prevalence between the countries. At this stage the available data do not permit adequate testing of the different hypotheses advanced.

### 1 Introduction

While heroin use appears to be decreasing in the European Union, the morbidity and mortality due to heroin continue to be a serious problem in a number of Member States (Kimber et al. 2010; Solberg et al. 2002, World Health Organization 2003). To reduce heroin dependence and the related harms, Member States have developed and supported opioid substitution treatments (OSTs). The purpose of OSTs is to provide individuals participating in treatments with opportunities to focus on reducing the use of illicit drugs, reducing the risk of infectious diseases, improving physical and psychological health, reducing criminal behaviour, reintegrating individuals to work and education and to improve social functioning without necessarily stopping drug use (World Health Organization 2003). As the box below illustrates, a variety of pharmaceutical agents can be used in the delivery of OST.

### Pharmacological agents used in treatment of heroin dependence

OSTs can include several pharmaceutical agents such as methadone, levo-alpha-acetylmethadol (LAAM), buprenorphine, naltrexone, buprenorphine/naloxone (Suboxone®), and in some places medical-grade heroin. Methadone is a synthetic opioid that helps prevent and stop withdrawal symptoms from heroin. While effective in replacing heroin and reducing symptoms it also has a high potential for misuse.<sup>1</sup> LAAM, also a synthetic opioid is considered to be similar to methadone in its effects, which include analgesia, sedation and respiratory depression. LAAM is indicated for use in the treatment and maintenance of opioid dependence and it has a long duration of action requiring less frequent dosing. Buprenorphine is a semi-synthetic opioid narcotic used to treat opiate dependence but can also become addictive as it can produce similar effects to those experienced when consuming heroin (i.e. euphoria). It is usually administered sublingually. Naloxone is a narcotic antagonist and hence reverts the symptoms produced by narcotics. In combination with buprenorphine, it is used to discourage intravenous abuse, in which case it can precipitate extreme withdrawal (in dependent users) or reduces the high experienced (in non-dependent users)<sup>2</sup>. Naltrexone has similar effects to naloxone; however, its longer half-life (compared with naloxone) has potential advantages in terms of providing a longer period of antagonist cover, but the potential disadvantage is that withdrawal reactions would also be prolonged.

There is strong consensus that OST is the best way to address heroin dependence. According to the World Health Organization (WHO), there have been over 100 randomized studies of opioid maintenance treatment, which consistently report benefits and largely focus on methadone (World Health Organization 2003). OST benefits range from overall improvements in health outcomes and reductions in risk behaviours (Solberg et al. 2002), overall increased survival over time (Kimber et al. 2010), demonstrable reduction in HIV infections (Sullivan et al. 2005; Gowing et al. 2011) and improved health and behaviour outcomes in special populations such as imprisoned individuals (Hedrich et al. 2012). In this context, a variety of models have demonstrated the cost-effectiveness of OST as a form of treatment (Schackman et al. 2012).

This case study looks at two Nordic countries that are quite similar on a number of measures, but have had different experiences with opioids over the past two decades: Finland and Sweden. Indicators from both countries suggest that heroin use has decreased since the late 1990s, but it is now extremely rare in Finland (Tanhua et al. 2011). By contrast, heroin is still the most common drug detected in deaths in Sweden. Both countries started prescribing buprenorphine to treat heroin dependence in the late-1990s, but in Finland buprenorphine dependence is now the main reason why individuals seek treatment and is believed to be the leading cause of drug-related deaths in this country (Tanhua et al. 2011). This chapter seeks to generate plausible hypotheses, which if tested, would help account for these differences between the neighbours. The implications for OST policies throughout the EU of these hypotheses are highlighted as appropriate.

To support its aim, this paper is structured as follows. Next section briefly explains our rationale for developing this paper through a logic model, as presented in Figure 1, and provides the socio-economic background along with a short discussion of historical developments in the run-up to the introduction of buprenorphine as part of OST in the two countries. Subsequently, available data on opioid consumption, along with on treatment admissions, reported prices and drug seizures are presented. The following section gives an overview of the opioid substitution treatment regimes and their development in both countries. Next, information on opioid-related harms is provided to shed additional light on trends in opioid consumption in both countries. Finally, this paper synthesizes the above-presented data and formulates several hypotheses that might account for the observed differences between Finland and Sweden.

<sup>1</sup> However, for instance, from a Swedish perspective methadone's potential for abuse is not regarded as high as that of buprenorphine.

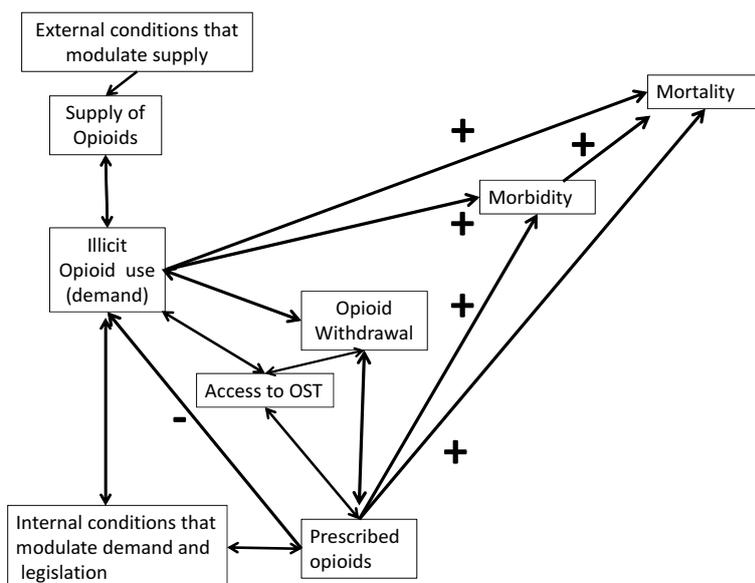
<sup>2</sup> When used properly through the sublingual route, over half the administered dose of buprenorphine enters the circulation but less than 10% of the dose of naloxone does. Of course if it is used illicitly via the IV route then all of each drug enters the circulation. Nutt, D. J. (2010) 'Antagonist-agonist combinations as therapies for heroin addiction: back to the future?' *Journal of psychopharmacology* 24(2), 141-5.

## 2 Background

### 2.1 Logic model

The following logic model (Figure 1) guided the development of this paper. External conditions affecting opiate supply or opiate transit countries may modulate the internal socio-economic environment in receptor countries, specifically in regards to the availability of illegal opiates entering those countries. Internal conditions can affect the distribution of drugs, their consumption, and the way treatment for abuse is provided. These internal conditions (political and legal frameworks and social norms) can also determine how widely and effectively legal opioid prescription is provided to the population but can also have an effect of abuse (even of legally prescribed substances). When abuse exists, these legal and political frameworks can allow for the development of opioid substitution therapies that are mainly aimed at reducing addiction as well as improving the conditions in which individuals expose themselves to opioids. Populations that are more vulnerable or that engage in high-risk behaviours are at especial risk. These high-risk behaviours, such as opiate abuse, may lead to changes in opiate-related morbidity and mortality. A variety of factors may influence the types of drugs people abuse and the method of abuse. These include changes in the supply of opiates (both legal and illegal), changes in internal and external conditions, and economic uncertainties. The latter can also modify the way in which countries approach opiate substitution therapies and how wide or restrictive programs can be which in turn can affect legal and illegal consumption.

**Figure 1:** Logic Model explaining relationships between opioid markets, opioid abuse and its related consequences and the role of Opiate Substitution Therapies (OSTs)



### 2.2 Socio-economic and historical comparisons

Sweden and Finland are broadly comparable on a range of socio-economic indicators (Table 1). Both countries are affluent Nordic states with health and welfare systems that achieve roughly similar social outcomes as expressed by indicators such as life expectancy, at-risk-of-poverty rate and educational attainment. Historically, both countries' most vulnerable populations have fared well in economic crises because in part, their welfare policies have buffered adverse economic conditions and have not affected overall health trends (Kunst et al. 2005). Still, within each country there are large illness differentials mostly related to educational levels where people in lower socio-economic positions are associated with higher illness levels (Lahelma et al. 1994). Morbidity is higher also among those without jobs and in agricultural settings where Finland has a greater proportion of the population compared to Sweden (Lahelma et al. 1992). In addition, studies of long-term trends also show that Finland has comparatively poorer health in relation to other Nordic countries. This has been partially explained as a cohort effect associated with lower living standards existing in Finland until the mid-1950s. Another possible reason is that alcohol abuse in Finland is greater. These effects are more notable among men (Silventoinen and Lahelma 2002).

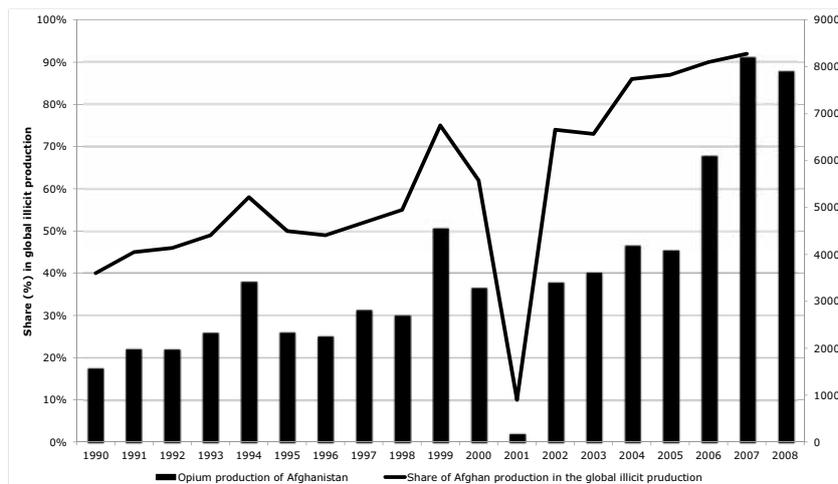
**Table 1: Demographic economic and health indicators for Finland and Sweden circa 2010**

Indicator	Finland	Sweden
Population	5,387,000 (2011)	9,453,000 (2011)
Life expectancy at birth	79.9	81.5
At-risk-of-poverty rate by poverty threshold (% of total pop)	13.1	12.9
Gender gap employment (%)	1.0	3.9
Total annual expenditure on health per capita at current prices and PPPs (\$US)	3,251	3,758
Health insurance coverage (Percentage of the population)	100	100
Hospital beds density per 1000 population	5.9	2.7
Public spending on family benefits in cash, services and tax measures, in percent of GDP, 2007	2.83	3.35
Tertiary level educational attainment for age group 25-64 as a percentage of the population in the corresponding age group	35.1 (2006)	30.5 (2006)
AIDS incidence per million	3.9	6.8
HIV prevalence	0.05%	0.09%
Prison pop rate/100,000	60	70

Sources: World Bank, OECD, WHO, European Centre for Disease Prevention and Control, and International Centre for Prison Studies, 2012.

Similarly to the socio-economic characteristics of the two countries, there are both commonalities and differences in the development of Finland and Sweden in the context of the 1990s and early 2000s. In the first half of the 1990s both countries underwent a serious economic downturn. Sweden entered a recession following the burst of its housing and financial bubble. The Finnish crisis, while partially affected by the economic slump in Sweden, was mostly attributable to the collapse of the Soviet Union, a key Finnish trading partner, and the ensuing disruption to mutual trade. The Finnish downturn exceeded in its scope that of Sweden and affected mostly working and younger populations, whose levels of poverty increased substantially in its aftermath<sup>3</sup> (Gorodnichenko et al. 2012). From a drug supply perspective, the breakup of the Soviet Union also resulted in changes in border arrangements and regimes between the European Union, newly independent Baltic countries, and Russia, allowing for increased illicit goods exchanges. Furthermore, the Soviet collapse coincided with the aftermath of the Soviet intervention in Afghanistan and the rise of the Taliban. In this country, historically one of the main suppliers of heroin for Europe, production of heroin peaked in 1999 and then started to drop in 2001 after the 2000 ban on poppy cultivation enforced by the Taliban before the planting season of 2001 (Paoli et al. 2009). This ban affected Europe in different ways. For Eastern Europe, Russia, the Baltic countries, and increasingly the Nordic Countries, the 'old silk road' of commerce through Central Asia, Russia and to some extent the Caucasus has become a much more common route of trafficking (Fenopetov 2006) while for other countries in Western Europe (or southern Sweden, where the vast majority of the population is concentrated), routes coming from the Middle East, Turkey, and North Africa, has continued to be used. After a short period, poppy cultivation in Afghanistan increased but, as will be discussed in the next section, heroin consumption in Finland and Sweden did not follow this upward trend. The following Figure 2 illustrates opium production over time in Afghanistan, as reported by the EMDCCA, Monitoring the Supply of Heroin to Europe report (EMCDDA 2008).

<sup>3</sup> As Hytti (2003) points out, the Finnish economic experience was exacerbated by her lack of market diversification.

**Figure 2: Afghanistan – Estimated opium production and share in global detected illicit production, 1990 – 2007**

Source: Adapted from UNODC 2007 and UNODC 2008)

### 3 Opioid consumption, prices and seizures

Obtaining detailed information about heroin consumption in Finland and Sweden is difficult. Like in many countries, data reported by Finland and Sweden on estimated trends of problem opioid use to the EMCDDA are very patchy at best. The Finnish national focal point reported its estimates of problem opiate users as a share of total population for five years between 1998 and 2005, which remains the latest estimate. These estimates were preceded by estimates of the prevalence of problem opiate use in the Greater Helsinki region since 1995 (which remains the oldest Finnish estimate available<sup>4</sup>), which were later extrapolated to the entire country. None of these estimates is broken down by opiate type. Sweden has periodically reported estimates of the size of its entire population of problem drug users since 1979 (the latest estimate available being from 2009). However, the last estimate that was broken down by types of drug is from 1998 (Olsson 2001), more recent estimates of problem drug use do not reliably allow such a breakdown<sup>5</sup>. While in some places injection drug users are a proxy for heroin users, this is not the case in Europe where amphetamines are sometimes injected. Further, the EMCDDA statistical tables with information about drug use in the general population do not include a column for heroin or opioids. UNODC collects information about consumption in the general population, but heroin use is very low, making it difficult to draw inferences. Thus, much of this section depends on general trends reported by the focal points and information about drug treatment admissions. The remainder of the section report information of prices, which also require a hefty amount of scepticism.

#### 3.1 Consumption

Following its introduction as a problem drug in the second half of the 20th century, trends in heroin consumption in Finland and Sweden followed a similar path, marked by reported increases in both countries in the 1990s. The UNODC World Drug Report (UNODC 2000) reported that the annual prevalence of opiate use in Finland was 0.05 percent, among everyone ages 15 and older based on a UNDCP estimate for 1997. This is somewhat lower than the figures reported by the national focal point to the EMCDDA, which are summarized in table 2 below and estimated the percentage of problem opiate users in the 15-54 population was 0.06-0.09% (based on 95% CI) in 1998. The number of problem opiate users in Finland rose to its peak in 2002, only to decline in subsequent years (Tanhua et al. 2012). This is consistent with findings reported in the 2012 UNODC World Drug Report, which includes ARQ responses about annual consumption of opioids for both countries (Tanhua et al. 2011). The information for Finland is from the 2006 ARQ and the rate for those aged 15-64 was 0.20 percent, i.e. somewhat higher than National Focal Point's estimates for the preceding years. However, the ARQ allowed countries to

<sup>4</sup> However, researchers observed that the Finnish drug profiles had not changed much since the late 1980s, Virtanen, A. (2000) Finland Drug Situation 2000: National Report on the Drugs Situation in Finland, Helsinki: National Research and Development Centre for Welfare and Health (Stakes).

<sup>5</sup> Others pointed out that the 1998 study encountered methodological difficulties that, among other issues, led to an upward adjustment of former estimates, Andersson, B., Lönnberg, A., Akmea and Andersson, B. (2002). National Report Sweden 2002, Stockholm: Swedish National Institute of Public Health, Centralförbundet för alkohol- och narkotikaupplysning.

report prevalence rates for the all-encompassing category of “opioids” as well as for subgroups “opiates” and “prescription opioids.” Finland did report for “opiates”, which includes heroin and perhaps opium.<sup>6</sup> This figure was only 0.01 percent. Compared with the 0.2 percent figure for “opioids”, this implies that heroin is rare in Finland<sup>7</sup>. As will be discussed in greater detail in the following sections, this is consistent with treatment indicators and data on heroin seizures, which have been consistently low since 2001 (Finnish Customs 2010). The relatively small population of heroin users in Finland tends to consist of younger persons and there is a higher proportion of consumption by injection (Barrio et al. 2011). Furthermore, these data are consistent with reports of a large increase in buprenorphine consumption in Finland over the last decade, suggesting a large-scale replacement of heroin with buprenorphine took place in Finland over the past decade. Seizures related to the use of buprenorphine tablets have increased since 2001, with a slight decrease in 2005 (Forsell et al. 2010). One report indicates that buprenorphine abuse is the highest in Finland (Yokell et al. 2011) and police data indicate that much of the smuggled buprenorphine to Finland has come from France where it is readily available since all primary care physicians can prescribe it for opiate dependence (Nordmann et al. 2012; Yokell et al. 2011; Obadia et al. 2001).

**Table 2: Estimates of the proportion (%) of problem opiate use in Finland**

Year	1998	1999	2001	2002	2005
Opiate users	0.06-0.09	0.09-0.11	0.14-0.17	0.15-0.21	0.13-0.18

Source: *Reitox 2011 Report (Tanhua et al. 2012)*

The consumption of heroin in Sweden has varied substantially in the last 40 years with reported high levels of consumption after 1974, a reduction in the 1980s and a steady increase until the 2000s. The prevalence figure for those aged 15-75 in Sweden indicated in the UNODC 2000 World Drug Report was 0.1 percent. Given the different age categories, potential rounding error, lack of information about specific opioids, and the fact that many problem users do not show up in the GPS, we cannot make inferences about which country had more heroin users per capita at the end of the 1990s from these data. According to the national estimate from 1998, 28% of total 26,000 estimated problem drug users were users of opiates (Olsson 2001). This corresponds to roughly 0.15% of the Swedish population aged 15-54 in that year, i.e. somewhat higher share than that in Finland but not dissimilar to those arrived at a few years later.<sup>8</sup> In the last decade opiate consumption in Sweden has decreased but comparatively, consumption of heroin remains higher than in Finland (EMCDDA 2012). The number of estimated problem drug users in Sweden remained roughly constant over the 2000s. However, as will be discussed in greater detail in the next section, among treatment seekers, the proportion of drug users with heroin as their primary substance decreased from 24% in 2004 to 17% in 2008. There might have been a corresponding rise in the use of other opiates, but as late as 2008, heroin was still a more frequent primary substance than all other opiates combined. As in Finland, in Sweden injection is the preferred method of heroin followed by inhalation and sniffing (Byqvist 2006).

## 3.2 Treatment admissions

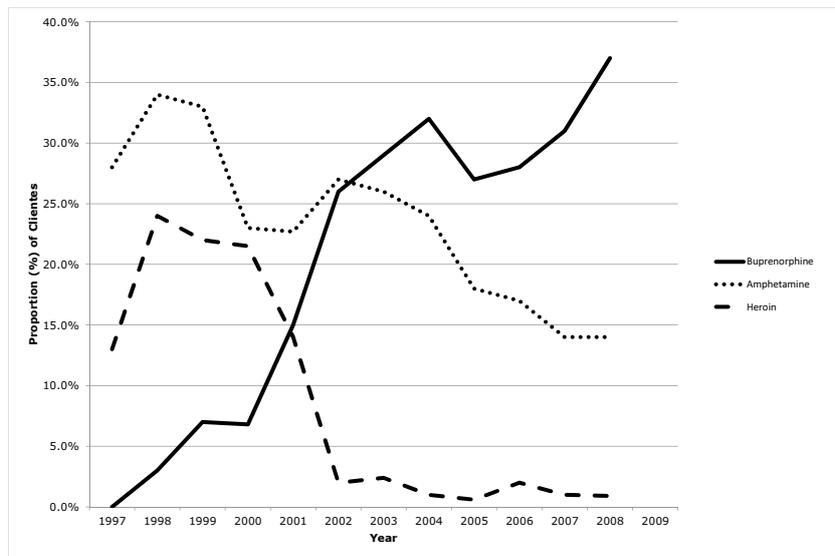
Figure 3, from Uosukainen et al (Uosukainen et al. 2012) highlights the contrasting trends between heroin and buprenorphine use amongst clients seeking treatment at the Helsinki Deaconess Institute, an institution that provides treatment for substance abuse in the greater Helsinki area. The figure shows that around 2001 the proportions were equal and then got inverted. Clients reporting buprenorphine abuse replaced clients previously reporting heroin abuse. Interestingly, for Finland, this period coincides with marked increases in supply of heroin (the peak production for Afghanistan was 1999) followed by reduction in the availability of heroin coming from Afghanistan due to imposed effective controls by the Taliban in the late 2000. For 2001 and through 2002 when the drop in heroin availability affected most of Europe (Paoli et al. 2009), the replacement of buprenorphine became more evident.

<sup>6</sup> By contrast, the language of the National Focal Point uses “opiates” as an umbrella term to encompass heroin, buprenorphine, methadone etc.

<sup>7</sup> Indeed, multiplying the UNODC’s 0.01 percent by the 3.5 million Finnish residents aged 15-64 circa 2005 would suggest that there were roughly 350 annual heroin users in Finland in this age range. While this figure should not be considered precise, it highlights the dearth of heroin users in Finland at this time.

<sup>8</sup> Population data as per Eurostat database, data set [demo\_pjangroup]. The age span was chosen to match that used in the Finnish reports, Olsson et al. estimate that less than 5% of problem users are older than 50 years, Olsson, B., Adamsson Wahren, C., and Byqvist, S., (2001) *Det tunga narkotikamisbrukets omfattning i Sverige 1998*, Stockholm: Centralförbundet för alkohol- och narkotikaupplysning, CAN.

**Figure 3: Proportions of clients per year seeking treatment for buprenorphine, amphetamine and heroin abuse from initial client visits seeking treatment at the Helsinki Deaconess Institute in Finland, 1997 – 2008**



Source: Adapted from Uosukainen et al. (Uosukainen et al. 2012)

Table 3 shows the increase in treatment admissions for buprenorphine abuse and simultaneous decrease for heroin for all of Finland.

**Table 3: Substances used by clients entering treatment for the use of narcotics and pharmaceuticals (% of clientele) in Finland, 2000 – 2009**

Drug / Year	2000	2001	2002	2003	2004*	2005	2006	2007	2008	2009
Opiates**	29	28	28	31	34	37	41	46	50	55
- heroin	20	13	6	3	3	2	2	2	2	2
- buprenorphine	7	12	20	24	27	29	31	33	34	33
Stimulants	28	26	28	28	26	22	21	19	16	16
Cannabis	17	20	18	16	15	14	13	10	9	10
Alcohol	18	19	20	19	18	19	17	17	18	12
Pharmaceuticals	5	6	5	6	6	7	7	7	7	7

\*Data corrected

\*\*Unclear whether Row 2 - Row 3 - Row 4 should = % for other opiates.

Note: the year 2001 is the period when the Taliban banned poppy cultivation.

Source: Drug treatment information system, adapted from: Drug Situation in Finland 2010. 2010 national report to the EMCDDA by the Finnish National Focal Point, THL (Forsell et al. 2010).

Table 3 suggests that in Finland substances used by clients entering treatment centres changed considerably in two groups, namely heroin and buprenorphine. Overtime there is a reported decrease in use of heroin at the expense of an increased use of buprenorphine with other reported substances appearing to be somewhat stable.

The picture offered by data from Sweden is rather different. As shown in table 4, the largest group of admissions in this country is due to amphetamine consumption. Data for opiates were not disaggregated by type of substance in 2001 and 2004 and the overall opiate total accounted for roughly a quarter of those seeking treatment. In 2007 and 2008, when the data were reported separately, primary users of heroin made up 11% and 17% of all treatment seekers, respectively. By contrast, primary users of buprenorphine represented 3% of all treatment seekers in 2007 and primary users of 'other opiates' (i.e. other than heroin; data for buprenorphine alone were not available) 11% of this group in 2008. This suggests that heroin abuse has remained an important issue in Sweden and has not been replaced by buprenorphine abuse to the degree suggested by data available from Finland. Admittedly, there is a potential for data on buprenorphine abuse to be underreported in Swedish treatment centres because abuse of this drug does not qualify for OST programs; however, it is unlikely that this would significantly alter the overall picture.

**Table 4: Composition of treatment seekers by primary substance in Sweden**

Year	2001	2004	2007	2008
Amphetamine	22.4	35	34	29
Cannabis		19.5	20	23
Heroin	26.3 (all opiates combined)	24	11	17
Other opiates (Analgesics & buprenorphine)			Analgesics 8% (buprenorphine 3%)	11
Benzodiazepines			10	11
Cocaine			2	1

Source: Swedish Reitox reports 2002-2012.

### 3.3 Prices

It is difficult to compare prices across time and place if they are not adjusted for purity. As noted in a RAND report produced for the European Commission (Kilmer et al. 2010):

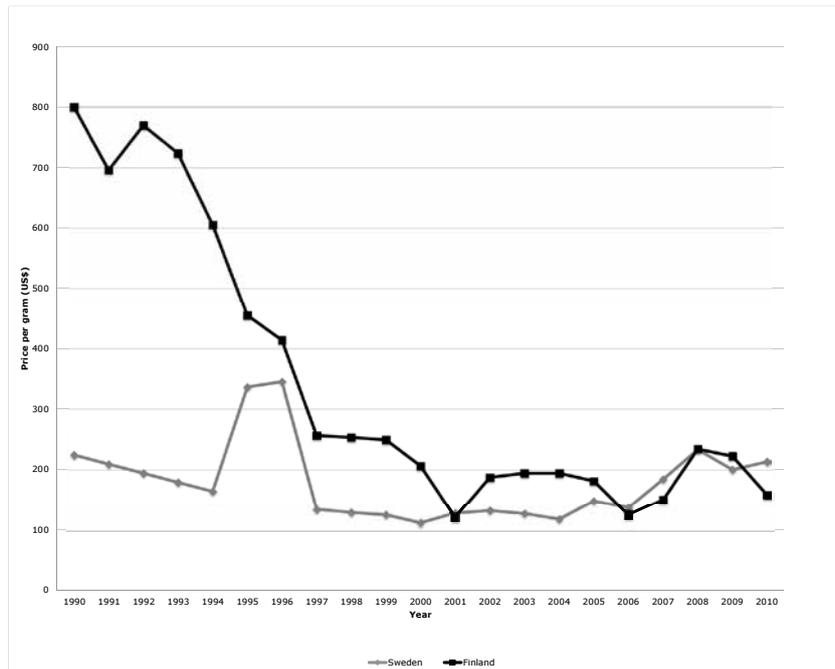
[I]t is important to distinguish between two types of prices: raw prices and purity-adjusted prices. If someone purchases a 1g bag of heroin on the street for €75, the raw-price per gram is €75. However, we know that heroin purchased at the retail level is usually diluted by dealers trying to expand their profit margin and dealers often do not necessarily know the precise purity of what they are selling. Thus, it would not be unusual if a gram of heroin purchased for €75 in one part of the city was 20 percent pure and in another place it was 30 percent pure. In this example, the purity-adjusted prices would be €375 per pure gram of heroin ( $€75/0.2$ ) and €250 per pure gram of heroin ( $€75/0.3$ ), respectively. To truly understand what is being traded and to appropriately monitor and analyse these markets, one needs to know not just the amount traded and the raw (gross) amount paid, but also the purity of the drug that was traded.

Purity is an important variable because similar doses with different levels of purity can have very different health effects, as the concentration of the active agent will be different. The UNODC has collected raw heroin prices in both Finland and Sweden for nearly two decades and the lack of information about purity suggests we must be careful about drawing inferences. However, price variations can be informative, as socio-political changes in supply countries (i.e. effective reductions in supply enforced by the Taliban in Afghanistan) as well as changes in transit countries (political changes in Russia after the fall of the Soviet Union) would have likely affected supply more in Finland (which is more dependent on Afghan supply through the northern routes of supply) and to a lesser extent Sweden, a consumer of heroin with a somewhat larger variety of supply countries including those from South East Asia<sup>9</sup> (Boekhout van Solinge 1997).

This presumably higher degree of dependence of Finland on Afghan supplies could explain the differential increases between Finland and Sweden seen in Figure 4 below. Such increases could be more notable with increases in the observed purity-adjusted price as reported by others (Paoli et al. 2009).

Figure 4 shows an available estimate of price per gram of heroin for both countries, as reported by the UNODC. It demonstrates that heroin was much more expensive in Finland than in Sweden in the early 1990s, followed by a sharp decline in Finnish prices much closer to the Swedish level over the course of the decade. That said, heroin in Finland remained notably more expensive well into the first half of the 2000s.

<sup>9</sup> The (growing) availability of heroin from sources other than Afghanistan, most notably South-East Asia in the late 1990s, is also visible in media production of that time, albeit often indirectly in relation to increasing presence of smuggling groups of Balkan origins active in Western European countries, including Sweden. See, for instance, Viviano, F. (1999) 'KLA Linked To Enormous Heroin Trade / Police suspect drugs helped finance revolt', March 5. In terms of types of regional patterns, white heroin, a more refined and expensive form of the substance, has traditionally dominated the Stockholm area, even though it is nowadays less common. Its delivery via the Baltics and possibly Finland was reported as a new phenomenon in the late 1990s (see, for instance, Andersson, B. et al. (2001) or McNeil, D. (2001). Brown heroin, a generally cheaper form of the drug, is usually associated with the Balkan route and has become increasingly prevalent. In fact, the 2005 Swedish Reitox Report observed that "brown heroin coming via the Balkan route dominates the Swedish heroin market." (Andersson et al. 2005).

**Figure 4: Price per gram of heroin reported by UNODC, unadjusted for purity or inflation (\$US)**

Source: UNODC 2012 (UNODC 2009).

The most recent data from the EMCDDA reports that the price per 1 gram of heroin in Finland in 2010 was Low: €115, High: €120. Sweden reported prices for different types of heroin. For brown heroin it was Low: €52.4, High: €314.5, Mean: €160.1, and Median: €115.3. For white heroin the prices were large with Low: €83.9, High: €445.5, Mean: €251.0, Median: €262.1. (<http://www.emcdda.europa.eu/stats12/ppptab2a>)

The price of buprenorphine is not regularly collected, but there have been reports of an 8 mg tablet of costing €30 to €35 (EMCDDA 2005). In France it can cost from €1 to €4 for the same amount of 8mg buprenorphine. Thus, there is potential for arbitrage. A survey of a population of drug abusers' willingness to pay in Helsinki reported that illegal buprenorphine prices ranged from €20 to €40 while buprenorphine-naloxone could be obtained for €12 or less. The same authors of this report state that "for comparison, the average daily dose of heroin, in Finland, would cost between €80 and €120 and amphetamine(s) between €40 and €50" (Alho et al. 2007).

### 3.4 Enforcement of laws against heroin seizures

Availability of illicit drugs is an important variable that affects trends in price and consumption and data on drug seizures can shed a useful, albeit imperfect, light on this matter. Tables 6 and 7 show the different numbers in seizures of drugs between Finland and Sweden, respectively. In Finland, after the key period 2002 as highlighted, a considerable reduction of seizures of heroin and an increase in buprenorphine seizures is evident (Brownfield 2011). In contrast, the seizure numbers of heroin for Sweden are more stable though tend to decrease over time. No information is available regarding Swedish seizures of buprenorphine alone.

**Table 5: Number of drug seizures in Finland recorded by the police and Customs in 2000–2009\***

Year	2000	2002	2004	2006	2007	2008	2009
Hashish	2,482	3,012	2,626	2,599	1,900	1,500	1,940
Marijuana	663	1,275	2,067	2,269	2,400	3,000	3,700
Cannabis plants (kg)	-	923	1,406	1,378	1,900	2,100	2,650
Amphetamines + Metamphetamines	2,369	3,399	3,392	3,101	2,990	2,900 + 120	2,910 + 125
Cocaine	40	45	65	82	92	107	102
Heroin	437	145	45	25	20	25	26
Buprenorphine (tablets)	-	741	844	840	800	850	940
Ecstasy (tablets)	393	329	328	297	340	250	190
LSD (Doses)	34	10	21	15	50	73	52
GHB + GBL (liters)				54	184	170 +80	112 +28

\* Data are not reported for 2001 and for 2003 and 2005. For the latter two, the statistics were adjusted so as to take into account seizures related to those unlawful use cases, which remained unregistered.

GHB is Gamma Hydroxybutyrate and GBL is Gamma butyrolactone,

Source: Adapted from Finnish Reitox Report (Forsell et al. 2010) that presents data from the National Bureau of Investigation (2010).

Data on seizures suggest that Russia and the Baltic countries are a major point of transit for heroin that ends in Finland (Tanhua et al. 2011). This Northern European route, while not the only one, is likely the main for Finland and most heroin comes from Afghanistan. It is likely that the reductions in production imposed by the Taliban in 2000 were reflected in reductions of heroin seizures afterwards, as supply storages were likely to complement the European market. This reduction was later on replaced by the increased availability and hence seizures of buprenorphine mostly in Finland.

In Sweden on the other hand, data indicate that sources of heroin come from northern Europe as well as from the Balkans and the Golden Triangle in South East Asia (Boekhout van Solinge 1997). This possible larger source of routes could explain differences in availability of heroin after 2002. In this period, while there is a reduction of heroin seizures in Sweden and an increase in other narcotic pharmaceuticals (including buprenorphine), such differences are not as marked as those observed in Finland as shown in table 5.

**Table 6: Number of seizures in Sweden analyzed according to Police and Customs forensic laboratories 2001-2010 (National Swedish Police, National Bureau of Investigation)**

Year	2000	2001	2002	2003	2004*	2005	2006	2007	2008	2009
Narcotics-classed pharmaceuticals	3,223	4,476	4,347	4,715	5,247	6,032	7,443	7,375	7,917	8,374
Cannabis	7,156	8,184	8,243	8,102	8,345	9,365	10,052	10,996	12,108	12,107
Heroin	1,217	1,052	1,057	900	804	800	871	688	671	493
Amphetamines	5,713	6,660	6,657	6,773	6,499	6,842	6,477	5,304	4,986	5,014
Metamphetamine	275	250	301	244	386	359	485	876	1,086	704
Ecstasy	621	631	489	411	381	309	268	231	42	127
Cocaine	328	440	545	524	546	772	725	813	792	724

Source: adapted from the 2011 Swedish National Report (Swedish National Institute of Public Health and REITOX 2012).

## 4 Opioid-substitution treatment policies

### 4.1 Finland

Finland's drug control legislation was enacted in 1994 through the Narcotics Act but Finland was the first Nordic country to criminalize drug use in 1966 and frequently punished use and possession of small amounts of drugs. Before the Narcotics Act previous legislation emphasized the need for prevention. Specifically the Act on Welfare for Substance Abusers from 1986 stipulates norms for services towards drug abusers and the reduction of health harms. Most services are provided at the municipal level and several NGOs and Foundations can also provide services (Skretting and Rosenqvist 2010). Substitution treatment is provided in inpatient and outpatient settings. OST substitution was initiated with methadone treatments in 1974 and later on legislation from 1997 formalized treatment with buprenorphine, or methadone.

The decree governing detoxification and substitution treatment for opioid addicts (33/2008) states that cases should receive care by health specialists. In regards to the evaluation and beginning of treatment, the focus is on outpatient rather than inpatient care. Pharmaceuticals containing buprenorphine or methadone can only be prescribed for the detoxification or substitution treatment of opioid addicts by a physician employed by a health care unit and responsible for its operation, or by their superior. This decree also allows the delivery of a combined preparation of buprenorphine and naloxone (Suboxone®) to be issued under a pharmacy contract signed by the patient and such contract stipulates that the patient will only get medications from one pharmacy. The pharmacy under these terms can transmit treatment-related information to the physician treating the patient as well as notify other pharmacies of the existence of the pharmacy contract. Treatment may be concomitantly provided in coordination with substance abuse or public health services and medications are provided under controlled conditions. Under certain circumstances when individuals demonstrate a desire to cooperate with treatment, take-away doses might be provided. Drug treatment in this country is mainly funded by the public budget of the communities.

Over time, with comparable increases in problem drug use, both Sweden and Finland have adopted less strict guidelines even while strict control measures for treatment regimes continue to be applied (Skretting and Rosenqvist 2010). This known as a dual-track model that promotes harm reduction while strengthens criminal control approaches (Hakkarainen et al. 2007). In Sweden all doctors were allowed to prescribe buprenorphine from 1999 until 2005 when a similar system of regulation was introduced for both buprenorphine and methadone. This resulted in stricter regulations for buprenorphine but a more relaxed model for methadone. There have been substantial increases in the demand for treatment services that occurred contemporaneously with changes in the provision of services. OST was initiated on a wider scale in Finland in 2002 and this is reflected in the large increases in the number of drug treatment clients consulting specialized services or outpatient care units.

The buprenorphine/naloxone combination was authorized in 2004, making Finland the first country in Europe to provide this substitution therapy. The use of naloxone in combination with buprenorphine does not alter the therapeutic effect of buprenorphine but has been designed to deter intravenous use, which would precipitate severe withdrawals. This combination is well tolerated and generally effective (Amato 2010; Magnelli et al. 2010; Moratti et al. 2010; Comer et al. 2010).

### 4.2 Sweden

Sweden passed a law regulating narcotic drug offenses in 1968 and since 1988 narcotics consumption has been illegal while in the same year the Care of Substance Abusers (Special Provisions) Act (LVM) addressing compulsory institutional care was updated, following its introduction in 1982 (Swedish National Institute of Public Health and REITOX 2010). Additional laws such as the Social Service Act of 1980 enacted rules covering voluntary care of drug users. An additional law, the Care of Young Persons Special Provisions Act (1991) specifies norms for arranging compulsory care of juveniles who misuse drugs. Another law pertaining to supply, The Narcotic Drug Controls Act, stipulates that narcotic medicines can only be obtained with prescriptions either by a dentist, a medical doctor, or a veterinarian. The National Board of Health and Welfare is the main authority for activities pertaining to substance abuse and in Sweden methadone maintenance treatments for intravenous opiate users have been used since the 1960s. The largest services are four general psychiatric units that dispense treatment in the cities of Uppsala, Stockholm, Lund and Malmö but services are now provided by about 60 units each with an assigned psychiatrist (Swedish National Institute of Public Health and REITOX 2010).

Strict criteria must exist for any treatment initiation with methadone in Sweden as OST is only provided for heroin abusers. In Sweden, these criteria include documented abuse of intravenous opiates for two years and previous evidence of having attempted drug-free treatments. In 1999 new regulations of the National Board of Health and Welfare were amended stating that in Sweden, the methadone program can cover not more than 800 patients but this cap was eliminated in 2005 and in 2010, inclusion criteria for OST were changed stipulating that to enter treatment, opioid dependence has to be documented for one year instead of two. Criteria to enter methadone programs apply to persons 20 years old or more and mixed drug abuse must not be occurring. OST should be directed to abusers of heroin, opium or morphine, while persons addicted to synthetic and semi-synthetic opioids are excluded. Substances used in substitution treatments are methadone, buprenorphine, and naloxone (in combination with buprenorphine branded as Suboxone®). Criteria to avoid diversion of OST are determined by physicians who assess stability of treatment for 6 months (with daily visits by patients), as well as the individual risk of patients engaging in transfers of drugs to other persons. Once these risks are assessed to be minimal, doses can be provided for a few days and with continued improvement they can later be picked up at pharmacies. To monitor progress frequent urine samples are obtained. Non-compliance with the program leads to ineligibility to participate for three months (Svensson and Andersson 2012).

Following a 2004 decision, guidelines for addiction treatment with methadone or buprenorphine were standardized and treatment was authorized only at specified medical facilities under strict treatment plans. These regulations are updated about every 2 years. Sweden authorizes beginning treatments with buprenorphine or naltrexone and in 2010 there were 64 care facilities providing maintenance treatment. Sweden gives importance to controlling individuals for signs of drug use and provides a strong local community-based delivery of prevention that focuses on a wider variety of problems including alcohol and illicit drugs.

Overall, access to treatment in Sweden is more restricted than in Finland and recent reports state that access difficulties for people who might otherwise seek treatment is not available thus potentially leading to illegal use (Swedish National Institute of Public Health and REITOX 2012). Perhaps these restrictions are tied to previous economic restrictions the country imposed during the recession of the 1990s.

Table 7 below presents available figures on numbers of OST clients in both countries along with an overview of key dates associated with the development of OST systems in Finland and Sweden.

**Table 7: Opioid substitution treatments in Finland and Sweden for available reported years**

Population using OST	Finland			Sweden		
	2007	2008	2009	2007	2008	2009
- Number of clients in opioid substitution treatment	1,200	1,500	1,800	3,115	--	--
- Using methadone	540	--	720	1,496	--	--
- Using buprenorphine	660	--	1,080	1,619	--	--
Year of treatment initiation						
- Methadone (MMT)	1974			1967		
- Buprenorphine (HDBT)	1997			1999		
- Buprenorphine/naloxone	2004			2006		
- Slow-release morphine	N/A			N/A		

Source: EMCDDA report 2012.

## 5 Opioid-related harms

Mortality, morbidity, and co-morbid conditions can partially contribute to understand trends in drug consumption. Co-morbid conditions such as HIV or Hepatitis C (HCV) are also associated outcomes with drug abuse. Heroin injecting behaviours have been associated with poor hygiene practices and the consequent increased spread of infections. Among them HIV and HCV infections can be useful to observe because there is ample evidence of their association with drug injection as well as more reliable systems of information to monitor them. These sources although subject to a wide variety of additional causes, can indirectly inform about trends in drug consumption

## 5.1 Deaths

The most evident harm from opioid use is death. Table 8 presents data on fatal poisonings in medico-legally examined drug addict deaths grouped according to the assumed main cause of death in Finland and Sweden. Consistent with the data discussed in Section 3, Finland saw a large increase in heroin/morphine poisoning deaths from 1991 to 1997 (from 4 to 20 deaths) and then a large decrease from 1997 to 2007 (from 20 to 2). Deaths from buprenorphine appear to have doubled from 2002 to 2007 (from 16 to 32).

**Table 8:** Fatal poisonings in medico-legally examined drug addict deaths grouped according to the assumed main cause of death

	Finland				Sweden			
	1991	1997	2002	2007	1991	1997	2002	2007
<b>Group I (Sum)</b>	20	43	43	52	64	106	107	151
Heroin/morphine	4	20	9	2	56	76	90	94
Methadone	0	0	0	16	2	2	5	22
Propoxyphene	3	7	8	1	4	24	8	5
Ketobemidone	0	0	0	0	0	0	0	1
Codeine	6	14	11	8	2	3	1	0
Cocaine	0	0	2	0	0	0	1	1
Fentanyl			3	7				10
Tramadol			9	14			2	12
Oxycodone			1	4			0	5
<b>Group II (Sum)</b>	1	2	13	10	7	2	18	16
Amphetamines	1	2	13	9	7	2	17	13
<b>Group III (Sum)</b>	5	1	16	45	0	3	3	12
Buprenorphine			16	32				8
<b>Group IV (Sum)</b>	10	6	22	22	7	5	8	15
Ethanol (Avila-Burgos et al. 2008)	2	4	7	13	3	0	0	1
<b>Total</b>	<b>36</b>	<b>52</b>	<b>94</b>	<b>129</b>	<b>78</b>	<b>116</b>	<b>136</b>	<b>194</b>

**Source:** Simonsen et al. 2011. Not all drugs are listed for each Group.

Concerning Sweden, table 8 suggests that deaths attributable to heroin/morphine generally increased over the observed period (from 56 in 1991 to 94 in 2007). Deaths attributable to buprenorphine were only reported for 2007 and they were dramatically lower than the comparable figure for heroin/morphine (8 and 94 deaths, respectively). The persistently high share of deaths attributable to opiates in Sweden is also evident in data collected locally, which also demonstrate there might be regional variations in the scope of heroin problem in Sweden. Indeed, the Swedish National Focal Point reported that, between 1998 and 2008, the proportion of drug-related deaths attributable to opiates was 24% in Gothenburg, 31% in Stockholm and 47% in Malmö (Swedish National Institute of Public Health and Reitox 2012).

## 6 Discussion

Reported prevalence of heroin consumption has followed a similar trajectory in Sweden and in Finland for a better part of the second half of the 20th century. Consumption of injected heroin was introduced in 1974-75 and had an early peak around 1979-1980, followed by a gradual decrease in the 1980s, only to experience a second wave of increase in consumption in the 1990s. The overall problem opioid use in Finland did not decrease substantially.<sup>10</sup> In fact, much of the fall in heroin consumption was replaced by a simultaneous increase in abuse of buprenorphine in Finland. Such change did not occur in Sweden. A notable divergence occurred in the 2001 when heroin consumption began a sharp decline in Finland while the decrease was far less dramatic in Sweden. This remarkable difference between two countries that had hitherto witnessed similar patterns of heroin use begs two questions:

1. Why did the abuse of buprenorphine replace heroin consumption in Finland but not in Sweden?
2. Would Finland have been better off had it not introduced buprenorphine?

<sup>10</sup> Indeed, the proportion of problem opioid users in the Finnish population remained stable between 2001 and 2005 (Forsell et al. 2010).

## 6.1 Why did abuse of buprenorphine take off in Finland but not in Sweden?

There is no definitive answer to this question, but there are a number of possible explanations for the difference in trends in heroin consumption in the 2000s between Finland and Sweden. These include availability of heroin in the country; drug prices; the time buprenorphine has been available in each country; prescribing practices and treatment settings; and different dosage or mechanism of administration of buprenorphine.

### 6.1.1 Heroin availability

The replacement of heroin abuse with buprenorphine abuse in Finland may have been associated with changes in heroin availability during the critical period of late 1990s and early 2000s. The peak in heroin consumption, registered in the late 1990s coincided with peak production of opium in Afghanistan, resulting in high availability of heroin in Finland.<sup>11</sup> The situation is likely to have changed as a result of the 2000 ban on poppy cultivation by the Taliban, leading to significantly reduced availability of heroin. This scenario matches the picture offered by data on seizures of heroin, which indicate a notable decline in the aftermath of 2001. Poppy cultivation and heroin production nonetheless increased again a short term after yet it never increased in Finland but was replaced by buprenorphine. This phenomenon could resemble what Gerd Sommerhoff defined as a coenetic variable in 1950 (Sommerhoff 1950). In this case, such variable (the temporal limited availability of heroin) leads to a situation that converges on to a subsequent but different occurrence (a replacement with buprenorphine, despite heroin becoming available again). In other words the coenetic variable evokes a response that converges on an adaptive outcome that is different from the original situation (Beer 1989). Specifically, heroin consumption, limited by the ban and coupled with an environment where buprenorphine was available and at lower cost, led to a replacement of heroin by buprenorphine despite later on heroin becoming available again. Many contextual factors could explain these long term changes that led to the replacement including wider availability at some point in time, ease of use, better quality of dosage, lower or more stable prices, and therapeutic effects (independent of where the opioid was obtained). In this context, buprenorphine, particularly given its availability, as discussed in section 3.1, may have appeared an attractive alternative. By contrast, Sweden, while also susceptible to the repercussions of the reduction in the production of heroin from Afghanistan, was in a position to mitigate its impact due to the existence of somewhat more diversified heroin supply routes, as discussed in section 3.4. Again, this matches the picture offered by data on Swedish heroin seizures, which indicate a drop throughout the 2000s, but much less pronounced than the one recorded in Finland. Also, the Swedish National Focal Point estimated that the availability of brown heroin in the country increased between 1988 and 1999 and remained stable thereafter.

The availability of white heroin increased between 1998 and 1999, remained stable between 2000 and 2004 and subsequently decreased over the next five years.<sup>12</sup> Changes in the availability of heroin can affect price and consumption patterns but can also be reflected in the degree of purity of heroin available in the market or its origin.

### 6.1.2 Price of buprenorphine

Lower price is conceivably another factor that can possibly explain the increase in illicit use of buprenorphine and the related shift away from heroin, and is closely linked to the preceding one of heroin availability. Indeed, the main reasons reported for abuse of buprenorphine in several countries are a lower price than heroin and feelings of euphoria (Yokell et al. 2011). While this argument is potentially applicable to both studied countries, the attractiveness of buprenorphine as a cheaper as well as a safer alternative to heroin is likely to have been more pronounced in Finland. As discussed in chapter 3.3, Finnish retail heroin prices may have been considerably higher than those in Sweden in the 1990s (this is hard to say definitively without information about purity of heroin sold at the retail level in both countries). This gap seemed to narrow towards the end of the decade but persisted until the middle of the 2000s, spanning the period during which buprenorphine was introduced into the substitution treatment systems in both countries<sup>13</sup> (Alho et al. 2007).

<sup>11</sup> This development corresponds to a notable drop in prices of heroin in Finland between 1999 and 2001, which was not observed in Sweden, as discussed in Section 3.3. However, it is necessary to keep in mind that these data are not adjusted for purity and as such provide an imperfect indicator.

<sup>12</sup> Blid et al. 2010. Swedish National Institute of Public Health and REITOX (2010) 2010 National Report to the EMCDDA. New Development, Trends and in-depth information on selected issues. Swedish National Institute of Public Health, Stockholm. Contrary to the injectable white form of heroin, brown heroin can be smoked. Given the fact most new users start by smoking, the continuing availability of brown heroin in Sweden may have also played a role in perpetuating comparatively high numbers of heroin users in Sweden. We thank Bengt Svensson for this insight.

<sup>13</sup> It is estimated that the retail price of heroin in Finland was three to four times higher than illegal buprenorphine prices (Alho et al. 2007).

Earlier adoption of buprenorphine in Finland. One plausible explanation for the increased rate of buprenorphine abuse in Finland is its earlier introduction as a heroin substitute. Buprenorphine-based treatment was introduced in Finland in 1997, while use of buprenorphine in Sweden started two years later in 1999. As there is evidence from several European countries that OST with buprenorphine can lead to diversion of the drug (Yokell et al. 2011), longer exposure to availability of buprenorphine and the possibility of its diversion for illicit use could explain partially the divergence between the two countries, even though it is very unlikely to account for the difference in its entirety.

### **6.1.3 Prescribing practices and treatment setting**

Another potential reason for the rise in buprenorphine use in Finland could be local prescribing practices and availability of treatment options. In comparison to majority of other European countries, Finland has a restrictive system for the delivery of substitution treatment and relatively strict criteria for eligibility.<sup>14</sup> As a consequence, the rigid control of drug treatment in Finland has likely contributed to individuals resorting to illicit buprenorphine (Alho et al. 2007). It should be noted, however, that an analysis of access to treatment is more useful for accounting for the rise of illicit buprenorphine use in Finland, rather than for explaining the difference between Finland and Sweden. The Swedish treatment system is rather similar to the Finnish one in terms of restrictiveness and eligibility<sup>15</sup> and therefore the likelihood of a similar diversion of drug use would be expected to be comparable.

Rönkä and Virtanen (2009) point out another element of the Finnish treatment system that might be partially responsible for the rise in the number of problem buprenorphine users. In Finland, amphetamine users account for roughly 80% of all problem drug users. Yet while short-term detoxification and non-medical treatment are available for this client population, it is much more difficult to obtain access to continued treatment as there is no dedicated psychiatric care available for them. As a result, amphetamine users may feel the need to take opiates in order to pass treatment screening, developing addiction to opioids in this process. Given the availability and low cost discussed above, buprenorphine appears to be an option for this population.

### **6.1.4 Administration practices**

The use of opioids and their administration can be also a relevant factor. The mechanism of administration is important because different types of poly-drug users report different purposes of abuse, which is key for identifying the proportion of users who illegally obtain buprenorphine for treatment versus those who use it for recreational purposes. Data on administration patterns from Sweden and Finland confirm that drug users dose themselves with buprenorphine in different ways. A survey from Sweden for example, reports that sublingual administration of illicit buprenorphine was more common. In addition, it was significantly more frequent among heroin users compared to amphetamine users (Hakansson et al. 2007). The same study indicates that illicit buprenorphine is mainly used among heroin users for withdrawal treatment or self-detoxification, rather than for euphoria seeking, in places where maintenance treatments are not available. In this instance, the preference for sublingual form may be reflective of the fact that it corresponds to how buprenorphine is generally prescribed in its legal form. By contrast, injected buprenorphine is more common in Finland (Alho et al. 2007; Partanen and Mäki 2004; Uosukainen et al. 2012)<sup>16</sup>. This is particularly applicable to younger individuals, who tend to abuse buprenorphine in ways different from the prescribed sublingual form.

Admittedly, there are several limitations to any inferences made from an analysis of drug administration patterns. These may be driven by factors other than desired effect of drug use, such as price. For instance, the preference for the injecting form of buprenorphine may be primarily a function of the fact that this mechanism of delivery requires smaller doses than the typical medically prescribed sublingual form, arriving at similar effects at a lower cost. Nevertheless, the data presented above lend some support to the hypothesis that the disproportionate increase in buprenorphine abuse in Finland may have been driven in part by recreational users, i.e. those not seeking to use illicit buprenorphine as a form of self-medication, possibly in absence of formal opioid treatment, as appears to have frequently been the case in Sweden. This also seems to be roughly in line with the proposition presented above that at least some of the new problem buprenorphine users in Finland may have been recruited from poly-drug users, predominantly users with amphetamines as their primary substance.

<sup>14</sup> Substitution treatment is provided in inpatient and outpatient settings and through specialized units. General practitioners are also allowed to provide such treatment but in practice they rarely do so.

<sup>15</sup> For instance, treatment centers in Sweden do not allow lateral use of drugs (Svensson and Andersson 2012).

<sup>16</sup> Finland is no exception in this regard. Intravenous abuse of buprenorphine has been described in other European countries as well.

### 6.1.5 Synthesis

These factors represent a list of possible explanations for the increase in illicit buprenorphine use in Finland and for its departure from hitherto shared patterns of heroin use with Sweden. Obviously, none of these is able to account for this phenomenon on its own; however, taken as a whole, they offer a contextual background that allows us to formulate plausible hypotheses as to what set Finland apart from its Nordic neighbour and, more generally, from other European countries. One important qualification to add here is that attribution of causation is problematic mostly because of lack of data. As a result, it remains impossible to determine with certainty whether the rise in buprenorphine use in Finland occurred as a consequence of a diminished availability of heroin during 2001, price changes associated with this, the introduction of a new cheaper and safer drug such as buprenorphine, prescribing practices and treatment settings, or administration practices or, patterns of drug use and availability in turn helped shape the explanations.

## 6.2 Would Finland have been better off had it not introduced buprenorphine?

Given the lack of information on all possible aspects of the use and abuse of buprenorphine in Finland, it is impossible to provide a definitive answer to this question. While there has been a substantial increase in the number of problem buprenorphine users in the 2000s, this occurred at the backdrop of a significant drop of heroin users as shown in Figure 3 and table 3. In theory, this development should have brought about positive outcomes as buprenorphine use is considered to be associated with fewer risks than heroin. Data from non-European countries suggests that when injected, it has been associated with better hygiene practices, thus reducing the likelihood of HIV infections. No data on these practices is available from Finland or Sweden. In addition, buprenorphine, even when used illicitly, can be better dosed and removes risks associated with lack of clarity about heroin purity (Yokell et al. 2011). However, in practice, the increase in buprenorphine abuse in Finland manifested itself in vastly increased incidence of the substance in drug-related death statistics. The number of deaths mentioning buprenorphine with death grew from fewer than 10 cases in 2000 to 73 in 2003 to 111 in 2009 (See annex)<sup>17</sup>. When it comes to deaths directly ascribed to buprenorphine, their number increased from 16 in 2002 to 32 in 2007, accounting at that point for one quarter of all drug-related deaths in the country (Tanhua et al. 2012). This meant that in 2007 Finland had higher percentage than any other Nordic country of fatalities caused by class III substances<sup>18</sup> (Simonsen et al. 2011). As mentioned previously, these increases are probably linked to poly-drug use most likely involving buprenorphine conjunction with benzodiazepines and amphetamines.

On the other hand, with respect to drug-related infectious diseases, while it is impossible to directly associate the rise in buprenorphine use with positive outcomes stemming from higher hygienic standards theorized above, it does not appear to have had any detectable negative impact. Since 2000, the number of HIV infections in Finland has increased; however, this was due to the rise in sexually transmitted infections. The number of intravenous infections remained low throughout the 2000s. The number of cases of hepatitis C transmitted via injecting fell from 1,001 in 1999 to 596 in 2010. Similarly, the number of acute hepatitis B cases decreased substantially over the past decade, with infections contracted through intravenous drug use having decreased most.

While the effects of increased buprenorphine use in the short run offer a somewhat mixed picture, it is conceivable that it will lead to more positive outcomes in the longer term. The increased use and abuse of buprenorphine have led the country to experiment with drugs that have similar therapeutic effects but less euphoric or addictive effects. In late 2004, a buprenorphine-naloxone combination drug (Suboxone®) became available in Finland, the first of all countries monitored by the EMCDDA to do so, followed by Sweden two years later. The introduction of this combination according to some has come as a consequence of the advantages and disadvantages of buprenorphine (Alho et al. 2007). This combination drug is considered to have several advantages over buprenorphine in that it allows for expanded access, take-home dosing, lower costs, and possible lower levels of abuse potential, as it is not suitable for injection due to the naloxone component (Yokell et al. 2011). Suboxone® has gradually come to be the most common medication in substitution treatment, accounting for about 60% of all cases and limiting the use of buprenorphine only to a number of isolated cases<sup>19</sup> (Tanhua et al. 2012). The usage of the buprenorphine/naloxone received further boost in 2010 when pharmacies in Finland were cleared to distribute

<sup>17</sup> For comparison, a similar number for heroin was 4 cases in 2003 and 3 cases in 2009.

<sup>18</sup> Classification as per the UN Convention on Psychotropic Substances of 1971.

<sup>19</sup> The remaining 40% represents methadone. Indeed, single ingredient buprenorphine (Subutex) was withdrawn in 2007 due to concerns about misuse (Uosukainen et al. 2012).

this medication<sup>20</sup> (Laine 2010). As a result of these developments, it is envisaged that the health and social harm caused by the increase in buprenorphine use will be reduced in the coming years while the benefits gained from substantially reduced heroin use will be fully retained. A confirmation of this hypothesis should be followed up longitudinally addressing whether or not there are benefits of combining buprenorphine with naloxone. As such, Finland's as well as Sweden's more recent experience with buprenorphine/naloxone might well provide important lessons for other countries.

## 7 Conclusions

To better understand the implications of different approaches, this chapter has presented a case study of two similar countries, which developed different approaches to OST at different times: Finland and Sweden. The available data suggests that in Finland most of the opioid abuse problems are related to buprenorphine while in Sweden consumption has been stable and is still dominated by heroin consumption (EMCDDA 2012).

To study this problem carefully, the international implications of drug availability should be considered, as this is a transnational problem. The sudden marked decrease in opium production in Afghanistan might have triggered a change in drug consumption. The availability of at the time legal buprenorphine in France that was later smuggled into Finland is an important factor. Some of the smuggled buprenorphine enters via Sweden so this problem affects both nations. Documented problems in access to OST might have exacerbated illegal trade of buprenorphine. Improving access to OST could provide users and potential abusers with more options for delivery of treatment under safer, and more controlled environments.

Several unanswered questions remain and deserve serious study including better understanding of the motivations for diversions and sources of drugs and therapeutic uses of diverted drugs. This is relevant for studying buprenorphine as well as buprenorphine/naloxone combinations. For the latter, there is even less evidence about diversion practices. The mode of consumption, the local and international availability of drugs, behaviour of individuals in societies, the implementation of OST programs, enforcement, illicit trafficking, and the health sector's capacity to respond and adapt to changes modulate opioid abuse. Understanding these interactions as well as the benefits and secondary effects of different drugs can contribute to the implementation of a better-informed drug abuse prevention program that combines harm reduction with proper enforcement activities.

Discussions about diversion should focus on the social, medical, public health, and economic benefits that arise when buprenorphine is used to self-treat addiction and withdrawal symptoms or as a harm reduction approach to manage the risks associated with drug dependence (Fatseas and Auriacombe 2007).

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<sup>20</sup> Pharmacies were originally intended to start doing so in 2008 with the passage of a Decree on substitution treatment. However, implementation was two years delayed because of personal data protection issues.

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## Annex 1: Drug findings in forensic investigations of cause of death, Finland, 2003-2009

### Drug findings in forensic investigations of cause of death, Finland, 2003-2009

	2003	2004	2005	2006	2007	2008	2009
Heroin	4	0	3	2	1	3	3
Buprenorphine	73	72	83	88	97	104	111
Cannabinoids	82	80	71	99	94	93	119
Amphetamines	51	52	66	64	94	73	94
Methadone	3	11	14	21	26	33	34
Cocaine	1	3	2	1	3	3	4
Gamma	1	1	2	6	2	1	9
<b>Total</b>	<b>147</b>	<b>176</b>	<b>179</b>	<b>191</b>	<b>234</b>	<b>247</b>	<b>254</b>

**Note:** Heroin consumption was much higher in the 1990's and peaked at the beginning of the 2000's. After 2002 its consumption plummeted (Forsell et al. 2010).

**Source:** Tanhua (2012), p.76. Mentions are not mutually exclusive (Tanhua et al. 2012).

# Report 2

## Managing potential conflict in illegal markets: an exploratory study of cocaine smuggling in the Netherlands<sup>1</sup>

Melvin Soudijn and Peter Reuter

### Abstract

Illegal enterprises operate in settings of risk and uncertainty very different from those in legal businesses. Not only do the state and competitors threaten their transactions and assets but they cannot make use of written contracts, settle disputes through the civil courts or obtain information as readily as their legal counterparts. It is widely assumed that, as a consequence, illegal entrepreneurs, such as drug dealers and human smugglers, make routine use of violence to settle disagreements or punish failures. Studies of drug retailing, mostly in the U.S., show a variety of non-violent dispute resolution methods but there is no study of high level traffickers, whose risk-reward calculations may differ. Analyzing 31 police investigations from the Netherlands, we found data on 33 incidents involving failure of cocaine smuggling related transactions and the subsequent outcome. We examined these incidents for the use of violence and threats. The data show that in most instances the party with a grievance follows routines familiar to legitimate organizations, investigating whether the balance of evidence favours an interpretation of bad luck or incompetence as opposed to an effort to defraud. Most disputes are resolved with neither threat nor violence. However, when negotiations break down, threats and violence are often used. The use of a data base of incidents shows promise in improving understanding of the role and sources of violence in the high level drug trade. This could be relevant for police agencies as incidents that are resolved peacefully hint at future transactions. Violent incidents, on the other hand, may be an indicator that more violence will follow. This is an exploratory study and further research of this type is needed to assess the role and determinants of violence in the higher levels of the drug trade.

## 1 Introduction

Smuggling cocaine is a risky business. Those involved face threats not only from law enforcement agencies but also from competitors, anxious to steal their shipments, suborn their agents and bribe away their corrupt protectors. The extraordinary spike in drug-related homicide rates in Mexico since 2006, with over 10,000 such homicides annually (Rios and Shirk 2011), represents the nightmare scenario of drug smuggling violence.

But what is striking about the post-2006 Mexico case is precisely that it is so rare. In most other settings, the trade seems quite peaceable; the internal dynamics of drug smuggling generate few incidents of violence, let alone homicide. Even in the United States, with the easy availability of firearms and a large drug trade, there have been in recent years a relatively modest number of drug-related homicides.<sup>2</sup> Similarly, despite its central role in the cocaine importation sector for Western Europe, the Netherlands has, in recent years, experienced very few drug-trafficking related homicides.<sup>3</sup>

To improve understanding of the role of violence in cocaine smuggling we created a data base of 33 “incidents” from a set of 31 case files of large scale cocaine smuggling enterprises. Each case file involved one or more criminal leaders (called

<sup>1</sup> We thank Jonathan Caulkins, Beau Kilmer and Mark Kleiman for helpful comments. Emma Disley and Paul Gruter also provided useful reviews as part of the RAND Quality Assurance process.

<sup>2</sup> No estimates, either official or unofficial, are reported on drug-related homicides. However the large decline in total homicide in the U.S. since the early 1990s is routinely asserted to be heavily influenced by reductions in drug-related violence; see Blumstein and Wallman (2005).

<sup>3</sup> The Netherlands does not produce an official figure on homicides annually, let alone an estimate of the number that are drug-related. However unofficial estimates for all homicides are around 180 a year over the period 2001-2011. <http://www.elsevier.nl/Nederland/nieuws/2013/1/Elseviers-moordonderzoek-2012-iets-minder-moorddadig-1137293W/> Last accessed 18 December 2012.

ringleader hereafter) who were domiciled in the Netherlands, though a majority of the ringleaders were not ethnically Dutch. Each incident involved some problem that had occurred with a shipment of cocaine or a related transaction. Most typical was the failure of a shipment to arrive at the stated place at the specified time. The specific reason for that failure is not apparent and possibilities are varied including some police action, fraud/theft or the incompetence of an agent. Large scale in this study indicates the handling of at least over 20 kilos of cocaine; these were not retail level transactions, though at least one ringleader occasionally sold near-retail quantities. Often hundreds and even thousands of kilos were involved (see the annex). Ringleaders and their collaborators acted as importers, brokers or transporters.

How did those who lost money as a result of the failure respond in dealing with the agent or transactional partner apparently responsible? In particular, was violence used, threats made or was it dealt with in a less aggressive fashion? What factors influenced this choice?

We coded each incident in terms of how it was handled, using a coding system developed specifically for that purpose. We found that in the majority of instances, the resolution was peaceful. The party who suffered the loss typically made some effort to determine culpability and whether the agent/transactional partner had acted fraudulently. Sometimes they gave the agent the benefit of the doubt when it was difficult to determine what actually happened. That may well have depended on the depth of prior relationship but we did not have enough observations of prior relationship to be able to test that hypothesis.

Violence was not rare; one third of incidents were coded as involving violence, often murder, and another 6% involved serious threats or intimidation. When looking at the data in terms of ringleaders, the results were not much different; just over one third (7 out of 18), resolved at least one incident with violence.

This is an exploratory study. It involves a small number of observations on one drug, at one level of the trade, in one country at a particular point in time. Nonetheless, we believe that it provides a valuable addition to research on the dynamics of the drug trade and that the methodological innovation of creating an incident data base will prove useful.

## 2 Prior research

Academic interest in the instrumental (as opposed to expressive) use of violence in illegal markets is of long standing. For example, a standard explanation for the emergence of the Mafia in the United States, following the creation of large illegal markets with Prohibition and then illegal gambling, is the need to internalize the costs of violence to those markets (Schelling 1967). The assumption was that with many small enterprises, a competitive illegal market would generate high levels of violence and, in the context of a rich, essentially orderly society; this would bring increased police efforts to suppress that market. The initiator of the violence would bear only a small part of the cost of his actions since the police would target the market as a whole. On the other hand, an organized crime group which controlled the market would bear all the costs of violence in that market and hence would attempt to suppress killings and assaults. Some scholars even took that argument to imply that the Mafia increased social well-being by reducing market related violence (Buchanan 1973).

This was a highly abstract discussion. No scholar to our knowledge has attempted to compare similar markets, one dominated by organized crime and the other populated with atomistic enterprises. All one can find is occasional anecdotes, such as that of Zaitch (2005) citing a well-known female cocaine dealer in Miami, referred to as the Black Widow, whose aggressive tactics were thought to have attracted attention of the police against the whole cocaine market.

As suggested by Reuter (1983), violence is a two edged sword for participants in illegal markets. On the one hand it protects the subject from being victimized. On the other hand it discourages others from transactions with him. In markets characterized by many potential transactional partners there are strong reasons to use violence strategically, perhaps even sparingly. Norms about the use of violence may develop that also help keep violence down. In the original formulation, this theory was applied to the study of loan sharks and their customers but has application to illegal markets generally and to relations within enterprises as well as to relations with customers.

More recently there has emerged an interest in mechanisms of informal control to reduce violence that might develop in illegal markets. These empirical studies have focused on individual rather than collective incentives for the use of non-violent resolution of disputes. There are many strands to this literature and we concentrate just on those bearing most directly on our topic.

Scott Jacques and Richard Wright have recently published a number of studies of informal controls in U.S. retail markets (e.g. Jacques and Wright 2008, 2011; Jacques 2010). Jacques and Wright argue that the loss of access to the conventional formal dispute resolution mechanisms increases the need to develop informal control mechanisms instead. They show that much of the retail drug market violence is not expressive but rather purposive and tactical, if not strategic. Not all disagreements are resolved through violence, since participants understand that they are operating in the context of a network of long-term relationships.

Jacques and Wright focus on the concept of retaliation, "the handling of a grievance by unilateral aggression" (Black 1998, p. 75). The provocations for grievances include "victimizations involving fraud (e.g., fake drugs or money), theft (e.g. burglary), violence (e.g., robbery), or market-related disputes (e.g., over territory) that occur against and among drug traders." (Jacques and Wright 2011, p. 733).

Not all retaliation is violent. For example, the response to being defrauded in a drug deal might be a retaliatory rip-off or burglary (Jacques 2010, p. 187). Jacques and Wright (2008) offer a classification of retaliation; violent (which can come in two forms: violent confiscation or pure violence) and non-violent (which can involve stealth or fraud). In a more recent article (Jacques and Wright 2011) they expand their categories of response to what they characterize now as "deviance" from the rules: "Toleration is doing nothing about deviance. Avoidance is curtailing interaction with the deviants. Negotiation involves disputants talking out a conflict, whereas informal mediation involves a neutral third party resolving the dispute, both of which sometimes result in compensation. Retaliation is unilateral self-help accomplished through theft, fraud, vandalism, or violence. These forms of informal control may be conceptualized as an ordinal variable: Toleration is the least severe form of popular justice; avoidance is more severe, but not as severe as negotiation, which is less severe than retaliation (Cooney 2009)." (Jacques and Wright 2011, p. 733; emphasis added)

They illustrate the value of this classification by using data from interviews with two samples; 25 street dealers in St. Louis and 25 middle class dealers in Georgia (primarily Atlanta). The results, represented through illustrative cases, are that indeed there is an array of responses to grievances. More importantly, at least some participants are able to provide a reasoned account of why they chose the particular response. Violence was chosen to protect or develop a reputation that would deter others from victimizing the respondent. On the other hand, tolerance might be chosen when the offender was a long-term partner for transactions, so that it was important to maintain working relations, even at the expense of absorbing the current loss.

The Jacques and Wright research dealt with drug retailing and did not consider intra-organizational disputes. Nor did it take into account uncertainty, how to deal with an adverse event which might or might not be the consequence of another participant's negligence or fraud. Other U.S. research on the resolution of disputes in drug markets is also focused on retailing.

Of particular interest in this respect is the work of Angela Taylor (2007). She interviewed 27 people who were involved in the drugs trade at or near the time of the interview. She selected individuals involved in street corner dealing. She managed to describe 53 incidents, 35 of which ended violently. Most of these violent incidents had to do with debts and theft. Having a weapon at hand, being egged on by friends and substance abuse increased the probability of violent behaviour.

The research on informal control in illegal markets is better developed in the US than in Europe. Most relevant to our research is the seminal study of Damian Zaitch (2002; 2005). Zaitch collected ethnographic data on 43 Colombians involved in cocaine trafficking in the Netherlands over the period 1996-2001. Some of the subjects were involved in low level smuggling, others in retailing. Zaitch's subjects were aware of the value of a reputation for contingent violence: "[t]hey built violent reputations even against their will" (p. 202). "To prevent being cheated, to punish misbehaviour or failure, to settle scores, and to get rid of creditors, cocaine entrepreneurs have very often resorted to threats or assassinations both toward business partners and their own personnel." (p. 204).

Nonetheless, one of his principal findings was that few disputes were settled by violence:

"Entrepreneurs themselves use several other mechanisms to prevent or avoid the use of violence. Even when trust has failed there is still a gap before actual violence. For example, in cases of business failure or rip-off, entrepreneurs would first try to get civil compensation: money or a favour in return. In other cases they would just forget about it or they would be satisfied with an explanation. In fact the number of conflicts and problems faced by entrepreneurs that are solved in a nonviolent manner is amazing." (Zaitch 2005, p. 206).

A vivid example, relevant to our own work, concerned Miguel “a professional drug courier”, who dallied with a woman he encountered while in Venezuela on a drug deal. Instead of staying just 2 days he stayed a month, without informing the exporters or importers whose cocaine he was holding. Two men were dispatched by the “patron” to find out what the problem was but when he showed them the drug shipment was still intact they simply told him to get moving (p. 206).

Matrix Knowledge Group (2007) reports data from 222 drug traffic-involved offenders in UK prisons, by far the largest sample of offenders to be interviewed for these purposes. The sample was chosen from among prisoners who had received a sentence of at least seven years for a drug offense, taken as a screen for identifying major traffickers. In fact just over half had some involvement in import/export of drugs, though often just as couriers. There were a substantial number of high level domestic dealers. The analysis is descriptively interesting but provides minimal information on the use of violence because that was not its focus.

In a similar fashion to the Matrix Knowledge Group, Gruter and Van der Mheen (2005) interviewed 61 drug dealers (of whom 24 were imprisoned) in the Netherlands. 37 retail drug dealers were found via snowball sampling, starting with two base cocaine dealers in Rotterdam. The detainees were selected on the basis of the administration of Dutch district courts. The selection criterion was a non-suspended sentence of 4 or more years for violations of the Opium Act. The interviews with this second group demonstrate that the structure and methods of working within the cocaine distribution chain in the Netherlands are heavily connected to the way cocaine is imported into the Netherlands. Therefore, a distinction was made between large-scale cocaine import (mainly via the sea harbour and in some cases via road transport) and small-scale import mainly via Amsterdam’s Schiphol Airport. However, the interviews do not touch upon sources of conflict and the use of violence.

Not all studies on drug markets and conflict resolution require interviews with offenders. The WODC, a criminal justice knowledge centre for the Dutch Ministry of Security and Justice, periodically analyses files of closed Dutch police investigations of criminal groups. Based on such files, the WODC reported that conflicts sometimes were violently resolved, but not always. Criminals also opted for avoidance or gave people a second chance to redeem themselves (Kleemans et al. 1998; 2002). However, the two studies are not very clear on the number of conflicts encountered and its resolution. A third study on criminal markets in general found that criminals would negotiate and try to find out what happened when the promised goods were not delivered (in time) or if there was a delay (or lack) of payment, especially when the parties involved had good relations prior to the conflict. Violence on the other hand was the preferred solution in situations when a partner became a competitor or talked to the police (Van de Bunt et al. 2007).

Our study adds to the literature in a number of ways. First, it provides data on disputes in the drugs trade. A few exceptions aside, this is a topic often neglected in other studies. Secondly, the focus is on a high level of the drug trade; the organizations all handle transactions of tens of kilograms of cocaine, valued in the many hundreds of thousands of Euros, if not millions. Previous studies on conflict in the drug market have been exclusively about retail level transactions or have only had a few mid to high level dealers (e.g. Gruter and Van der Mheen 2005). Third, the unit of observation is what Jacques and Wright would call a potential “grievance”. We observe thus not just incidents of violence but also those that potentially are violent but are resolved another way. Other scholars describe illustrative non-violent settlement of disputes but do not present a data set that allows potentially for an assessment of the correlates of different paths taken for resolution. We believe this may be an innovation of methodological interest, though our small data base prevents us from fully exploiting the potential of this innovation.

### 3 Data

The data for this research were obtained from 31 case files on criminal enterprises that were collected for an earlier study of the cocaine market in the Netherlands, the publicly available Crime Pattern Analysis (CPA) Cocaine 2012 (Van der Laan 2012).<sup>4</sup> The CPA cocaine uses these case files to report on the nature and scope of criminal activities in relation to the smuggling and trafficking of cocaine, the criminal organisations and people involved, the social consequences of cocaine trafficking and possible future developments. Talking with the researcher of the CPA report, it became clear that the case files contained information on risks, failures and repercussions, but this information had not been included in the CPA report. In order to

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<sup>4</sup> The study was commissioned by the National Crime Squad (NCS) of the former Netherlands Police Agency. It is part of a project on Crime Pattern Analysis (CPAs) of several forms of serious organized crime. The aim of a CPA is to provide strategic input every four years for the National Police itself and the National Public Prosecutor’s Office on ‘special focus areas’. One such special focus area is cocaine.

analyze such incidents in a consistent manner, we put in a formal request to the head of the (former) NCS to study these files. This was granted under the condition that they be anonymized. We will therefore use the same fictive codes as in the CPA report. These codes are based on the year in which the investigation made its major findings (seizures, arrests) followed by a letter, such as 2008A.

The 2012 CPA cocaine report focused on case files in which investigations came to head in the period January 2007 – October 2011 (a previous CPA on cocaine was published in 2008 and dealt with the period 2002-2007). However, the research period itself stretches from 2005 to 2011 because some case files are built on incriminating evidence gathered in earlier years. The 31 case files constitute the most important case files put together by the NCS on cocaine trafficking in that timeframe, judged by the amount of cocaine involved (see annex). Excluded are four case files that were mislabelled as still running but were actually closed.

The 31 case files indicate the smuggling of at least 49,174 kilos of cocaine. Note that a kilo of cocaine at the import level costs about 25,000-30,000 Euros (information obtained from interviews with police officers). Some 10,000 kilos were seized in the Netherlands and 20,000 abroad. More than 15,000 kilos was successfully smuggled before the investigation team learned of it, for example, by information from seized computers and financial records of suspects.

The total of 49,174 kilos over the period 2005-2011 should be seen as a minimum, because it includes only shipments that are mentioned in the investigative files. The files will not always include information dating back more than a few years, loads intercepted abroad or loads not intercepted at all. Therefore, the figures in the annex should be read as an absolute lower boundary on the amount of smuggled cocaine that the investigated criminal groups were involved in.

Most of the cocaine seized abroad was destined to be smuggled into the Netherlands. This does not mean that the Netherlands was the final destination. Estimates of the Dutch cocaine market are very uncertain, but it is very unlikely to be as much as 5 tons per annum. This figure, compared with Dutch seizures of about 10 tons per year and nearly 50 tons of cocaine over a period of six years looking only at the shipments involving these 31 cases, shows that the Netherlands is an important transit country (Van der Laan 2012). Europol reported something similar Next to Spain, the Netherlands is seen as a significant cocaine importation and distribution channel (EMCDDA / Europol 2013, p. 45).

Furthermore, most ringleaders are also involved in the smuggling and production of other drugs including, ecstasy, precursors, hashish, Dutch cannabis, or heroin. They do not seem to have much involvement in illegal markets other than drugs; only one is involved in cigarette smuggling and another in human trafficking (he owns a brothel).<sup>5</sup>

The 31 case files deal predominantly with investigations from the NCS that are focused on a particular criminal entrepreneur (a ringleader) and his co-workers. The NCS investigations were sometimes jointly carried out with the Hit and Run Container (HARC) Team Rotterdam<sup>6</sup> and in some cases with foreign law enforcement agencies<sup>7</sup>.

Each investigation in the file tries to find evidence of specific criminal behaviour. For instance, a ringleader could be active in different fields of crime or run two smuggling operations at the same time. Co-workers undertake varying tasks. Every criminal activity warrants a separate investigation. These investigations are brought together in the case file on the criminal enterprise.

The case files include a broad overview of the alleged criminal acts (substantiated by detailed information) and the different indicted suspects. These can range from a relatively small group of four people (2007A) up to 11 (2010A) and even 31 suspects (2011b). On average, a case file took 8 months of investigation by a team that might average 9-10 officers at any one time. However, the number of suspects or time investigated does not necessarily reflect the size of the criminal enterprise. Both are strongly influenced by the available law enforcement staff at that particular moment in time and priorities.

All case files involved one or more ringleaders who were resident in the Netherlands. He (except one case file, they are all males) might not have been born in that country and most are not of Dutch ethnicity, as shown in table 1.

<sup>5</sup> For more information on this phenomenon, see Rubin et al.'s chapter on polymorphous criminal networks in this volume.

<sup>6</sup> The HARC team specializes in drugs investigations dealing with containers going through Rotterdam harbour. It consists of Rotterdam harbour police, Customs, Fiscal Information and Investigation Service and Prosecutor's Office.

<sup>7</sup> Specifically, the British Serious and Organised Crime Agency (SOCA), the Belgian Federal Police and investigative units from South America.

**Table 1: Ethnic background of ringleaders**

Ethnicity	Total	%
Dutch	27	39.1
Surinamese	12	17.4
Colombian	8	11.6
Chinese	3	4.3
Curacao	3	4.3
Moroccan	3	4.3
Arubanese	2	2.9
British	2	2.9
Argentinian	1	1.4
British Guiana	1	1.4
Ecuadorian	1	1.4
Indonesian	1	1.4
Israeli	1	1.4
Tunisian	1	1.4
Turkish	1	1.4
(Unknown)	2	2.9
<b>Total</b>	<b>69</b>	<b>100</b>

About forty percent of the ringleaders were of Dutch nationality. Another twenty five percent were from former or current Dutch possessions around the Caribbean (Aruba, Curacao or Suriname). About 12 percent came from Colombia. The rest truly spanned the globe, though it is interesting that only 2 came from another European country (the UK). All ringleaders have been resident for some years in the Netherlands and have operations there.

In the criminal case files, we focused on incidents that could potentially, or did actually, derail the trafficking of cocaine. We defined incident in a broad sense keeping it open to include all kinds of possible failures. These could range from accidentally faxing the details of an operation to the wrong fax number (2010B), forgetting to extract all the cocaine out of a shipment of fruit (not included but known from other case files), to even stealing shipments of cocaine (2011B). Of course, every case file itself is testament to failure because the police discovered the trafficking operations. But it is not the incident by itself, or the discovery process of the police that is our focus, but the way the ringleader deals with setbacks. Did he blame others? Did he give people the benefit of the doubt? Did he take violent action?

In addition to the file analysis, interviews were conducted with several investigating officers from the NCS working on cocaine smuggling. We asked them about particular details of the incidents reported in the case files and incidents in general and how the traffickers dealt with these.

It is important to note that Dutch criminal investigations, compared to those in other countries, provide a great deal of 'objective' evidence on the main suspects. Most noteworthy is the use of wiretaps. Both in relative and in absolute terms, the use of intercepted telecommunications in the Netherlands is high<sup>8</sup>. Although not every conversation was transcribed verbatim, these telecommunications provide a great deal of insight into the way criminal activities are carried out, and how offenders collaborate. Especially since the key individuals, as Campana and Varese (2012) put it, are always kept under close surveillance. This results in two other conditions being fulfilled that might be asked of the usefulness of wiretaps (Campana and Varese 2012). First of all, the ringleaders can be heard talking quite freely in moments of stress. Although most of them are quite careful on the telephone, when things go wrong and it becomes necessary to react, ringleaders throw caution to the wind. Secondly, the tapped conversations are followed over a reasonably long period of time. Most were followed for months, often during the whole period of the investigation. This gives a good insight in day-to-day affairs of the ringleaders and his response when things go haywire.

<sup>8</sup> A special report on wiretapping in the Netherlands mentions that "a tapping order has been issued for approximately one in every thousand telephones in use". (Odinot et al. 2012 p. 276).

It should also be noted that in stark contrast to investigations in the U.S. and other countries, Dutch cases do not result in plea bargains. This is important because the prosecutor is required to prove beyond any reasonable doubt the occurrence of specific criminal matters and can't rely on hearsay, i.e. defendants pleading guilty and naming accomplices in exchange for a quicker trial and a reduced sentence.

There are of course some drawbacks to using these specific police data. First, the information is compiled for a criminal prosecution. It therefore focuses on the criminal conduct of the main suspects, and not their socio-economic background. Excluded from the main records are also police observations and wiretaps that were not deemed necessary by the police to build criminal evidence. This is typically the kind of information that could be of use to social networks analysis as it often encompasses social interactions. Secondly, tapped conversations end up in paper form. The actual conversations were not listened to by the authors. This probably limits the nuances available to the authors as written conversations do not reflect the tone of voice in which things are said. Third, the criminal cases focus on what happens in the Netherlands, and not what happened abroad. Often the Dutch case files contain some information about the findings of foreign investigations of the suspects, but not the whole picture. That information would have to be obtained from the case files in the relevant countries. This was not feasible for this study, due to a lack of access to foreign police case files. Fourth, it is possible that successful cocaine smugglers (i.e. those who have not been caught) differ from those in the case files. The empirical data might therefore be distorted. However, some of these smugglers had been importing large shipments (hundreds of kilograms) for years; they might well be regarded as successful in their chosen occupation.

Whatever their drawbacks, the 31 case files still produce a rich portrait of Dutch cocaine smuggling. As will be shown, there is great diversity in involved nationalities, age, smuggling routes, risks, failures and repercussions. Previous scientific studies of organized crime in the Netherlands show that police files can have definite added value to academic research into organized crime (see e.g. Van Duyn 1995; Fijnaut et al 1998; Kleemans 2007; Soudijn 2006). Perhaps one of the main reasons why police files are underutilized in academic research (other than the Netherlands) is simply the lack of access to these files by academic researchers and/or the lack of freedom to publish independently on results. For the purposes of this study, the advantages of a file analysis ultimately outweighed the disadvantages. The case files contain objective 'hard' data. Police observations and wiretaps serve as credible indicators of the suspects' activities. Besides, finding information on risks and retaliations are difficult come by in other methods. Ethnographers such as Zaitch (2002; 2005) can gather such data but often are restricted to a specific community and will find it difficult to obtain the confidence of several large scale drug dealers simultaneously. The case files thus give a broader view into the world of cocaine smugglers operating in the Netherlands.

In total, the close police observation of several criminal trafficking operations and the extensive use of wiretaps made it possible to identify 33 incidents and the way these were handled. That is not to say that only 33 incidents occurred. There are additional incidents but with insufficient information on their resolution, so they were omitted. The 33 incidents involved only 18 ringleaders out of a total of 69. Some of them were involved in multiple incidents.

### 3.1 Coding scheme

The goal is to capture the variety of transaction-related grievances (incidents), identify the relationship between injured and culpable party, what was done to establish fault/responsibility and the final resolution of the grievance. We only included incidents for which it appeared that sufficient data were available to code all these fields.

The codes were developed after an initial reading of the main records. Given the novelty of the topic and the lack of any strong theoretical guidance we have erred toward creating more codes than may be necessary; it is always possible to merge categories later. We coded five characteristics of each incident:

1. The nature of the precipitating event. Our goal here was to distinguish what might be beyond the control of the individual (e.g. police interception), what could arise from a misunderstanding (quality/quantity of drugs) as opposed to incompetence (unable to get the drugs off the ship) and what would appear to be an effort to defraud (delivering less than the specified amount of money).
2. The identity of the injured party, i.e. who stood to lose either drugs or money. The relevant categories were the relationship of the ringleader to other actors; manager, subordinate, contractor or transactional partner (importer, exporter).
3. The identity of the culpable party, the individual(s) who appeared to the ringleader to be responsible for the lost of drugs or money. We used the same categories as for the injured party.

4. Effort to establish responsibility. In most instances there was uncertainty as to why the money or drugs had been lost or the shipment delayed etc. Did the injured party make an effort to establish what had actually occurred and who, if anyone, was responsible for the failure, either as a result of incompetence or of fraud.
5. How the grievance was resolved. This is the variable of greatest interest for this study. Coded as violent was any serious effort to bodily harm the culpable party, even if it was unsuccessful; in two incidents the police, knowing about the effort as a result of wiretaps, intervened to prevent the assault or murder. A separate category was created for intimidation, where threats of violence were made but there was reason to doubt that actual assault would occur without additional provocation. Non-violent incidents were coded descriptively, e.g. compensation or bargaining about future compensation or even ignoring the violation, perhaps because the injured party did not think the loss could reasonably have been avoided.

Both authors coded the cases. The first author (MS) had access to the full files. The second author (PR) worked from English translated extracts of the anonymized files. There were numerous initial disagreements that had to be resolved. For example, in one case the truly culpable party was a subordinate of the importer but the injured party was the exporter because he still owned the cocaine at the time it was lost. The exporter demanded compensation from the importer, imposing a liability doctrine for subordinates not so different from that found in legal markets. Who was, for these purposes the culpable party? Potentially there were two grievances, one between the agent and the importer and the other between the exporter and the importer. We coded it preliminarily as one grievance involving the importer and exporter but that is arguable.

Indeed, it sometimes turned out to be difficult to establish culpability. One individual would appear culpable to the ringleader but the investigative files might show that it was someone else. We chose to code the apparently culpable but include a note as to whether he was the truly capable.

## 4 Findings

### 4.1 Incidents and their resolution

We begin by presenting more details from incidents in three illustrative case files. These show the wide range of ways in which deals can go wrong for cocaine smugglers. The constraints referred to earlier such as minimal written records, need to be guarded on the telephone, interventions by the police, and difficulty in monitoring agent behaviour directly all come into play.

#### **Case 1: 2007 F**

In this case file, two incidents are found. Both are resolved peacefully, but it is interesting to note that the initial reactions are different.

The first incident starts when ringleader Pete places an order of 20 kilos with an exporter in Brazil. He and the exporter have known each other for some time and are on friendly terms. However, when Peter receives the cocaine, it turns out that 12 kilos were of good quality, whereas he describes the other 8 as 'chalk', cocaine of bad quality. He phones the exporter to complain about the 8 kilos of bad quality. The exporter says he is sorry, but his main contact was only able to produce 12 kilos on short notice. He therefore used another source to obtain 8 other kilos to fulfil the order of 20 kilos. Pete says that he should have tested those 8 kilos more thoroughly. The exporter is sorry, and indicates it is his fault. As a gesture of good will, he will send an 'engineer' to the Netherlands, a technician who can improve the quality slightly by extracting impurities. They will split his payment. Pete says that such a procedure still would cost him 20% more than he had planned. Next time, when the exporter is unsure that he can get good quality cocaine, he should just report it back. Pete says he would rather have 12 good kilos than some good and some bad. In the end the technician is not send but they will make it up somehow.

The second incident starts shortly after the first one when Pete employs a courier to bring a suitcase with cocaine into Europe. The courier is not up to the task and panics near the exit gate. He ditches his suitcase with cocaine. When he reports back by telephone to Pete that he lost the cocaine, Pete becomes very angry. Telephone conversations show that Pete suspects him of betrayal and Pete wants to kill him. He phones the exporter in Brazil to talk about his plans. Pete tells him he wants to lure the courier to Bogota and deal with him over there. He suspects that the courier works for somebody else, and wants to find out. His Brazilian contact has a better idea. Why lure him to Bogota if you can do it closer to home. The Brazilian will gather

a few men in Spain to do the job. He actually says over the phone he will have the courier killed, Pete just has to say when. This maybe a chance for the Brazilian to make things up to Pete. However, Pete's brother is more level-headed and decides to check out the airport for himself. He finds that the courier didn't lie about the route he took. He manages to convince his brother that it is just bad luck and to leave it at that.<sup>9</sup>

### Case 2: 2011E

The ringleader is active in a variety of drug operations. For years he has been involved in the production of synthetic drugs, and also produces marijuana. Both drugs mostly go to the UK market. By paths that are unknown to the police, he also becomes involved in smuggling cocaine. One cocaine shipment, however, goes wrong because it is sent to the wrong destination. He only has corrupt contacts in Antwerp harbour, but the container is delivered to Rotterdam harbour instead. It is unclear from the files whose fault it is, but it is possibly the mistake of the exporters in South-America. Because the ringleader can't change the destination on the manifest, he has the container sent to a delivery address in the Netherlands. As a precaution, he uses a frontman. As an extra precaution, the frontman gives the transporting company an incorrect address but on the day of delivery awaits the truck near that address to direct it to the right transit warehouse.

Meanwhile, the Colombian exporter also sends 4 men (from Colombia and Venezuela) to the transit warehouse. One of them has the blueprints of the hiding place in the shipment. As Van Duyne (1995) noted earlier, this is often done to oversee the offloading and prevent disputes. The exporters in such cases have financed the operation up to the point of delivery. Once it is in the hands of the buyer, he is obliged to pay the cocaine in the next few days or weeks (when he has sold it on). With 'boots on the ground' and eyes to see, the exporters can make sure that they completed their part of the deal. However, in this particular case, the police already had gotten wind of the shipment and arrested the lot. As the shipment first went to the wrong destination and the shipment was clearly intercepted by the police, the exporters did not hold the Dutch importers responsible for any losses.

### Case 3: 2011F

Whereas the 2 other cases have to do with bringing cocaine into the Netherlands, this one deals with getting money out of the country. An investigation found a group of 4 individuals solely focused on smuggling cocaine money abroad. The investigation showed that they would receive or collect money from at least 15 different sources. These sums could be as small as tens of thousands or as large as hundreds of thousands of Euros. When the money was received, it was noted down in a ledger. After a couple of days, the money was physically smuggled to South-America by couriers. If needed, the money was first changed from small bills to 500 Euro bills so that a single courier could carry up to 150,000 Euro hidden in a suitcase. The ledger and other papers show that in less than 2 years, at least 42 million Euros of cash was smuggled out of the country. Because most amounts in the ledger were multiples of 28,000-30,000 (the price of cocaine in the wholesale market), a conservative guess would put the amount of cocaine that is involved at 1,428 kilos.<sup>10</sup>

It wasn't difficult to find couriers. As Zaitch (2005) described in his fieldwork, in the Colombian community in the Netherlands it was a public secret that certain men or women were always looking for Colombian compatriots who would want to earn 3,000 euro and a paid vacation in exchange for smuggling money. There were always enough candidates; the confiscated materials indicate at least 46 couriers were used. To avoid couriers making off with 150,000 Euro or more, the ringleader built in some precautions. She wanted to know the name and addresses of other family members, never took the couriers directly to the money stash but handed it over in the courier's own home or in a hotel and escorted them to the airport and the check-in counter. However, she could not keep an eye on them once they had gone through the security gates. It was also impossible to escort them all to their destination, because couriers were flying almost daily to South-America. Couriers, knowing they were unwatched, could therefore be tempted to pretend that they were stopped by the border police and had to hand over the illegal money. Any time a courier reported back that he or she was stopped, the ringleader therefore insisted on being given physical proof in the form of a police report. When a courier did not take such a report with him, he was in trouble. On the other hand, if there was proof, the ringleader only wondered if it was bad luck or whether there was a snitch among her fellow companions.

<sup>9</sup> Jonathan Caulkins suggests that Pete may have been acting strategically with the Brazilian. By discussing his willingness to kill the delinquent courier, Pete is reminding the Brazilian that he can retaliate when problems arise; no more "chalk".

<sup>10</sup> There is the possibility that the 1,428 kilos in table 1 connected to 2011F in actually belongs to one or more other smugglers that were put in the column of successfully smuggled but not intercepted.

As can be seen from these 3 descriptions, incidents are very varied and can be resolved differently. In the next section, we look at involved ringleaders, types of incidents and its resolution.

### The 33 incidents

In this section, we present data on the 33 incidents studied. These involve 18 ringleaders out of 69. The number of ringleaders is too small to make any meaningful comparisons. Table 2 shows the nature of the problem that generated the incident. They are concentrated in four categories. Nine of the 33 (27%) were classified as involving a dispute about money that was owed in a transaction. Seven (21%) concerned the loss of drugs in a shipment. The two other categories (both with 5 incidents) related to offloading problems (such as the ship being in the wrong harbour) or police seizures.

**Table 2: Characteristics of incidents**

Incident type	Resolved	Threats	Violence	Total
Money dispute	3	1	5	9
Loss of drugs	4		2	6
Problems offloading	5			5
Police confiscation	4		1	5
Unexpectedly low quality of drugs	3			3
Stealing cocaine			2	2
Delay		1		1
Quitting			1	1
Exposing operation	1			1
<b>Total</b>	<b>20</b>	<b>2</b>	<b>11</b>	<b>33</b>

Every incident has financial roots. Money is lost when police confiscates the drugs, money is lost when drugs cannot be off loaded, money is lost when a shipment is delayed, etc... However, the direct reason for a (potential) problem can be quite diverse, as table 2 shows with its 9 broad categories, ranging from money disputes to problems offloading and exposing the drug smuggling operation. Within these broad categories, incidents also take diverse forms: money disputes themselves might consist of money launderers spending a drug dealer's money instead of investing it (2008C, 2009A). But it also happened that a drug dealer fell out with a close associate over money matters (2009C). Another example is a Dutchman and his girlfriend going to Colombia with a down payment for a new shipment (2010A). The airport police in Colombia arrests the man and confiscates the money. His girlfriend is not stopped and she travels onwards to the Colombian contacts. The Colombians spend her money on a lawyer to get the Dutchman out of his predicament. This succeeds, but the Dutchman is not given any drugs as the Colombians insist on a new down payment. The Dutchman contests this.

Drugs losses also happened quite frequently. For instance, a small loss occurred when a Colombian ringleader living in the Netherlands ordered a subordinate to travel from the Netherlands to Frankfurt in order to obtain a parcel of 4 kilos of cocaine in Frankfurt from an English speaking man (2007E). The subordinate doesn't want to go to Frankfurt because a few years back he had escaped from a German prison and still has an outstanding arrest warrant in Germany. At the same time, he can't say no to the ringleader and therefore over the telephone he falsely claims that he is in Germany but that he can't find the contact. The deal therefore blows up and the Englishman throws the coke away. In another example, a Surinamese ringleader also brings in coke with pellet swallows as a sideline to importing by bulk (2007G). It turns out that one swallower produced less pellets (75) than he swallowed (125). He had lost 50 on the way over to the Netherlands. Another ringleader encountered a slightly larger setback when a drugs courier panicked at the sight of airport security and left a suitcase full of cocaine (2007F). Of course, cocaine can also be lost when it is intercepted by the police (2008B, 2010G, 2011A). These losses often run in the hundreds of kilos, as when a shipment of 300 kilos hidden in a container were found by the police (2010F).

A different kind of problem, often resulting in losses, occurs when the drugs arrive undetected but cannot be smuggled through customs. In one case, the Dutch ringleaders made three attempts to offload the drugs from a ship in Rotterdam harbour (2010A). Other smuggling schemes failed when the Colombians accidentally send the shipment to the wrong harbour (2011A, 2011E). A particular noteworthy incident occurred when cocaine was attached in specially prepared tubes to the hull of an ocean liner (2007G). Divers were supposed to clear this shipment of cocaine from the hull but they become ill during the operation and a replacement could not easily be found.

Other categories also speak for themselves, as when the quality of the drugs is less than was agreed beforehand (2007F, 2007G, 2011B), a shipment that takes months to arrive instead of weeks or is cancelled a second time in a row (2007G), a subordinate who wants to quit but is not allowed to because he has access to areas closed to the general public at an airport (2008F). One time a co-worker stole 110 kilos of cocaine (2010A) and another coworker accidentally send details of the operation to the wrong fax number (2010B).

Although all incidents had financial repercussions, the parties involved handled them differently. As can also be seen in table 2, problems could be resolved without threat or violence, with threats or with violence. Most violence occurred when money was in dispute (five times), drugs were lost (2) or cocaine was stolen (2). When the police didn't know beforehand about a dispute, they were unable to step in, as in two cases when two people were shot to death. The police did know about other disputes and thus were able to prevent the kidnapping of two other people who were likely to be tortured or killed. On another occasion the police was able to warn off the intended victim of a hitman.

Table 3 gives a general overview of the type of resolution, be it non-violent, violent or threats.

**Table 3: Resolution of incidents**

	N=33	%
Resolved w/o threat or violence	20	60
Violence	11	33
Threats	2	6
<b>Total</b>	<b>33</b>	<b>100</b>

Sixty percent of the incidents were resolved without threat or actual violence. Participants were often willing to negotiate a compromise. For example, a seller says that the buyer did not deliver as much money as promised following a delivery (2011A); they agree that this will be dealt with in their next transaction. These kinds of agreements point to the confidence of the participants that their transactional partners have a high probability of continuing to operate.

However it is striking that forty percent did involve the actual use of violence (including two incidents in which the police stepped in to rescue the target). Looking not at incidents but at ringleaders (i.e. taking into account that there are multiple observations on some individuals) we find seven out of 18 who are involved in at least one incident resolved with violence. It appears that it is not just a few "bad apples" that feel the need to use violence.

The methods used to establish whether the putatively culpable party was either grossly negligent or acting in bad faith also varied a great deal. If the offered explanation was a police action, then sometimes the "accused" would be required to provide credible evidence of that action, such as a police report of an arrest or a confiscation. Only in one case (2008B) did the ringleader choose not to accept a subordinate's excuses when the latter claimed the police confiscated the drug shipment before he could get hold of it. However, it is unclear if the subordinate could not get evidence of the confiscation or that the ringleader simply tried to avert his financial losses by blaming the subordinate. Less formal evidence would also help as in 2010f when the Dutch resident smuggler hears of a 300 kilogram seizure, worries that the courier may have been helping the police but is reassured when a website reports the arrest of the courier. In a number of cases (e.g. 2007E, 2008D) the Dutch importer is required to meet with the South American exporters to provide a face-to-face account of the incident before it is resolved. Modern technology is of course regularly used. For example, in 2008d, the suspected party has to photograph a container from which cocaine has been removed and email it to the exporters, not, on its face, a particularly credible piece of evidence.

Table 4 and table 5 report data on incidents according to (1) whether the injured and culpable parties are of the same or different ethnicity and (2) whether the grievance is internal to an enterprise (i.e. involving a manager and subordinate or contractor) or across enterprises (e.g. a seller and buyer).

**Table 4: Incidents characterized by ethnicity**

	Same ethnicity	Different ethnicity
Resolved w/o threat or violence	12	8
Violence	4	7
Threat		2
<b>Total</b>	<b>16</b>	<b>17</b>

**Table 5: Incidents characterized by relationships**

	Internal	external
Resolved w/o threat or violence	8	12
Violence	6	5
Threat	1	1
<b>Total</b>	<b>15</b>	<b>18</b>

We observe that the proportion resolved non-violently is higher for those involving the same ethnicity (12 out of 18 non-violent) compared to those involving different ethnicity (only 4 out of 15); this is consistent with the hypothesis that it is easier to resolve disputes involving the same ethnicity. Other differences in table 5 were modest.

## 5 Caveats, implications and future research

The data presented above are descriptively interesting. They represent to our knowledge the first effort to describe and analyze the settlement of disputes in the high levels of the drug trade. As in studies of the lower levels of that trade, there is a good deal of variation in how disputes are settled; violence is just one method and not the dominant one. The data are consistent with an hypothesis that the drug trade, even at this high level, is run in a manner similar to that of any small business in which managers have to make decisions about individuals, either subordinates or transactional partners, that reflect the need to preserve relationships. Indeed, given the impediments to information flows in these markets, relationships may be even more important than in legal markets. Violence has potentially high costs as a mode for dealing with a grievance, even aside from risks posed by police response to the victimization.

Nonetheless we are surprised that such a high percentage involves the use of violence. In some cases the culpable party had acted in an egregious fashion (e.g. money meant for delivering a job is spent for own pleasures), which is not to justify morally the violence but to suggest that it was not arbitrary and capricious. Cocaine smuggling attracts many individuals who indeed cannot be trusted; their behaviour may reasonably provoke forceful responses, shading into violence.

Before turning to next steps, we note again the major caveats in using these data for a study of high-level drug dealing. This sample is limited in scope; Dutch-resident dealers, cocaine, 2005-2010. While it adds to the literature by providing data on high-level transactions, there are reasons to be concerned about the generalizability. In particular, the Netherlands is a country characterized by low levels of violence. For example, the UNODC (2012) study of homicide rates shows the Netherlands with a rate of 1.1 per 100,000, close to the Western European average of 1.0 and much lower than the 4.2 rate for the USA, let alone Colombia's extraordinary 33.4. Perhaps the social and legal environment of the Netherlands makes violent retaliation less attractive. However, note that most of the transactions involve a foreign-domiciled partner, almost always in the violent Americas, and that the ringleaders travel extensively. There are many opportunities for violent resolution outside of the Netherlands.

We believe that the creation of a data base of "grievances" or potential disputes may be a useful innovation for research in this area; Taylor (2007) created something similar for retail dealers. Studies that focus only on incidents in which violence is actually used are always in search of a denominator or measure of context in which to assess the correlates of violence.

The use of the grievance as the unit of observation may provide a natural denominator for understanding what triggers violence.<sup>11</sup>

Is it possible to use this kind of data to go further and to test significant hypotheses? We start by identifying some relevant theoretical and policy issues and then describing data that could be used for these purposes.

One theoretical direction coming out of the prior literature concerns the correlates of a violent resolution of a grievance. Why do some grievances get resolved violently while other apparently similar problems get resolved peaceably? The problem with the data in the current study is that we have limited and selective information on many of the incidents. For example, it is very likely that the length of the pre-existing relationship between the parties is an important factor; this information is available for only a few of the incidents. Supplementing these data with interviews with investigators can be helpful but there may still be a significant number of instances in which these data remain unavailable. Absence of evidence of a long-term relationship cannot be equated as evidence of a new relationship.

Data on the ethnic origins of participants is consistently available, so that we can compare whether violence is more likely when a grievance involves individuals from different ethnic origins. There would however be a concern that there were other unmeasured characteristics of the dispute that might explain this, such as (again) length of prior relationship.

Data from these sources (wiretaps, informant interviews, electronic bugs in meeting rooms) also regularly include the transactional relationship between the parties, in particular whether they have a hierarchical relationship or are independent. Again we might compare the probability of violent resolution, conditional on the nature of the relationship. There is however no theory to test here since none has been developed to distinguish between the two kinds of disputes.

The data in Varese (2012) is a kind for which this analysis would be appropriate. Varese used extensive wiretap files that were released by Italian prosecutors in connection with a trial against a Russian mafia group that had moved some of its operations to Italy. He and his collaborators have analyzed these data with respect to the relationships among participants (testing hypotheses about the extent of hierarchical control) and the topics that occupy the participants' time. About one quarter of the discussions concerned group management; these should provide abundant data on grievances and their resolution. Records drawn from "bugs" placed in homes or gathering places are likely to provide even more such data, since there is less reason to be discreet in conversation in those settings as compared to phones.

This report is entitled an exploratory study. The study is exploratory in at least two senses. First, it has examined the possibility of creating an incident data base using intelligence data files. We believe that this has been at least partially successful. We were able to identify a moderate number of incidents that could be described in a consistent fashion for analysis. Further discussions with investigators should enable us to identify more such incidents. What is less clear is whether the data can be developed enough to undertake more refined analyses. Second, the study just begins the exploration that makes this topic of both policy and theoretical interest. What factors generate violence in these high level drug markets and what, if any, structural interventions, can ensure that participants move toward peaceful resolution of grievances? Furthermore, if these grievances show one thing, it is that cocaine smugglers do not operate as separate cells that have no contact with each other. Far from it, exporters, importers and transporters have far more access to each other than is commonly believed. This perception should lead to better international cooperation in researching or preventing the cocaine trade.

Finally, we turn to the practical and policy implications of this work. For police agencies, it is useful to know more about what characteristics of drug trafficking enterprises make them prone to violence. One of the goals of drug enforcement is to minimize drug-related violence (Kleiman 2009). Drug enforcement can generate violence by creating instability among the participants (Reuter 2009). Police agencies take into account many factors in making their targeting decisions and the likelihood of generating violence may be one that could properly be added to the list.

Further, the insights from this research can help police understand more about the origins of violence in drug markets. What are the situational and organizational correlates of the propensity to use violence? With additional data from other nations on

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<sup>11</sup> Note though that this is only one source of violence in illegal markets; it covers neither psychopharmacologic nor economic-compulsive violence (Goldstein 1985), which may be hardly relevant for higher level dealers. Nor does it include territorial violence; territoriality may also be irrelevant for these essentially abstract markets. Reuter (2009), in the context of Mexico, argues that instead of territory, drug trafficking organizations may be competing for control of key officials. That might apply to Dutch cocaine smugglers, since there is frequent reference to corrupt officials in port and airport facilities.

the same phenomenon, researchers can contribute to a better understanding of how enforcement can reduce drug trafficking related violence. Just as harm reduction is an important factor in decisions about drug users, so it can be used by police agencies, and market violence can be one of the factors taken into account.

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## Annex 1: Cocaine seized and smuggled 2005-2011 in 31 file cases (kg)

Table A1 shows the amount of cocaine that was seized in the Netherlands or abroad, in addition to (1) the amount that the police intelligence indicated was being prepared to be smuggled and (2) seizures abroad from parties allied to Dutch investigations. It shows that these cases involve major cocaine smugglers; only three of the cases involved cocaine organizations that handled less than 100 kilograms in the period, while 14, nearly half, handled more than 1,000 kilograms.

Table A1: Cocaine seized and smuggled 2005-2011 in 31 case files (kg)

Investigation	Confiscated in the Netherlands	Confiscated abroad	Not confiscated but successfully smuggled	Preparations	Total
2007A		3,000			3,000
2007B	5		30		35
2007C	121				121
2007D		2,860			2,860
2007E		642	70		712
2007F			27		27
2007G	99	67	8	50	224
2008A	37				37
2008B	23				23
2008C	1,653				1,653
2008D	173	480			653
2008E		2,960	5,979		8,939
2008F	68		102		170
2009A		5,233	1,118	Unknown large shipment	6,351
2009B		900	3,500		4,400
2009C				1.100	1,100
2009D		198			198
2010A	411	183	2,530		3,124
2010B		316			316
2010C		209	200		409
2010D	112	50		2,500	2,662
2010E	250		250		500
2010F	1,017	772			1,789
2010G	555				555
2010H	4,200				4,200
2011A	379	275	80		734
2011B	130		270		400
2011C		1,200			1,200
2011D		1,200			1,200
2011E	145				145
2011F	9		1,428		1,437
<b>Total</b>	<b>9,387</b>	<b>20,545</b>	<b>15,592</b>	<b>3,650</b>	<b>49,174</b>

Source: Van der Laan (2012), p.34.



## Report 3

# 'Polymorphous criminal networks': considering criminal groups' engagement across markets

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## Abstract

At a time when drug policy and law enforcement regimes for tackling illicit markets are in a state of flux, it is important to understand how changes in the treatment of one type of illicit activity or substance may impact others. Some criminal networks are unlikely to allow profits and trade in one area to disappear without seeking to replace that income in other ways. On the contrary, many criminal groups and networks have shown themselves to be adaptive to changing when under pressure. We call these 'polymorphous criminal networks' (PCNs) because of their ability to change. However, relatively little is known about the relationship between most illicit trades, for example between one illicit drug and another or between drugs and human trafficking, or about the relationship between those and many of the licit activities in which criminal networks also engage. Indeed, there are very few sources of information, datasets or even frameworks for thinking about such relationships. And the data that are available largely depend on law enforcement reporting, driven by seizures and arrests, which is often a better measure of the allocation of police resources than of actual levels of activity by criminal groups. Yet without better information about how criminal networks' activities shift and change, it is difficult to develop evidence-based policy and operations to tackle them. This chapter begins to address this gap and indicate a means of building the evidence base by providing an illustrative collation of the licit and illicit activities undertaken by criminal networks as identified in a targeted review of the literature. The paper also captures, where possible, reasons for market diversification and movement between licit and illicit goods. Finally, we propose a new framework building from textured micro-level case study and investigative information, to develop an understanding of wider, non-criminal justice datasets that may be available to develop more robust understanding of the relationships between the range of activities undertaken by transnational criminal networks, especially those who traffic in drugs.

## 1 Introduction

There are many reasons criminal networks may change the goods and services in which they trade. They may find their profits in a given illicit market squeezed or their activities under threat. For instance, either increasing or decreasing law enforcement efforts could affect profits available in a market. Crackdowns may increase risks and costs of engaging in criminal activity, thereby reducing profits (Sherman 1990). On the other hand, legalising or medicalising a previously illicit drug could reduce profits available in its illicit trade (Kilmer, Caulkins et al. 2010). For example, if provision of opioid substitution treatments were to expand significantly, this could reduce demand for illicitly purchased opiates. Such changes within illicit markets raise questions about whether and how criminal groups may compensate for lost income.

Existing studies indicate that geographic diversification of trade in one illicit substance can be a route to recouping losses (Reuter and Trautmann 2009). This has been termed the 'balloon effect' because of the way air shifts to other parts of a balloon when the balloon is squeezed. One area in which much less is known, is whether this balloon effect is a useful metaphor for a criminal group's ability to diversify its overall portfolio of goods and services as well as its geographic routes for one particular substance. This in part depends on the extent to which criminal networks are 'polymorphous' – that is, able to turn their attention to focus on other goods and services in which they are already involved, or able to move into trading new substances and services to find profits elsewhere, adapting and shifting to new geographic routes and markets. An important question for policy makers and practitioners seeking to tackle drugs and other markets, is what would be the impact on other illicit activities of effectively tackling some criminal markets. Would tackling one illicit market such as the

heroin trade or other illicit drugs be likely to bring about a significant increase in other illicit trades such as human trafficking, illicit sex markets and illicit firearms? Or are drug trafficking, sex trafficking, firearms and other trafficking more likely to move relatively independently of one another than to act as market substitutes? This concern is made acute by the apparent shift to legalized provision of cannabis in the United States, raising questions such as whether Mexican drug trafficking organisations (DTOs), already active in a number of other illegal trades, push even further either in terms of the range of these activities they undertake or the level of resources they devote to their existing portfolio.

Developing an evidence base in this area would also help policy makers and practitioners respond to other related questions, for example about the relationship between illicit markets and licit markets. For example: are legal highs a substitute market for illicit drugs? Or do they tend to co-occur? Do legal prostitution and/or lap dance clubs foster an environment conducive to further illicit sex trade?

Such questions are important for those planning operations and developing policy to address transnational crime and trafficking. Without better understanding of these phenomena it is difficult to anticipate and plan for the possible consequences of operational and policy changes. And without the ability to understand and anticipate these shifts, there is a risk that the net effect of targeting scarce resources at a particular illicit market will simply move the problem around.

To address these questions, those working in this field require more systematic information about what goods and services are traded together, or 'co-occur', within a given criminal network and whether, why and how criminal groups diversify their activities. There is a sizeable and growing literature on many aspects of transnational and organised crime, and a few studies have considered particular cases of goods and services that may be simultaneously traded by criminal networks. However, to our knowledge co-occurrence and diversification of goods and services have not yet been the starting point of analysis. In order to inform policy and operations in this field, this paper aims to provide a first step towards developing more systematic knowledge regarding relationships between different illicit markets, and between illicit and licit markets, with the aim of considering whether and how criminal networks diversify or shift their activities. Systematic databases of co-occurrence and diversification do not exist. In order to begin to fill this gap and explore this area, we provide an overview of instances of co-occurrence and diversification identified in other studies. These descriptions are illustrative rather than systematic or comprehensive, because in many instances co-occurrence and diversification described in other studies are not the primary focus of those studies. For example, studies indicate that some heroin traffickers are also trafficking other drugs, and some are also involved in counterfeiting, extortion and corruption. This could suggest that criminal networks trafficking heroin may be well-placed to shift or further expand into other drug markets. Such information does not tell us about how readily they are able to succeed in doing so.<sup>1</sup> Instead it indicates a phenomenon that merits more systematic analysis, especially if profits from the heroin trade come under pressure.

## 1.1 Background to the study of co-occurrence and diversification

This section provides an introduction to some of the ways criminal networks adapt, move geographically and diversify. It raises the question of whether and how we could begin to conceptualise diversification of criminal markets more widely.

### *Transnational and organised crime*<sup>2</sup>

Much research in the field of transnational and organised crime focuses on the structure and practices of criminal groups, with the groups themselves as the unit of analysis, be it as social networks, economic enterprises or learning organisations (Schloenhardt 1999; Paoli 2003; Shelley 2003; Felson 2006; Leman and Janssens 2008; Campana 2011; McIntosh and Lawrence 2011; Morselli, Turcotte et al. 2011; Varese 2011a). Such research has made a significant contribution to the state of knowledge in the field and to a more textured understanding of the work of criminal organisations and the environments in which they operate. However, there is also growing recognition within the policy and law enforcement communities that the traditional image of stable and hierarchically organised crime groups based in one area or region focusing on a particular illicit activity does not reflect the full landscape of current transnational and organised crime (UNODC 2010; Europol 2011;

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<sup>1</sup> Even though there are methodological challenges with drawing inferences from data on traffickers who have been caught, a Matrix study of drug traffickers in prison indicated that for those who had been caught moving into new markets may have been at risk for doing so (Matrix Knowledge Group 2007).

<sup>2</sup> Although there remains much discussion regarding the definition of what is an organised criminal group, for the purposes of this report we refer to the United Nations definition. Accordingly, an organised criminal group "shall mean a structured group of three or more persons, existing for a period of time and acting in concert with the aim of committing one or more serious crimes or offences (...) in order to obtain, directly or indirectly, a financial or other material benefit" (UNODC 2004).

EMCDDA and Europol 2013). Instead, many criminal groups may be better understood as networks, and they may be both diverse and flexible (Galeotti 2004; Kenney 2007; Edwards and Levi 2008).

### ***Polymorphous criminal networks***

With this emergent recognition of complexity, there is growing acknowledgement that criminal groups and networks may link with each other, adapt supply chains and adjust their activities in response to law enforcement interventions and market opportunities (UNODC 2010; Europol 2011). There is also evidence that local criminal groups as well as cross-border transnational criminal networks are likely to be involved in more than one illicit market or activity (Pearson, Hobbs et al. 2001; Kleemans and De Poot 2008), crafting intricate and sophisticated portfolios of trade (Malm, Bichler et al. 2010). Further, there is research on the extent to which criminal groups are believed to be able to organise themselves and respond to market opportunities (Reuter 1983; Paoli 2002; Albanese 2008; Morselli, Turcotte et al. 2011). Because of this increasingly acknowledged flexibility of structure and activity, in this paper we use the term 'polymorphous criminal networks' (PCNs) to denote those groups or networks, at local, national, regional, or international levels, able to profit from activities relating to multiple illicit goods and/or services.

### ***Geographic mobility***

In response to some media and other accounts depicting criminal networks akin to multinational organisations (Glenny 2009), research has focused on criminal networks' geographic mobility, and their capacity to diversify by entering foreign markets. Some studies in this vein have therefore focused on the drivers and constraints of geographic diversification (Dupont 1999; Shelley 1999; Paoli 2003; Varese 2006; Broude and Teichman 2008; Leman and Janssens 2008; Campana 2011; McIntosh and Lawrence 2011; Morselli, Turcotte et al. 2011; Varese 2011a). Whether analysing the "long term transplantation of mafia groups in new territories" within Italy (Varese 2006), the movement of the Camorra-based La Torre Clan to Scotland and the Netherlands (Campana 2011), or "the external and internal organised crime threats to Canada" (Morselli, Turcotte et al. 2011), the authors tended to agree that criminal groups are likely to mobilise elsewhere depending on the limitations and opportunities available.

### ***Diversification of illicit drugs***

In addition to geographic diversification, other studies have addressed diversification within illicit drugs markets (Pearson, Hobbs et al. 2001; Matrix Knowledge Group 2007; Europol 2011). While the official figures on drug seizures are difficult to access, there are some that seem to support the incidence and main characteristics of this phenomenon. As an example, the textbox below summarises some findings regarding multi-drug seizures in Italy<sup>3</sup>.

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<sup>3</sup> Whilst in this section we present an emerging picture of some aspects of co-occurrence from data made available to us, this picture is very likely to be partial, as police and those reporting on seizures are likely to focus especially on whatever strategic priorities are highlighted for them at a given time, and are likely to seize more and identify more co-occurrences within and between substances on which they are focusing (for more on this please see chapter 1.2 Challenges to the study of market diversification). Thus, while it is possible and may be useful to begin to build a partial picture from such data, the limitations involved in doing so from such data are as important as what it reveals, and it is because of this endogeneity of criminal justice activity and data that we conclude by suggesting the development of a new approach to complement existing data for assessing co-occurrence and diversification.

### Poly-drug dealing in Italy

An analysis of the data relating to multi-drug seizures in Italy from 2008 revealed a general pattern of co-occurrence between the different illicit substances seized by the competent authorities. Even though these figures are based on seizures of small quantities of drugs, it is nevertheless relevant to note the tendency identified of dealing in more than one substance.

Attending to the seizure figures from that year, crack and ketamine were the substances most frequently reported to be co-occurring with other drugs. For instance, 79.35% of the crack seizures were reported as associated with the seizure of other drugs, most repeatedly with heroin (29 seizures) and with heroin and cocaine (27 seizures).

On the other hand, cannabis was the substance least likely to be reported as co-occurring with other drugs. Only in 22.12% of the cases was cannabis reported as seized together with other substances. Furthermore, cannabis registered the most uneven frequency of co-occurrence. In fact, out of the 2,752 cases where co-occurrence was recorded, 1,743 (i.e., 63.34%) regarded co-occurrence of other substances with cocaine, by far the drug most repeatedly reported to be seized with cannabis. The co-occurrence of these two substances further appeared to be the most frequent.

**Source:** C. Rossi, University of Rome Tor Vergata (personal communication).

The literature on the trade in illicit drugs has also identified what has been called a 'balloon effect', highlighting the flexibility and elasticity of illicit drugs markets. This balloon effect describes criminal groups' likelihood of shifting or transferring their drug production and trafficking routes to a new location in order to avoid the drug control efforts of a given State (Greenfield and Paoli 2011; Paoli et al. 2009; Reuter and Trautmann 2009) and is one of the well-documented unintended consequences of drug policy (Reuter 2009). As noted above, the questions explored and approach outlined in this paper seek to build on this notion, considering not only the unintended consequences of control within the supply chain of a particular illicit market, but beginning to map and build an understanding of how this balloon effect may occur across different markets, both licit and illicit.

#### ***Towards a focus on wider co-occurrence, diversification and its drivers***

While there has been some focus on diversification of routes and of movement between trafficking in different types of illicit drugs, there has been less attention to the multiplicity of goods and services that may be traded, provided and trafficked together. There has also been less research on what may be driving movement between and across such routes, goods and services. Some authors have begun to note that certain activities and commodities may be more likely to co-occur than others (Lichtenwald, Perri et al. 2009; Soudijn and Kleemans 2009; Shelley 2012)<sup>4</sup> and there is a growing body of knowledge exploring the links between licit and illicit markets (Malm, Bichler et al. 2010). Yet a better understanding of co-occurrence and of when, how and why groups have shifted their activities could valuably inform the development of policy and operations to tackle these diverse and potentially interconnected activities (McIntosh and Lawrence 2011).

## 1.2 Challenges to the study of market diversification

In attempting to identify co-occurrence and diversification from one market to another a significant challenge lies in the lack of readily accessible data. Police in many countries do not uniformly record the range of illicit goods and services traded and/or engaged in by criminal groups. Crime figures are often more of a reflection of police performance than an accurate representation of actual levels of crime (Dijk 2007). Further, because the licit goods or services engaged in and provided by those criminal groups are normally beyond the scope of law enforcement action and interest, these activities may be even less likely to be recorded. Even though a number of guidelines and rules have been established at national level in many countries, the degree of police discretion regarding the recording of crime varies across different criminal justice systems and jurisdictions (Aebi et al. 2010). Furthermore, at every stage of the criminal justice system a significant number of cases are likely to 'fall out' of the system and therefore go unrecorded. Throughout this process some peripheral criminal activities may be filtered out as well. As a result, the great majority of offences initially recorded by the police do not result in convictions

<sup>4</sup> For instance, Shelley (2012) noted a "growing convergence of the drug and human trade", which she attributed to the growing involvement of drug trafficking groups in human trade.

at Court,<sup>5</sup> and therefore such data is not readily available from traditional criminal justice records which do not then capture the breadth of activities and services carried out by any one criminal group (Aebi et al. 2010).

A better source of information for these purposes may be the many detailed case files, wiretaps and interview transcripts assembled by law enforcement authorities, such as, for example, the Organised Crime Monitor in the Netherlands.<sup>6</sup> Indeed, relying on such sources and methodologies is established practice for academic research as well as operational intelligence, and some influential studies on particular criminal groups have been based on information gathered through such methods (Paoli 2003; Campana 2011; Varese 2011b). However, as these data are difficult to obtain and can be expensive to analyse, a fully systematic review of such sources therefore presents enormous resource hurdles.

## 1.3 Approach

As noted above, this paper aims to provide an exploratory start at building a picture of what goods and services have been found co-occurring, and of diversification<sup>7</sup> from one market for a good or service into another. In order to do so, the paper begins with a targeted review of relevant empirical literature, case studies, reports in grey literature and a survey conducted by the UNODC. This targeted review focused on the trafficking and operations of serious and organised criminal groups and networks. Through this targeted review we identify goods and services noted in the studies included as being produced, trafficked and/or traded together. Drawing on the information extracted from the targeted review, in Section 2 below we populate a table with these instances of co-occurrence and provide a brief overview of these. The aim in doing so is to illustrate instances in which co-occurrence has been identified, to demonstrate the possibility of doing so and the potential value of building a mapping of co-occurring markets in terms of goods and services. This is a useful starting point to understanding how and why PCNs diversify, as discussed in the subsequent section identifying some of the different triggers and contributing factors that have been attributed to market diversification in the studies and literature identified. The aim of this section is to extract and to propose a taxonomy of factors that facilitate or contribute to diversification and co-occurrence. In order to provide some insight into how and why some goods and services tend to co-occur, and how PCNs diversify, the paper presents a number of examples drawn from press releases from Europol, the UK's Serious Organised Crime Agency (SOCA), and informed by interviews with a number of high-level law enforcement experts from HM Customs, SOCA and the London Metropolitan Police.

However, it is worth noting that the data collected on co-occurrence and the reasons for diversification can only be a partial glimpse of what is possible in taking a more integrated approach to assessing linkages across markets and diversification by networks. The instances identified in existing work are limited by the studies themselves (which were not focused on systematically cataloguing co-occurrence), and available data (which does not record substances and activities in a way that facilitates such a mapping). The aim in the limited scope of this paper is not therefore to present a comprehensive catalogue of all goods and services ever identified as co-occurring, but rather to provide a first step and one proposed route towards building this picture. For this reason the final section of the paper outlines a proposed approach to developing more systematic knowledge about the relationships between the range of licit and illicit goods and services traded by criminal networks and groups.

# 2 Co-occurrence

## 2.1 Approach to illustrate co-occurrence

As discussed in chapter 1.1 (Background to the study of co-occurrence and diversification), several studies have referred to co-occurring goods or diversification of criminal activities and commodities traded. These studies tend to focus on the

<sup>5</sup> This is with regard to criminal offences in general and not only serious or organised crime. For instance, a number of initiatives to narrow the 'justice gap' have been launched in the UK since 2002, when "only a fifth of crimes recorded by the police resulted in their perpetrator being brought to justice" (<http://www.cps.gov.uk/publications/prosecution/justicegap.html>).

<sup>6</sup> <http://english.wodc.nl/onderzoek/cijfers-en-prognoses/Georganiseerde-criminaliteit/> (accessed on 22 May 2012 at 17h44)

<sup>7</sup> We think it is useful to distinguish between diversity and diversification. When we discuss co-occurrence here, this is about diversity in the number of areas in which a group may be engaged. In subsequent sections, when we discuss movement into new markets and reasons identified for that movement or shift we consider this to be diversification.

criminal groups, the environments in which criminal groups operate, and some on the illicit markets themselves (Reuter 1983; Shelley 2003; Paoli 2004; Varese 2006; Morselli, Turcotte et al. 2011; Varese 2011a; Shelley 2012). However, whilst there are indications that certain activities as well as goods and services are more likely to co-occur than others (Soudijn and Kleemans 2009), co-occurrence per se has not yet been the subject matter of systematic and wide-ranging empirical study. In order to illustrate that certain groups and networks are involved in multiple activities, and that co-occurrence can be identified through existing studies and other sources, we have extracted and tabled different groups' and networks' activities, goods and services from a targeted review of empirical studies<sup>8</sup>.

Studies selected for this table have relied on a broad range of methodologies, including:

- Case files, police records (Shelley 2003; Kleemans and De Poot 2008; Leman and Janssens 2008; Soudijn and Kleemans 2009; Varese 2011a)
- Transcriptions of wiretapped phone conversations (Campana 2011; Varese 2011a)
- Survey data (UNODC 2010)
- Interviews (Pearson, Hobbs et al. 2001; Shelley 2003; Campana 2011)
- Newspaper reports, human rights reports and other relevant materials (Shelley 2003).

## 2.2 Building a picture of co-occurrence

Whilst it is not possible to tell from the information here whether or not the picture is representative of this phenomenon more widely, it nevertheless captures a range of PCNs and their portfolios of activities as discussed in the literature, particularly within the 11 studies considered (Dupont 1999; Pearson, Hobbs et al. 2001; Shelley 2003; Paoli 2004; Kleemans and De Poot 2008; Leman and Janssens 2008; Soudijn and Kleemans 2009; UNODC 2010; Campana 2011; Silverstone 2011; Varese 2011a). These included a total of 27 organised crime groups from 12 different countries, and a set of 54 different activities or commodities, ranging from primarily illicit to primarily licit, as listed below in Table 1. While these categories are not in practice mutually exclusive and there is some overlap between the two, the distinction is made here to facilitate an overview and illustrate inter-penetration of licit and illicit activities amongst PCNs.

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<sup>8</sup> For a complete overview of the data extracted from the literature please see annex 1.

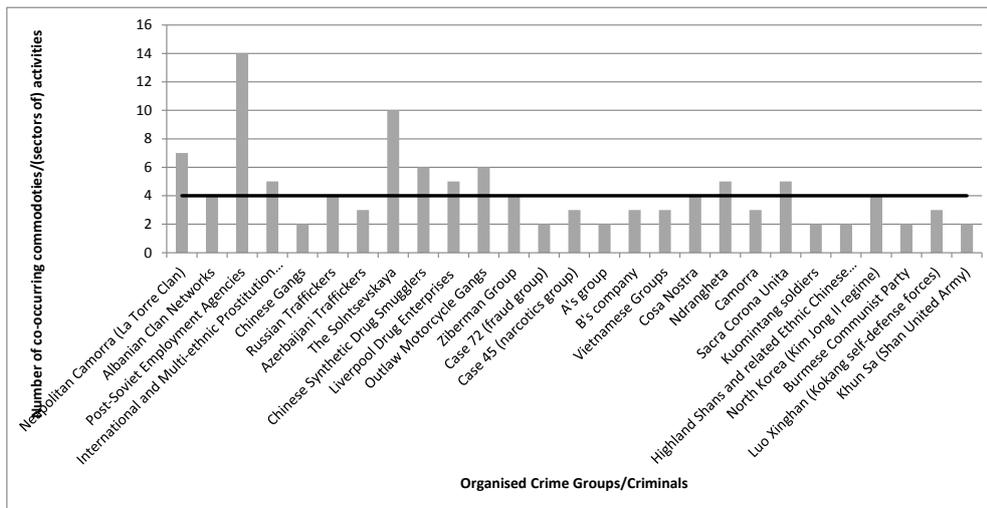
**Table 1: Activities/commodities identified in the literature**

Commodities/(Sectors of) activities	
<ul style="list-style-type: none"> <li>• Primarily Illicit</li> <li>• Cannabis production</li> <li>• Amphetamine production</li> <li>• Opium production</li> <li>• Synthetic drugs production</li> <li>• Manufacture of new designer drugs</li> <li>• Trade of chemicals and necessary equipment to produce synthetic drugs</li> <li>• Establishment of methamphetamine laboratory</li> <li>• Ecstasy trafficking</li> <li>• Hashish trafficking</li> <li>• Precursors trafficking</li> <li>• Cocaine trafficking</li> <li>• Amphetamine trafficking</li> <li>• Cannabis trafficking</li> <li>• Heroin trafficking</li> <li>• Opium trafficking</li> <li>• Synthetic drugs trafficking</li> <li>• Unspecified drug trafficking</li> <li>• Cigarette smuggling</li> <li>• Smuggling of alcohol</li> <li>• Protection racket</li> <li>• Extortion</li> <li>• Human trafficking/smuggling</li> <li>• Fraud</li> <li>• Corruption</li> <li>• Insurance scams</li> <li>• Money laundering</li> <li>• Counterfeiting</li> <li>• Trafficking of false documents</li> <li>• Vehicle trafficking</li> <li>• Financing armed groups</li> <li>• Trafficking of arms</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily Licit</li> <li>• Food and catering sector</li> <li>• Construction industry</li> <li>• Real estate</li> <li>• Travel agency</li> <li>• Pubs/Bars</li> <li>• Employment agency</li> <li>• Tour operator activities</li> <li>• Transport sector</li> <li>• Hotels</li> <li>• Import/Export sector</li> <li>• Modelling agency</li> <li>• Horticultural sector</li> <li>• Wood and furniture trade</li> <li>• Pharmaceutical products trade</li> <li>• Cloths trade</li> <li>• Trade in works of art</li> <li>• Gold and steel trading</li> <li>• Computer-trading</li> <li>• Helicopters and antennas trade</li> <li>• Banks</li> <li>• Public works</li> </ul>
<b>Can be illicit or licit depending on the context</b>	
<ul style="list-style-type: none"> <li>• Prostitution</li> <li>• Gambling</li> </ul>	

**Note:** The commodities/(sectors of) activities are listed here in the way the authors referred to them in the studies. For a full list of the studies please see annex 1.

The average co-occurrence scenario recorded and reported in the sources included here tended to involve approximately four activities or commodities. The most active organised crime group appeared to be the one described as 'Post-Soviet employment agencies' (Leman and Janssens 2008), which the authors describe as being engaged in 14 different activities, across licit and illicit markets, as illustrated in Figure 1.

**Figure 1: Number of co-occurring commodities/(sectors of) activities per organised crime group as identified in the literature**

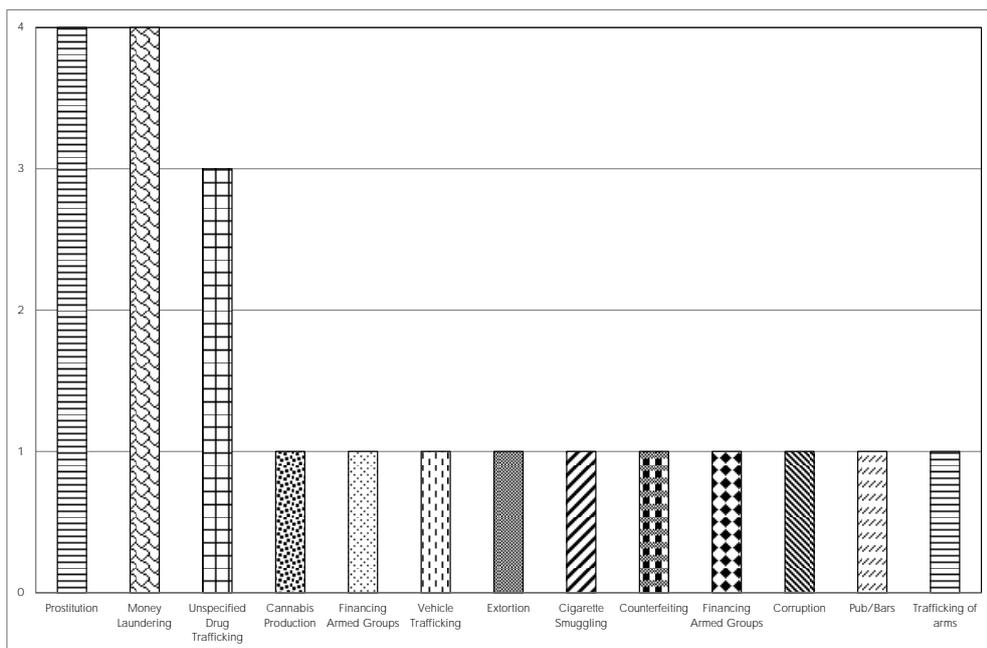


**Note:** The organised crime groups are listed here in the way the authors referred to them in the studies. For a full list of the studies please see annex 1.

Nevertheless, several studies identified other criminals/organised crime groups conducting one single activity<sup>9</sup>. For example, in the study from Soudijn and Kleemans (2009) the so-called 'Chinese human smugglers' did not seem to have engaged in any other activities or commodities apart from the smuggling of human beings.

In terms of co-occurrence exclusively concerning illicit activities or commodities and not restricted to drug-related production or trade, the most frequently recorded activity from these studies was trafficking/smuggling of human beings. This seems to have co-occurred with other activities in all seven of the instances identified. It is worth noting that in more than half of the cases, trafficking/smuggling of human beings was registered as having co-occurred with prostitution and with unspecified drug trafficking – that is trafficking in some illicit drug (Figure 2).

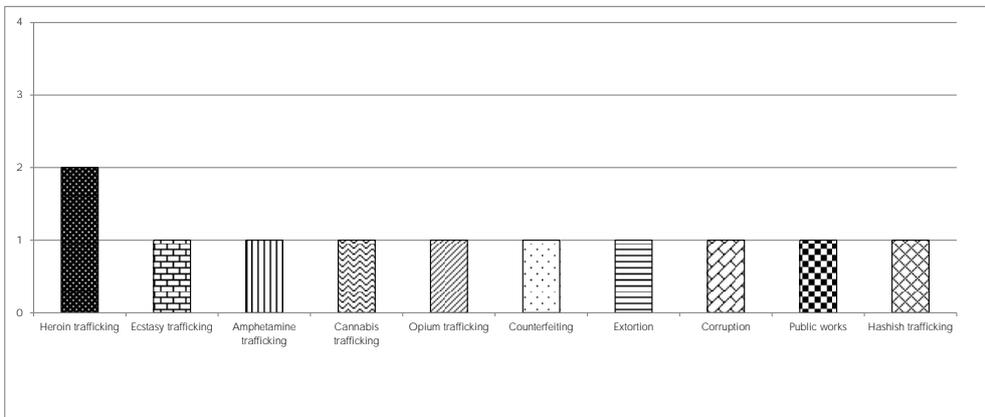
**Figure 2: Frequency of co-occurrence of trafficking/smuggling of human beings with other primarily illicit commodities/ (sectors of) activities as identified in the literature**



<sup>9</sup> While we acknowledge the presence of such cases, given that the main focus of this study lies on the mobility and diversification of PCNs, these have not been included in our database of co-occurrence.

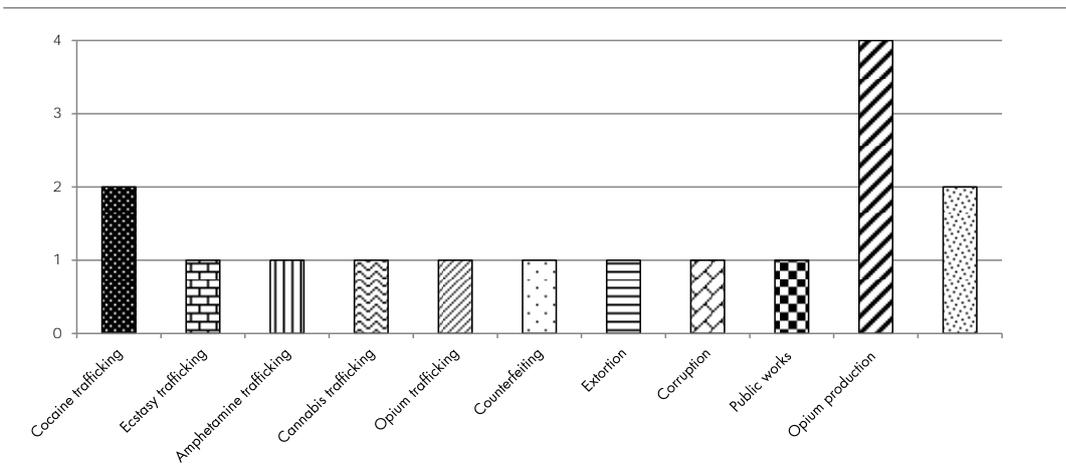
Furthermore, the studies acknowledged involvement in a range of drug-related activities. Accordingly, about two-thirds of the organised crime groups (19/27) engaged in the production and/or trade of illicit substances. In seven of these cases, the authors did not specify the type of illicit drug being traded, merely referring to 'drug trafficking'. However, in other studies more of this type of information was collected. Drug trafficking was described as not co-occurring with the production of drugs in a total of 10 of the cases from these studies. What is more, the majority of these trade-only instances involved the trafficking of other substances or commodities. Cocaine and heroin were described as co-occurring with other primarily illicit and primarily licit activities/commodities in all the incidences registered in the literature (100% rate of co-occurrence). The patterns of co-occurrence of these two substances are presented below in Figures 3 and 4, respectively. In terms of cocaine trafficking, the literature seemed to point out a stronger co-occurrence with heroin than with the remaining substances or commodities/activities.

**Figure 3: Frequency of co-occurrence of cocaine trafficking with other primarily illicit and primarily licit commodities/ (sectors of) activities as identified in the literature**



The trafficking of heroin tended to be mostly associated with the production of opium, followed by the trafficking of cocaine and other unspecified drug trafficking. Indeed, and as shown in Figures 3 and 4, the trafficking of cocaine and heroin frequently co-occurred in the studies we identified. Additionally, the trafficking of these two substances presented a somewhat similar pattern of co-occurrence, with eight of the substances traded or activities concurrently conducted being the same (ecstasy trafficking, amphetamine trafficking, cannabis trafficking, opium trafficking, counterfeiting, extortion, corruption and public works). The frequency of co-occurrence tended nevertheless to vary.

**Figure 4: Frequency of co-occurrence of heroin trafficking with other primarily illicit and primarily licit commodities/(sectors of) activities as identified in the literature**





## 3 Market diversification

### 3.1 Review of market diversification

As noted above, some attention has been given to PCNs' geographic mobility, and the constraints they face in moving into licit and illicit markets both in local and in foreign territories (Reuter 1983; Paoli 2004; Varese 2006; Morselli and Turcotte 2011; Varese 2011a). Multiple explanations for this geographic diversification have been offered, ranging from economic and environmental, to cultural and ideological factors. In addition to geographic diversification, other studies highlight the skills and knowledge, cultural and ideological factors that appear to explain how some PCNs change the activities in which they are engaged (Shelley 2003; Edwards and Levi 2008). This section sets out some of the main factors that have been identified in this literature in order to begin to build a framework for understanding when and why PCNs diversify, and what may be some of the facilitators in their doing so.

#### ***Market forces***

Morselli et al. (2011) build a conceptual framework on the 'mobility of criminal groups', or what leads to the presence of criminal groups and organisations across a variety of settings (Morselli and Turcotte 2011), based on previous research on the topic. Criminal groups' mobility is, according to this framework, explained by 'push and pull factors', which are differentiated in terms of those which drive groups away from the setting in which they operate, and those which attract groups to new markets. Pull factors are further broken down into the 'strategic context', in which groups organise themselves around a potential opportunity and 'the emergent context', in which groups are required to attain greater levels of organisation to take advantage of a promising opportunity (Morselli and Turcotte 2011). Examples of market forces include the level of competition among existing firms, the threat from violent competitors or the supply and demand changing fashions.

#### ***Legislative and regulatory environment***

Noting Peter Reuter's framework based on the economic constraints imposed by the legal status of goods and services and the level of law enforcement activity (Reuter 1983), law enforcement monitoring and the level of competition within the criminal market have been seen as having an impact on PCNs' abilities to expand and diversify. Morselli and Turcotte (2011) elaborate on such a framework, noting that levels of impunity when participating in a market (Tremblay and Cusson 1998), as well as regulatory variation between states, affect the attractiveness of certain markets (Broude and Teichman 2008). Indeed, Paolo Campana, who carried out an in-depth study on the Camorra group based on wiretapped conversations by the police, also found that certain mafia members favoured Aberdeen as a market in which to conduct business, as a 'safe place for a Mafia member to love' (Campana 2011). The study further noted that 'the lack of anti-Mafia legislation, and therefore the powerlessness of the Italian authorities to extradite any suspect charged with a Mafia-association criminal offence, made Scotland a perfect place to conduct such legal business' (Campana 2011). Low risk of detection due to limited state capacity was also cited in a study on the growth of the trade in human trafficking in Soviet successor states (Shelley 2003). Nevertheless, the introduction of preventive measures by policy makers might also lead to negative displacements. For example, following the introduction of such measures some offenders might be able to adapt quickly to the new constraints, rendering the measures ineffective. Vijlbrief identified six types of displacement, such as spatial, temporal, offense, methodical/tactical, target and offender (Vijlbrief 2012). In his study of the Dutch policy against the production of synthetic drugs, in particular the 'Quick Response' project<sup>10</sup>, Vijlbrief noted that to avoid the stricter control measures, the organised crime groups tended to use new source countries (for instance, Poland and China), and also started their own production of many of the necessary chemicals, in what constituted a spatial and methodical displacement, respectively (Vijlbrief 2012).

#### ***Regime change and political events***

Morselli and Turcotte (2011) introduced the concept of 'market contingencies' citing a study on heroin markets in East Asia, in which tactical alliances and networks were formed as a consequence of tacit agreements between former communist party members and the military government in Burma (Dupont 1999). Historical events and regime change can create market opportunities in the guise of a number of different factors. Louise Shelley, who carried out several studies on human trafficking and smuggling, identifies factors driving such activities linked to regime change and historical events (Shelley 1999; Shelley 2003; Shelley 2003b). As per Dupont, she notes that 'in former Soviet states and in China, strong crime groups, with links to the surviving Communist power structure have stepped in to fill the power vacuum' (Shelley 2003). Shelley further argues

<sup>10</sup> The 'Quick Response' project was launched in 2008 and aimed to impede the synthetic drug producers in the Netherlands from obtaining the precursors and other chemicals required for the production process. The project involved a close partnership with the Belgian authorities to increase the number of seizures, as well as a more rapid and centralized process of intelligence gathering and assessment.

structural factors, such as the breakdown of borders that facilitated migration, which, coupled with social consequences, such as the loss of social security and economic hardships, created the conditions in which the industry was able to thrive. Traffickers were able to take advantage of this increase in demand for migration, stemming from those seeking new economic opportunities abroad, as well as those fleeing war-torn countries (Shelley 2003). Interestingly, Shelley notes an ideological reason associated with the change of regime which drove demand, in the sense that the 'rise of prostitution has been a result not only of economic necessity but also a rejection of socialist ideology in which prostitution was suppressed and its existence denied' (Shelley 2003).

### ***Human capital, knowledge and networks***

Further factors noted for influencing PCNs' ability to diversify are linked to human capital and knowledge. Varese (2006) outlined a framework of factors conducive to the geographic mobility and diversification of mafia groups<sup>11</sup>, organising them as facilitators of 'supply of Mafiosi' or as facilitators of 'demand for mafia protection'. Accordingly, the key factor tends to be the demand for criminal protection. Nevertheless, the role played by kin-based recruitment was also highlighted. This recruitment system has helped the groups expand their activities to new territories, building upon trust and perceived shared group identity. Varese further noted that the 'soggiorno obbligato' policy<sup>12</sup> may have had the unintended consequence of providing the Mafiosi with an opportunity to expand their knowledge and networks to new settings. Leman and Janssens (2008) contrasted the Albanian closed networks with a number of post-Soviet networks. The former seemed to be much more reliant on family and clan ties, similarly to what Varese observed with regard to the Italian mafia groups (Varese 2006). However, the post-Soviet networks tended to be based on wider "friendship coalitions" reaching out to other groups with specialised knowledge in particular criminal activities: "Tourist visas were used for European countries and this involved a specialised Bulgarian network that provided false documents in return for payments. According to the traffickers, the supplier was inexpensive and had influential friends in Bulgaria. He provided Greek, Portuguese, Spanish, Bulgarian and Norwegian passports" (Leman and Janssens 2008, p.5).

### ***Culture***

Other cultural factors are also referenced in the literature, such as gender roles and the burden of responsibility to provide for the family, which tends to be placed on women in former Soviet states, and on men in China (Shelley 2003). Shelley (2003) noted that with the economic and ideological crisis following the collapse of the Soviet regime many women were forced to seek work abroad in order to provide for their families. This may put them in a situation of vulnerability to the services of traffickers. In China the role of guarantor lies on the male and thus the Chinese gangs tend to smuggle males for labour abroad (Shelley 2003). Cultural norms, such as the manipulation of voodoo superstition by traffickers in Nigeria to entice vulnerable women (Shelley 2003b) is an additional cultural factor identified in the literature as a driver or enabler of activity.

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<sup>11</sup> Varese (Varese, p. 414) uses the concept of 'transplantation', which he defines as "the ability of a mafia group to offer criminal protection over a sustained period of time outside its region of origin and routine operation".

<sup>12</sup> This policy comprised the forced resettlement of convicted Mafiosi outside of their area of origin.

## 3.2 RAND taxonomy of influencers of PCN market diversification

The table below provides an overview of some of the main factors identified in the literature and discussed above for market diversification.

**Table 2: RAND taxonomy of influencers of PCN market diversification**

Market forces	<ul style="list-style-type: none"> <li>• Level of competition among existing firms</li> <li>• Number and kind of potential entrants</li> <li>• Bargaining power of buyers</li> <li>• Bargaining power of suppliers</li> <li>• Threat/opportunity of substitute product</li> <li>• Supply and demand/changing fashions</li> <li>• Threat from violent competitors</li> <li>• Level of trust between buyers and sellers</li> <li>• Access to customer base (open/closed markets)</li> <li>• Access to commodity supply/production</li> <li>• Financial risk/return</li> </ul>
Legislative and regulatory environment	<ul style="list-style-type: none"> <li>• Level of competition in market place</li> <li>• Risk of involvement</li> <li>• Attractiveness of market</li> <li>• Level of regulation enforcement/corruption</li> <li>• Risk to proceeds/assets</li> <li>• Incentivisation through avoidance of consumer protection regulations</li> <li>• Incentivisation through high tax rates to deal in untaxed or counterfeit goods</li> <li>• Displacement effects</li> </ul>
Regime change and political events	<ul style="list-style-type: none"> <li>• New opportunities for individuals to tap into networks that can be used for organised crime</li> <li>• Structural changes: no more borders</li> <li>• Harsh economic conditions drive demand</li> <li>• Rejection of Soviet equality and sexualisation of women associated with prostitution</li> <li>• War and violence</li> <li>• Ungoverned space</li> <li>• State involvement</li> </ul>
Human capital, knowledge and networks	<ul style="list-style-type: none"> <li>• Skills and knowledge to tap into</li> <li>• Family and ethnic ties</li> <li>• Access to logistical infrastructure (transport, storage, manufacturing facilities, financial expertise, forged documents, internet, etc.)</li> <li>• Changes in technology</li> <li>• Language</li> </ul>
Culture	<ul style="list-style-type: none"> <li>• Gender roles</li> <li>• Manipulation of traditions</li> <li>• Tap in to consumer resentment of high taxation rates</li> <li>• Capture new markets/consumer demographic through internet</li> </ul>

## 4 Examples of market diversification

### 4.1 Transnationality of PCNs

This chapter provides examples of co-occurrence and diversification, as well as illustrating the highly transnational nature of PCNs, drawing from actual law enforcement case files and press releases, complemented and informed by interviews with law enforcement officials and the expertise of a key informant. These aim to illustrate the phenomena discussed in the preceding sections.<sup>13</sup>

<sup>13</sup> While some of the information from these examples originates in the UK, and the UK is a node as a receiving country for trafficking of many kinds, the illustrative vignettes illustrate the transnationality as well as the polymorphousness of the PCNs. The cases of co-occurrence presented in this section have not been included in the co-occurrence database (annex 1).

### ***Poly-drug trafficking***

Tariq Dad controlled a criminal organisation from Bristol that extended across Bristol and the South East of England to Istanbul in Turkey. The organisation controlled a supply of heroin from Turkey to Bristol, and distribution to street dealers in South East England, as well as the supply of cocaine from London to Bristol. This network was also involved in money laundering through offshore bank accounts. The organisation sourced their heroin from a Turkish based organised crime group, and their cocaine from a London based organised crime group.

Heroin was seized in the UK and Turkey, and cocaine seized in the UK. Cash was also seized from bank accounts. One gang member, Omar Tariq was prosecuted for a firearms offence. A major heroin supplier in Turkey was arrested and a cocaine supplier in London was convicted in a separate trial. The Dad organisation enjoyed considerable wealth and international travel with their criminal business.

The reporting around this case focuses on drug trafficking and ancillary supporting activities. There was diversification in the type of drugs obtained and supplied. It is not evident what, if any, other criminal activities were conducted by the group. The investigation and subsequent prosecution concentrated on the most serious offences for which sufficient evidence was available.

*(Tariq Dad organisation: SOCA Press Release 14.07.10)*

### ***A case of co-occurrence: drug trafficking and euro counterfeiting***

An investigation by the Spanish National Police, working together with Europol, resulted in the arrest of a total of 25 members of an organised crime group. This organised crime group was involved in drug trafficking and in the distribution of counterfeit euros, having circulated more than two million counterfeit Euros in 20 EU countries. The group had been under investigation since 2010 and the Spanish authorities had already made previous arrests as well as a significant seizure of cannabis (1.018 tons). Europol was responsible for the coordination of the investigations among the countries where the group was operating.

The main counterfeiter owned a canned food distribution company, which he used as a cover for the illicit print shop. The group printed 50 Euro notes in that clandestine print shop and further imported fake 20, 50 and 100 Euro notes from other suppliers in Italy. The counterfeit euros were then distributed around Europe.

*(25 arrested in joint counterfeit Euro and drug trafficking investigation: Europol Press Release 13.12.11)*

### ***Geographic mobility associated with law enforcement pressure***

Sean Kelly pleaded guilty to involvement in the import of 71 kilos of heroin from South Africa. In 2010 two British nationals, Paul and John Beasley, were convicted in South Africa for their part in the offence, and their involvement in preparing another 100 kilos of heroin and 6,500 kilos of cannabis for export to the UK.

This is an example of the displacement of British criminals, previously operating in Spain but then forced further afield, by pressure from Anglo-Spanish law enforcement cooperation. Several British and European crime groups have relocated to South Africa, from where they control the movement of drugs and money from source countries to markets in Europe. This includes cocaine from South America. Drugs are routed from source countries (Afghanistan, Iran, Pakistan, Turkey, Colombia, Venezuela, Brazil etc) through southern African countries and on to consuming countries. Shipments at times go directly from source to market in Europe, but remain under the control of the South African based groups.

*(South African based Group: SOCA Press Release 26.11.10)*

### ***Production and trafficking of synthetic drugs***

Following an extensive investigation by a number of European law enforcement agencies, including Swedish, German, Dutch and Bulgarian authorities and in collaboration with Europol, an international organised crime group involved in large-scale production and trafficking of synthetic drugs across Europe has been dismantled.

The so-called 'Operation Fire' led to the arrests of key members of the organised crime group, to the seizure of large quantities of amphetamine, drug precursors as well as equipment and machinery and a number of firearms and ammunition. Three illegal drug production facilities have been also discovered and dismantled.

*(Synthetic drugs network broken up: Europol Press Release 12.1.12)*

### ***A pan-European network***

Do Huan Nguyen was extradited from the UK to Hungary in June 2010. He was wanted in connection with a pan-European people trafficking network, based in Budapest. In this network Vietnamese immigrants would arrive in Hungary via Moscow where they would assume the identity of residents within the Hungarian Vietnamese community. With false documentation they would travel to Ireland, and from there to Belfast and on to mainland UK. Once in the UK the illegal immigrants would return the false passports and begin repaying their debt to Nguyen by working in cannabis factories or 'Nail Bars'. The 'employees' of the new arrivals would pay up to 10,000 Euros to Nguyen's organisation for each immigrant.

*(Vietnamese illegal immigrant crime boss: SOCA press release 13.07.10)*

### ***Interpenetration of licit and illicit markets***

Paul Hewett, Karla Reeves, Wayne Reed and three others were sentenced to a combined total of 102 years for trafficking an estimated £117M worth of drugs. The investigation indicated that this group acted as a distribution arm in the UK for an international network which attempted to import approximately 22 tons of class A and B drugs over a two year period. The UK group concealed their criminal activities behind legitimate business services by:

- Adopting multiple company identities, including the fraudulent use of real company names and logos
- Contracting business service centres to act as messaging and collection points, unwittingly receiving and forwarding packages of cocaine and cannabis on their behalf
- Employing legitimate courier companies to carry out collections and deliveries
- Spreading their activities across a number of different locations; and using pseudonyms, pay as you go mobiles, and cash payments.

Ian Hockerday, another member of the group, was convicted of money laundering for the group.

*(Crime group using legitimate businesses for criminal purposes: SOCA Press Release 23 December 2010)*

### ***Poly-drug trafficking and illegal immigration***

An Albanian-speaking organised crime group was involved in heroin and cocaine trafficking, being active in France, Germany and Switzerland. To facilitate the drug trafficking, the group exploited asylum seekers and Albanian nationals, using them as couriers and drug dealers. The investigations started two years ago and resulted in the simultaneous arrest of 48 members of the organised crime group by police officers from those three countries. The French National Border Police of Saint Louis, the German National Criminal Police, supported by Eurojust and Europol worked together in the framework of a Joint Investigation Team. Cocaine, heroin and cutting agents were seized during the operation.

*(Successful operation against Albanian international organised crime network:Europol Press Release 23.10.12)*

### ***Geographic mobility and market diversification***

Mehmet Baybasin and 23 associates were involved in the smuggling of cocaine from South America into the UK and of heroin, cannabis and amphetamine from Europe. The investigation indicated the group were geared up to importing 40 tons of cocaine into the UK. The group were also found to be involved in money laundering, forgery and identity theft. Mehmet Baybasin and associates were prosecuted in Liverpool Crown Court in October 2011. The Baybasin family are well known throughout Law Enforcement. A typically extended Kurdish crime family, they have had members prosecuted in several countries. Huseyin Baybasin was convicted in The Netherlands for his involvement in murder, kidnap and drugs offences. Abdullah Baybasin was convicted in London in 2006 for drug offences; his group was alleged to be involved in blackmail, arson, firearms offences and supplying heroin. In 2010 he was acquitted in a retrial, after the Court of Appeal quashed the original trial verdict. The Baybasin family also had interests in legitimate business such as hotels and foodstuffs. The group had an extensive reach from the Middle East to Europe, and were believed to be involved in a myriad of criminal activities, principally drugs.

*(Baybasin organisation: The Times 28.10.11; SOCA press release 27.10.11; BBC News website 16.05.06; The Turkish Mafia, (Frank Bovenkerk & Yucel Yesilgoz) Milo Books Ltd.; Kurd net Website 23.10.10)*

### ***Changing business model in response to market and enforcement pressure***

Several key figures of criminal organisations moved from the drugs trade to smuggling cigarettes in recent years. Initially the criminal groups adapted their organisation to smuggle and distribute legitimate branded cigarettes, evading duty and taxes. When this trade was disrupted through tighter control by the tobacco manufacturers, the crime groups increased the acquisition and smuggling of counterfeit cigarettes. Responding to enforcement action and market pressure the criminal groups invested in setting up legitimate cigarette factories in other countries (Vietnam is one example). The cigarettes produced were of better quality than the counterfeit product, and had their own brand. The groups controlled the movement of the goods at arms length to the European market, where they were smuggled in without payment of taxes and duty. They remained outside of the jurisdiction of the courts of the destination countries.

*(Changing business model in response to market and enforcement pressure:HMRC interview 22.05.12)*

## 4.2 Conclusion

The press release summaries included in this section provide recent examples of market diversification and co-occurrence. These are not intended to be comprehensive or representative of PCN diversity and co-occurrence more widely, but nonetheless indicate the capacity of some organised crime groups to diversify their activities. Looking at these international examples to draw out what illicit and licit goods co-occur could be informative in trying to understand how changes in one particular market, such as the heroin market, are likely to influence other activities. For example, from the above cases we can see heroin co-occurring with the trafficking of cocaine, cannabis and amphetamines, with money laundering and a presence in legitimate businesses such as hotels and food companies. While this is not necessarily generalised, as a minimum it may suggest that there is merit in remaining aware that some of these could be areas in which those currently profiting from the heroin trade may be ready to expand.

# 5 The need for new approaches to measurement

In the sections above we have noted that different illicit and licit goods and services may interrelate and co-occur, as indicated in the literature, in the law enforcement case files and press releases. Policy and operations would thus benefit from a more systematic understanding of whether and how these co-occurrences take place, and whether and why criminal networks diversify their portfolios. We also noted that systematic data on co-occurring goods and services is not currently available, and that gathering law enforcement information 'by hand' in any systematic way would require costly and time-consuming sifting of vast amounts of case file information. These challenges raise the question of other possible means of improving understanding in this field.

One approach to improving data on co-occurrence and diversification would be to improve recording and reporting of such phenomena by seeking to influence law enforcement recording practices. This could be an important route to more systematic information in this field. However, adding new data collection exercises for the police is in itself costly and can be difficult to achieve, especially when time and budgets are under pressure. Further, even if such new data collection exercises were more easily achievable, they would only tell part of the story, as they would provide information from examples in which criminals had been surveilled and/or caught, thereby telling us as much about police activity and resources as about the extent or breadth of the activities beyond the purview of the police. For these reasons, we propose the development of an approach that acknowledges the interrelationships between illicit and licit market activities, and that explicitly sets out to map and explore these relationships and how they are affected by law enforcement activity and other contextual changes.

## 5.1 Developments in measuring illicit markets

Much of the literature in the field seems to acknowledge the need to produce more useful indicators of the level of criminal activity, overcoming the limitations of statistics based on police-recorded crime (Dijk 2007; Castle 2008). Some suggestions for making use of alternative data sources have thus been developed. Van Dijk has for instance proposed to analyse organised crime activity by using other statistical 'markers' or proxy measures, such as the perceived prevalence of organised crime, the number of unsolved murders, the rates of high level corruption and money laundering and the extent of the black economy (Dijk 2007)<sup>14</sup>. According to the author, these interrelated proxy indicators would allow for the construction of a composite organised crime index representative of organised crime activity across countries. A different approach has been applied by Bouchard in his study of the criminal population and the risks of detection in the marijuana cultivation industry in Canada (Bouchard 2007).

Drawing on Zelterman's capture-recapture model,<sup>15</sup> Bouchard further argued that this technique can be a valid measure to estimate a range of different hidden populations, namely burglars, car thieves, prostitutes and their clients, illegal gun owners, and drug dealers (Bouchard 2007).

<sup>14</sup> In particular, to capture the perception of organised crime levels, Van Dijk proposed to conduct interviews with groups within the population that may be particularly exposed to some of its main features, for instance business executives; this would then be complemented by other international perception data. Further, the author associates the rates of unsolved murders with 'mob-related violence,' and thus considers this an important proxy indicator of organised crime activity. Finally, the data sets of the World Bank Institute and the World Economic Forum would be indicative of money-laundering and of the extent of the black market (Dijk 2007).

<sup>15</sup> Capture-recapture as a methodology was originally developed within the biological sciences but has been progressively introduced in the field of criminology. Its most basic principle involves the capture and recapture of a set of population: assuming that there is proportionality between the number of individuals in the second sample and the whole population, it is then possible to estimate the total population size.

An illustrative example of the challenge of separating the effect of law enforcement activity from law enforcement reporting of illicit market activity is the recent reported increase in human trafficking in the UK.<sup>16</sup> It is difficult to know what this reported increase actually indicates: has there been an actual rise in levels of human trafficking to the UK? Or has increased law enforcement resource and attention to identifying and tackling it led to more traffickers being caught? Or has increased public awareness led to more reporting by the public or service providers? This uncertainty suggests that in order to begin to develop a more robust assessment of changes in illicit markets, more independent measures of levels of activity in and across licit and illicit markets are needed to supplement law enforcement data.

A useful example of how it is possible to obtain insights by looking at related (but apparently peripheral) signs of a 'difficult to measure' activity in data can be found in a different but nonetheless instructive area: measuring violent crime: that is, the development of the 'Cardiff model' for addressing violent crime. Professor Jonathan Shepherd is a maxillofacial surgeon who noticed many serious facial wounds coming in to the Accident & Emergency Department (A&E) in Cardiff, and realised that while many of these appeared not to have been reported to the police, many of the wounds seemed likely to be violent assaults rather than mere accidents. There is an existing intake 'interview' in A&E at which receptionists gather necessary information about date of birth, next of kin, etc. Shepherd decided that they should add a few simple items to the A&E intake interview such as "where did this occur", and "was a weapon involved" - and at a stroke obtained (health) data that could be provided, anonymised, to the police to improve knowledge of actual levels of violent crime (over and above recorded or reported levels of violence). Using health data in this way has informed intelligence-led policing of violent crime, thereby reducing its incidence by 40% in subsequent years. In taking this approach Cardiff went from being one of the most violent cities in its group of similar cities, to one of the least violent, and the results have persisted.<sup>17</sup>

Meanwhile, there are also examples of datasets already existing in one area that could be extremely useful if accessed by others, including those seeking to better understand illicit markets. For example, in the UK there is local level data on access to sexually-transmitted infection or disease (STD) clinics disaggregated by occupation, including sex workers, and this is broken down into off-street sex workers, on-street sex workers and trafficked sex workers. Those seeking to create strategy and operations to tackle trafficking in human beings could use that data to help build a more complete picture of local sex markets (79-90% of sex workers use local clinics<sup>18</sup>) than police data provides. However, those in a position to use the information are for the most part unaware of its existence. Of course, it would be necessary to use any one piece of information with caution, caveats and contextual knowledge gained from significant expertise: an increase in accessing of STD clinics by trafficked women in an area would not necessarily indicate increased trafficking, but could on the contrary reflect better information on availability of services, higher trust in those services that are available or an epidemic of an STD. Indeed, no one measure on its own is likely to provide a clear picture of what is going on in any given illicit market. However, it is also possible to develop measures or information to place alongside such indicators that would help interpret any movement in those indicators. For example, if access to STD clinics goes up, one way to check whether it is caused by some underlying driver such as more awareness of those services would be to also check whether DH or clinics had run any STD information campaigns in that period, or whether there was other evidence of greater trust in services. It is likely that while data availability on any one of these measures may vary across countries, there would be some areas, whether in trying to measure illicit drug markets, human trafficking or other areas, in which similar non-criminal justice data would be available and could be usefully drawn upon to improve measurement of the phenomenon.

<sup>16</sup> <http://www.homeoffice.gov.uk/media-centre/news/human-trafficking-report>

<sup>17</sup> <http://emj.bmj.com/content/23/1/12.abstract>

<sup>18</sup> Cabinet Office Social Exclusion Taskforce.

<http://webarchive.nationalarchives.gov.uk/+/http://www.cabinetoffice.gov.uk/media/346574/inclusion-health-evidencepack.pdf>

## 5.2 A possible new approach to measuring illicit markets

### *Using data from other areas to build an ecosystems approach*

We propose that there is merit in developing such an approach, considering the dynamic and changing nature of activities involving participants in those markets (for example suppliers, customers, law enforcement officials) and contextual factors (such as law enforcement, regulation, economic change). Given the dynamic and inter-related nature of these illicit markets, PCNs and the environments in which they operate, we have drawn on the analogy of an ecosystem. As in an ecosystem, it is likely that when one species or group is 'hungry', or under pressure (as when an illicit market is squeezed through law enforcement supply reduction activity), it is likely to seek to move into other niches or habitats. The expansion or contraction of numbers of one species or group affects those around it. And as in the study of criminal groups and illicit markets, many of the inhabitants of ecosystems are likely to hide when we try to count them. So scientists studying ecosystems have developed approaches other than exclusively trying to count animals that may be hiding. Even animals that are well camouflaged and fit for survival (as apparently are nimble organised crime groups) leave traces of their activity – for example tracks in the earth and the remains of their food sources - as they move through their habitats.<sup>19</sup>

This section explores how we may approach the empirical study of illicit markets as ecosystems, looking for the epiphenomena and more oblique traces of these activities and measuring these as a supplement to law enforcement data. In practice this approach would require seeking out what we are calling the traces of illicit activity, often in data that currently exists, including and especially outside of criminal justice. The case studies and investigations referred to earlier in the paper when illustrating co-occurrence and diversification are important in this undertaking. However, they are not important for their usefulness in drawing generalisations about what co-occurs with what or when groups diversify. Instead, they become useful in this approach for allowing detailed ethnographic insight where possible into the day-to-day workings of criminal markets and transnational crime. Obtaining this ethnographic insight allows the analyst to pick up where the likely data traces of this activity may be left. The kinds of areas this may include are, for example, health data, data on access to services, insurance and consumption and expenditure data.

When the likely useful datasets are identified, it is then possible to develop indicators that would allow the analyst to observe changes in levels of activity to be observed in these data. If several key indicators were to be gathered for each illicit market activity, these could then be assessed together, collated as a kind of dashboard for various illicit criminal markets in a particular area. If several of these indicators on the market dashboard then pulled in the same direction, this would increase confidence that these triangulated pieces of information were saying something robust about a given activity, trade, or when assessing several dashboards, about relationships between them.<sup>20</sup>

It is worth emphasising that such an approach does not necessarily require undertaking new data collection exercises. On the contrary, there are many costly and extensive datasets already in existence, and even new collections already getting underway, that may be helpful.<sup>21</sup> What is often missing for those who have the policy or operational expertise to use it, is a real knowledge and understanding of what data already exists in other fields that may be useful, and how.<sup>22</sup> For instance, those seeking to understand human trafficking may not know about the DH dataset on access to STD clinics. And even if they do know of this information, they may not be aware of the need for and development of approaches to reduce the likelihood of double counting in such data collections. What may be required from this approach rather than more data collections, is

<sup>19</sup> In one sense measuring illicit market activity may be very much like measuring just such invisible or camouflaged and moving targets. In attempting to measure the numbers of grey squirrels and red squirrels in various forests in the UK, straightforward counting is a challenge. Squirrels are nimble, move about quickly, hide to avoid being seen, and can easily be either missed or double-counted. Red squirrels have been under pressure in the UK with the introduction of non-indigenous grey squirrels and may be especially difficult to measure because they are more timid, as well as less plentiful. If fewer red squirrels are counted by eye in these circumstances, it would be very difficult to interpret such a finding: are the squirrels hiding more? Have they been pushed to other habitats? Or are they receding in numbers as another species puts them under pressure for food? Instead of attempting to measure them by simple counting techniques that could significantly over- or under-represent the numbers of grey and red squirrels, it may be necessary to look for alternative approaches, for instance by finding other signs of the squirrels' existence in a habitat. These other signs of squirrel life could include tracks, food residue, and droppings. Having identified these other signs, the observer can then estimate from those signs and traces how many squirrels it would take to leave that number of those traces. Luckily in the case of grey and red squirrels, they prefer different types of tree cones: red squirrels prefer large-seeded broad-leaves and grey squirrels prefer sidka spruce. So one approach to finding out how many red squirrels remain in a habitat would be to count the remains of the large-seeded broad-leaves that have been eaten and estimate the number of squirrels required for that level of consumption.

<sup>20</sup> In Putnam et al. (1993) *Making Democracy Work: Civic Traditions in Modern Italy*, factor analysis is used to analyse the factors associated with the development and embedding of governance in Ital, and contributed to the development of his concept of social capital.

<sup>21</sup> An example of how such an approach may be operationalised in an illicit market is the Street Level Up Approach, which was an approach developed by the UK Government's Concerted Interagency Drugs Action group (CIDA), responsible for combating Class A drugs. The approach focuses on connecting law enforcement agencies to address the harms from illicit drugs, [http://www.polfed.org/1205p26street\\_life.pdf](http://www.polfed.org/1205p26street_life.pdf)

<sup>22</sup> This is not a criticism of those included here – such knowledge is neither built in to the selection of policy and operational staff in this area, nor is it part of their everyday activity, remit or training.

an analytical exercise that assesses how well the various datasets can be mapped on to one another (and what is needed to do so), and to join this up with operational knowledge to see which may be useful for integrating in to a bigger picture.

### ***Moving beyond data silos and the opportunity for a new approach***

Drawing on data from one area of public service such as health to inform another such as criminal justice has traditionally been challenging. This is in part because of a tendency to collect, utilise and report information needed within the sphere in which it is primarily needed (and where it is being funded), without considering for what other purposes such information could be used. However, it has also traditionally been difficult because of privacy regulations and practical concern about sharing of data (Castle 2008).

However, with pressure on public budgets forcing consideration of how to make best use of existing activities, and with transparency movements across the EU, it is an opportune moment to seek to move beyond both of these hurdles. In the UK the Prime Minister's commitment to greater transparency and better use of existing data is evident in his letter of May 2010.<sup>23</sup> The creation of 'transparency panels' seeking to ensure sharing and good use of data that exists is considered a priority. And at EU level, the development of a public sector information initiative to optimise cooperation and learning from available information is also underway.<sup>24</sup>

In short, with greater commitment to openness and information sharing the many existing datasets that could be useful for this approach are increasingly available. It would be advantageous to join up these datasets for example by collating information on poly-drug trafficking or on 'multi-crimes'. The establishment of 'Big Data Working Groups' to look across different datasets within the criminal justice system as well as across other areas such as health or finance datasets, with anonymised aggregated data would allow for a better understanding of where illicit trade moves. This would provide a clearer picture of what is going on in a given illicit market and help in developing clusters of indicators or measures. For instance, where drug markets were squeezed, as was the case with the heroin market in Australia in early 2001 (Degenhardt, Conroy et al. 2005), looking at the data on other licit and illicit markets retrospectively could help us understand what happened to other markets when profits in that market came under pressure. This joining up through retrospective as well as ongoing analyses would allow policy makers and law enforcement to move beyond 'volumetric' measures of illicit markets, such as seizures and arrests, to include more independent measures that are not so heavily influenced by law enforcement activity.

## **5.3 Concluding recommendations**

Given both the challenges described with respect to measurement of illicit markets and the need to better inform policy and operations by doing so, we recommend several possible areas for progress. First, it would be useful to expand the collation of evidence of co-occurrence through mining of case studies and existing research. Second, it would be beneficial to simultaneously build understanding of PCNs' business models and reasons for diversification to inform policy and operations, through mining similar datasets, as well as through more targeted interviews and research.<sup>25</sup> Finally, we recommend drawing on existing and new research on co-occurrence to contribute to focused data assessment and data mining exercises specifically aimed at identifying, collating and analysing data from outside the criminal justice system to build a picture and more independent measures of illicit markets, the relationships between them, and between them and wider licit activities.

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<sup>23</sup> <http://www.number10.gov.uk/news/letter-to-government-departments-on-opening-up-data/>. Last Accessed: December 2012.

<sup>24</sup> DG INFSO ref, Commissioner's advisor.

<sup>25</sup> ALICE RAP and others are building on Matrix study and developing this work further. And it will be important to build on both management literature about behaviour of firms and the growing knowledge base from behavioural economics to do so.

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# Annex 1: Database on co-occurrence

## Database on co-occurrence

Prostitution	Gambling	Cannabis production	Amphetamine production	Opium production	Synthetic drugs production	Manufacture of new designer drugs		
							Neapolitan Camorra (La Torre Clan)	Campagna 2011
							Albanian Clan Networks	Leman & Janssens 2008
							Post-Soviet employment agencies (Russian and Bulgarian Networks)	
							International and multi-ethnic prostitution networks (Italian, Bulgarian, Albanian and Greek)	Shelley 2003
							Chinese Gangs	
							Russian Traffickers	
							Azerbaijani traffickers	Varese 2011
							The Solntsevskaya	
							Chinese synthetic drug smugglers	Soudijn & Kleema
							Liverpool drug enterprises	Pearson 2001
							Outlaw motor cycle gangs	UNODC 2012
							Ziberman group (Russian)	
							Case 72 (fraud group)	Kleema ns & de Poot 2008
							Case 45 (narcotics group)	
							A's group	
							B's company	Silverstone 2010
							Vietnamese groups (based in the UK)	
							Cosa Nostra	Paoli 2004
							'Ndrangheta	
							Camorra	
							Sacra Corona Unita	Dupont 1999
							Remnants of the Kuomintang (KMT) forces (Burma)	
							Highland Shans and related ethnic Chinese tribal groups	
							North Korea (Kim Jong Il regime)	
							Burmese Communist Party	
							Luo Xinghan, so-called "Opium King" (Burma)	
							Khun Sa (the head of the Shan United Army (SUA))	

Trade of chemicals and necessary equipment to produce synthetic drugs	Establishment of methamphetamine laboratory	Ecstasy trafficking	Hashish trafficking	Precursors trafficking	Cocaine trafficking	Amphetamine trafficking	Cannabis trafficking	Heroin trafficking	Opium trafficking	Synthetic drugs trafficking	Drug trafficking		
												Neapolitan Camorra (La Torre Clan)	Campagna 2011
												Albanian Clan Networks	Leman & Janssens 2008
												Post-Soviet employment agencies (Russian and Bulgarian Networks)	
												International and multi-ethnic prostitution networks (Italian, Bulgarian, Albanian and Greek)	Shelley 2003
												Chinese Gangs	
												Russian Traffickers	
												Azerbaijani traffickers	Varese 2011
												The Soltsevskaya	
												Chinese synthetic drug smugglers	Soudijn & Kleema
												Liverpool drug enterprises	Pearson 2001
												Outlaw motor cycle gangs	UNODC 2012
												Ziberman group (Russian)	
												Case 72 (fraud group)	Kleemans & de Poot 2008
												Case 45 (narcotics group)	
												A's group	
												B's company	
												Vietnamese groups (based in the UK)	Silverstone 2010
												Cosa Nostra	Paoli 2004
												'Ndrangheta	
												Camorra	
												Sacra Corona Unita	
												Remnants of the Kuomintang (KMT) forces (Burma)	Dupont 1999
												Highland Shans and related ethnic Chinese tribal groups	
												North Korea (Kim Jong Il regime)	
												Burmese Communist Party	
												Luo Xinghan, so-called "Opium King" (Burma)	
												Khun Sa (the head of the Shan United Army (SUA))	



Food and catering sector	Construction	Industry	Real estate	Travel agency	Pub/Bars	Employment agent	Tour operator activities	Transport sector	Hotels	Import/Export sector	Modelling agency	Horticultural sector	Wood and furniture trade	Pharmaceutical products trade	Cloths trade	Trade in works of art		
																	Neapolitan Camorra (La Torre Clan)	Campagna 2011
																	Albanian Clan Networks	Leman & Janssens 2008
																	Post-Soviet employment agencies (Russian and Bulgarian Networks)	
																	International and multi-ethnic prostitution networks (Italian,	Shelley 2003
																	Chinese Gangs	
																	Russian Traffickers	
																	Azerbaijani traffickers	Varese 2011
																	The Sointsevskaya	
																	Chinese synthetic drug smugglers	Soudijn & Kleema
																	Liverpool drug enterprises	Pearson 2001
																	Outlaw motor cycle gangs	UNODC 2012
																	Ziberan group (Russian)	
																	Case 72 (fraud group)	Kleemaans & de Poot 2008
																	Case 45 (narcotics group)	
																	A's group	
																	B's company	Silverstone 2010
																	Vietnamese groups (based in the UK)	
																	Cosa Nostra	Paoli 2004
																	'Ndrangheta	
																	Camorra	
																	Sacra Corona Unita	
																	Remnants of the Kuomintang (KMT) forces (Burma)	Dupont 1999
																	Highland Shans and related ethnic Chinese tribal groups	
																	North Korea (Kim Jong II regime)	
																	Burmese Communist Party	
																	Luo Xinghan, so-called "Opium King" (Burma)	
																	Khun Sa (the head of the Shan United Army (SUA))	

Public works	Banks	Helicopters and antennas trade	Computer-trading	Gold and steel trading		
					Neapolitan Camorra (La Torre Clan)	Campagna 2011
					Albanian Clan Networks	Leman & Janssens 2008
					Post-Soviet employment agencies (Russian and Bulgarian Networks) International and multi-ethnic prostitution networks (Italian)	
					Chinese Gangs	Shelley 2003
					Russian Traffickers	
					Azerbaijani traffickers	
					The Soltsevskaya	Varese 2011
					Chinese synthetic drug smugglers	Soudijn & Kleema
					Liverpool drug enterprises	Pearson 2001
					Outlaw motor cycle gangs	UNODC 2012
					Ziberman group (Russian)	
					Case 72 (fraud group)	Kleemaans & de Poot 2008
					Case 45 (narcotics group)	
					A's group	
					B's company	
					Vietnamese groups (based in the UK)	Silverstone 2010
					Cosa Nostra	Paoli 2004
					'Ndrangheta	
					Camorra	
					Sacra Corona Unita	
					Remnants of the Kuomintang (KMT) forces (Burma)	Dupont 1999
					Highland Shans and related ethnic Chinese tribal groups	
					North Korea (Kim Jong Il regime)	
					Burmese Communist Party	
					Luo Xinghan, so-called "Opium King" (Burma)	
					Khun Sa (the head of the Shan United Army (SUA))	

## Annex 2: Other examples of market diversification

### Case 1

Mark Howie, Andrew Kinnaird, and Derek Tunstead were employed at Tilbury Docks, London. They were convicted in May 2011 of importing cocaine and illegal cigarettes into the UK. The group specialised in smuggling illicit consignments through the Docks and hired their services out to other criminal groups. They undertook their own trafficking activities and stole legitimate cargo consignments. This is a good example of a crime group who are specialists in a particular area, facilitating other crime groups for a fee. They also used their expertise to facilitate their own criminal activities. This niche position offered them the ability to diversify into whichever illicit market was turning the best profit at the time.

*(Tilbury Docks Crew: SOCA Press release 13.05.11)*

### Case 2

Ajaz Asghar, Hayley Ellison, Fiyaz Asghar were convicted of offences relating to cannabis cultivation and supply at Reading Crown Court. It is estimated that the group produced £20M worth of high strength cannabis. Vietnamese nationals Ngol Son, Thong Nguyen, Bein Bui, and Cong Pham were convicted earlier and also received custodial sentences. The Vietnamese were employed as 'gardeners' at the 20 houses used for producing the cannabis. They rented the properties allowing Asghar and co to remain anonymous.

*(Cannabis Factory: BBC News website, 26.08.11)*

### Case 3

Narullah Khan, the owner of Khan Properties, together with Muhammed Asif Habib, Mark Owens and Fazal Hussain were convicted of money laundering in October 2010. They ran a collection and deposit service for several criminal groups, transporting huge amounts of cash in holdalls and feeding the cash in small amounts through numerous bank accounts to avoid suspicion. It was estimated they laundered £300,000 per week on behalf of various other crime groups. This is a good example of a niche function conducted by a 'specialist' within the wider organised crime community.

*(Money Launderer: SOCA Press release 22.10.10)*

### Case 4

Ifeanyi Chukwu Eze led a crime group in the UK overseeing drugs importations and distribution, and associated money laundering. The group organised couriers to travel from the Caribbean with packages of cocaine. The cocaine was heavily adulterated at two 'Bash Houses' controlled by Eze. These premises were used to mix the high purity cocaine with 'cutting agents', this process increased profits considerably and reduced the quantity of pure cocaine needed to be acquired at great cost and risk. The cash profits of the group were laundered through third party bank accounts and legitimate businesses. Eze was eventually sentenced to 13.5 years and 10 years imprisonment to run concurrently.

A good illustration of the cutting agent trade is provided by the case of David John Wain who ran a chemical supply business called Sourcechem from a residential garage in the UK. Through his website he sold 17 tons of cutting agents to UK drug traffickers to mix with class A drugs. The chemicals sold included phenacetin, lidocaine, benzocaine, procaine, and paracetamol. It was estimated this quantity of cutting agents when mixed with class A drugs would have realised £0.5Bn at street level prices. Whilst on bail Wain switched from cutting agents to supplying gamma-butyrolactone (GBL). The highly addictive industrial solvent was classified as a class drug in 2009. Wain's response was to raise the price and label the drug 'not for human consumption, and continue to sell to users. Wain was eventually sentenced to 12 years imprisonment in 2010.

*(Cocaine trafficking group & cutting agents supply: SOCA Press releases 30 April 2012, 10 December 2010)*

### Case 5

Jeremy Detheridge was sentenced to 3 years for smuggling drugs through the postal system, and David Truelove was fined for his part in the enterprise. The pair had purchased drugs online from a supplier in China. In April they imported two parcels through postal system containing Lignocaine, and MBZP, previously a 'legal high' but since classified as a Class C drug. In May another parcel arrived from China containing a quantity of dimethylcathinone, a class B drug. The investigation pointed to several previous shipments. The pair ran a website and sold the drugs on to users online. The pair had no links to organised crime. They are an example of the change online trading is bringing to the drugs trade, facilitating easy entry into the criminal business at a low level, without the need for an extensive network.

*(Online trading: UKBA Press release 14.02.12, UKBA interview 28.05.12)*

### **Case 6**

Carl Haynes and Dean Castle were convicted of importing a mixed load of drugs through the port of Dover. Castle ran a transport company based in Dover, the investigation indicated several previous importations by the company. The two were very knowledgeable about the frontier controls at Dover. In February 2010 Haynes was stopped by officers in Dover. Concealed within the load on the lorry driven by Haynes, officers discovered 26kg of heroin, 80kg of amphetamine, 147kg of cannabis, in excess of 40,000 tablets and 517gms of MDMA (ecstasy). Indications were that the load was for a single organised crime group who would hire out the services of Haynes and Castle to other networks without their knowledge. *(Transport group working for organised crime: UKBA Press Release 03 May 2012, UKBA interview 28.05.12)*

# Report 4

## Insights about cannabis production and distribution costs in the EU

Beau Kilmer and James Burgdorf

### Abstract

Enforcing laws against the production and distribution of cannabis dramatically inflates their costs. The increase is largely driven by having to compensate producers and suppliers for their risk of arrest, incarceration, seizure, and violent injury as well as by the inefficiencies associated with having to operate covertly. This report demonstrates how cannabis prices increase across the supply chain in the EU as distributors take additional mark ups to compensate themselves not only for shipping costs but also for the risks they assume. For instance, we show that in Morocco it costs €90-€180 to purchase the 36kg of cannabis needed to produce 1kg of cannabis resin. After accounting for labour and distribution costs as well as risk compensation, that same 1kg generates about €8,000 in gross revenues in a Dutch coffee shop. The report also discusses the cost of producing cannabis under a number of legal regimes. Making cannabis production and distribution legal could dramatically reduce their costs; however, the size of the decrease will largely depend on the type of production that is allowed and how the market is regulated (e.g. a competitive market with private firms, a state monopoly, non-profit cooperatives). Further, the significance of the drop will also depend on the economic and legal situation of the producing countries. We would expect to see larger drops in industrialized countries where labour costs are high and there are significant risks associated with being arrested and sanctioned.

### 1 Introduction<sup>1</sup>

Serious debates about cannabis policy are becoming more common and more mainstream in the European Union and the Western Hemisphere. While a number of Member States have pushed the boundaries of cannabis law reform, none allow commercial production, distribution, and possession for non-medical purposes. Even the Netherlands, which does not prosecute small retail cannabis transactions, legally prohibits the production and wholesale distribution of cannabis to the coffee shops.

Policy makers interested in understanding the fiscal and public health implications of alternative cannabis regimes should pay attention to the effect of these policy changes on cannabis production and distribution costs.<sup>2</sup> Indeed, if changes in production and distribution costs are large enough to influence the retail price, this could influence total consumption since consumers and non-consumers are sensitive to the price of cannabis (i.e., when price decreases, use increases; see reviews in Pacula 2010; Gallet 2013).<sup>3</sup>

The paper begins with a discussion about why prohibiting production and distribution inflates their costs, and why they could decrease if commercial production and distribution were made legal. Chapter 3 looks at the mark-ups along the cannabis supply chain with a case study of cannabis resin moving from Morocco to The Netherlands. Chapter 4 presents information about the costs of cannabis production under alternative legal regimes, building on insights from inside and outside the EU. Chapter 5 provides insights for policymakers about why they may care about a reduction in cannabis production and distribution costs.

<sup>1</sup> We would like to thank Vendula Belackova, Tjalling Erkelens, Mario Lap, Rosalie Pacula, and Peter Reuter for their comments on an earlier draft. The views presented here only represent those of the authors.

<sup>2</sup> This paper does not take a position about whether cannabis prohibition, or even cannabis for that matter, is a good or bad thing.

<sup>3</sup> Of course, the overall effect will also depend on tax rate and regulatory structure. In addition, policy changes may also have non-price effects on consumption (MacCoun 2010). For a more comprehensive discussion of the possible effects of alternative cannabis production policies, see Kilmer et al. (2010) and Caulkins et al. (2012).

## 2 Why does prohibition inflate production and distribution costs?<sup>4</sup>

When someone purchases cannabis, cocaine, or heroin, they are in effect largely compensating the drug dealer and everyone else along the supply chain for their risk of arrest, incarceration, seizure, and violent injury. This is the logic underpinning Reuter and Kleiman's (1986) "risk and prices" model that has guided the field for 25 years (Caulkins and MacCoun 2003). While Reuter and his colleagues have raised questions about specific instances where the theory does not quite reflect reality (e.g. falling purity-adjusted cocaine and heroin prices in the United States as incarceration risk for drug selling increased; Reuter and Caulkins 2006), there is no denying that prohibiting production and distribution makes drugs more expensive than what they would be if made legally available (see e.g. Miron 2003).

But the risk compensation is only one reason why prohibition increases the cost of doing business. As Caulkins and Lee (2012) note, there are inefficiencies associated with having to operate covertly:

The precautions required to evade detection make the production of drugs very labour intensive. Grocery-store cashiers, for instance, are more than 100 times as productive as retail drug sellers in terms of items sold per labour hour. Similarly, hired hands working for crack dealers can fill about 100 vials per hour, whereas even older-model sugar-packing machines can fill between 500 and 1,000 sugar packets per \*minute\*. This labour intensity of drug production, combined with the high wages demanded for that labour, are what drive up the costs of drugs; by comparison, materials and supplies — glassine bags, gram balances, and even guns — are relatively cheap.

There is also the issue of economies of scale. If cannabis were farmed like any other agricultural good, the production costs would plummet (Gieringer 2009; Caulkins 2010). As summarized by Caulkins, Hawken, Kilmer and Kleiman (2012b):

One of the most dramatic effects of legalization would be much, much lower production costs. The size of the potential decline is not widely appreciated . . . [but legalization] could cut production costs to just 1 percent of current wholesale prices. The simple reason why marijuana would be so cheap to produce is that marijuana is nothing more than the leaves and flowers of a plant that is easy to grow. Yet marijuana currently costs one hundred times as much per gram as even very fancy tea. That is primarily because prohibition forces producers to operate covertly, not because of any intrinsic difficulties with growing the cannabis plant. (161).

This is further discussed in chapter 4. While there are reasonable arguments to be made on both sides of the cannabis debate, one fact is clear: Prohibition dramatically inflates the costs of producing and distributing cannabis in developed countries.

## 3 Case study on cannabis distribution costs: from Morocco to the Netherlands

Cannabis is both produced in and imported into the EU. Estimates differ about the share of cannabis consumed in the EU that is domestically grown; however, there is near consensus that the share has increased over time (Jenson 2002; Potter 2008; EMCDDA 2012).<sup>5</sup> Most of the imported cannabis resin in Europe is believed to come from North Africa, mostly from Morocco. Other sources of cannabis include Afghanistan, Albania, Lebanon, and allegedly South Africa.

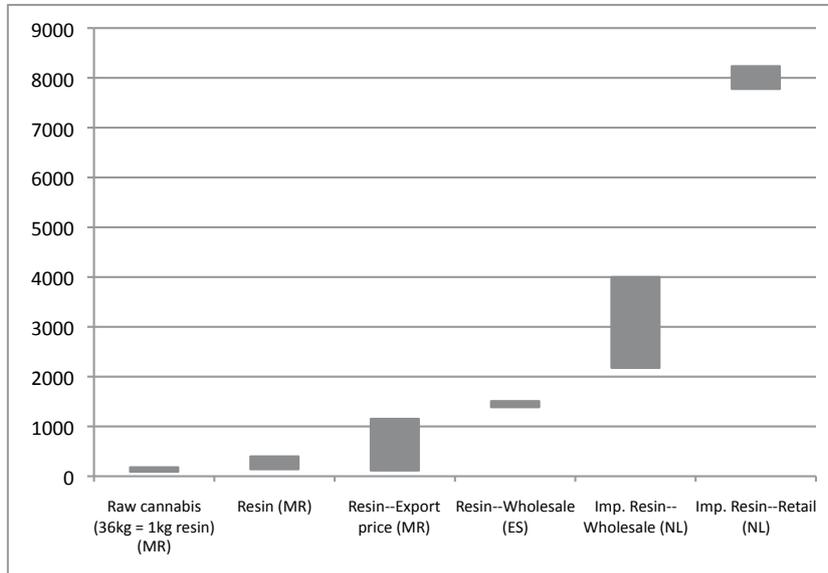
Figure 1 displays how the value of 1 kilogram of cannabis resin increased along the supply chain in North Africa and Europe in the mid-2000s. The size of each bar represents the amount of uncertainty about each estimate, where the bottom of the bar is a low estimate of the value and the top of the bar is a high estimate. Of course, there are likely examples of values

<sup>4</sup> We use prohibition in this chapter to mean a legal ban on the commercial production, distribution, and possession of cannabis for non-medical purposes.

<sup>5</sup> There has been a flurry of research on EU-cannabis production in recent years ( e.g. Potter 2010; Decorte et al. 2011; EMCDDA 2012). Potter's ethnographic study of cannabis growers in the UK highlights that not all producers are involved to make large amounts money; which is very different from those involved in international drug smuggling. Some grow for medical purposes, some grow for their own personal use, and others for more ideological reasons associated with the "ecological, spiritual, and agricultural benefits associated with the cannabis plant" (Potter 2010, p. 187).

falling outside of these ranges, but these are reasonable figures based on the existing, albeit thin, literature, in which circular and incomplete source references abound. When possible, we report how these price data were collected; however, some of the sources did not report this information.

**Figure 1: Approximate value of 1 kilogram of cannabis resin along the supply chain**



**Notes:** Created by Kilmer and Burgdorf and based on data from Bussink et al. 2007; UNODC 2006; UNODC 2007; Afsahi 2011; Gamella and Rodrigo 2008; and Niesink et al. 2010, as cited in Van Laar et al. 2011. MR=Morocco, ES=Spain, NL=Netherlands. Values reported in year 2012 Euros.

### Price of raw cannabis in Morocco

UNODC reports that it takes about 36kg of raw cannabis to produce 1 kilo of resin and that the farm gate price of a kilogram of raw cannabis in the mid-2000s was between 25 DH to 50 DH (Bussink et al. 2007; based on interviews with producers). This is consistent with Afsahi's assessment that, "Sold on average at 50 DH per kilo in its raw form, it can reach 100 DH during the best years and 20 DH during the worst" (Afsahi 2011). Using the 25-50 DH range, a conversion rate of €0.0866 per DH (January 2005), an inflation rate of 15.29% for the period covering 2005 through 2012, and multiplying by 36 kg generates an approximate range of €90 to €180 to purchase the cannabis at the farm gate.

### Price of resin in Morocco

The purchase price for a kilogram of resin in Morocco in the mid-2000s ranged from 1,400 DH to 4,000 DH (Bussink et al. 2007). This includes the labour and distribution costs of converting the raw cannabis into resin and bringing it to market, but the range also represents a fluctuation in cannabis prices.<sup>6</sup> Using the conversion rate of €0.0866 per DH (January 2005) and an inflation rate of 15.29% for the period covering 2005 through 2012 creates an approximate range of €140 to €400 per kilogram of resin.

### Export price in Morocco

Based on fieldwork and review of sources, Gamella and Rodrigo (2008) "estimate that export prices oscillate between €0.10 and €1.00 per gram of hashish." This is generally consistent with 2010 data from the UNODC (2012) reporting that wholesale prices for a kilogram of hashish in Morocco ranged from \$359 to \$1,436. Adjusting Gamella and Rodrigo's range for 15.29% inflation for the period between 2005<sup>7</sup> and 2012 yields a range of about €115 to €1,153 per kilogram.

<sup>6</sup> From Legget and Pitcheman (2008)—"In parallel to the decline in production, cannabis farm gate prices doubled, from 25 Dh/ kg in 2004 to 50 Dh/kg in 2005 (i.e. from €2.3/kg to €4.5/kg); cannabis resin farm gate prices almost tripled, from 1 400 Dh/kg in 2004 to 4 000 Dh/kg in 2005 (i.e. from €127/kg to €363/kg) (UNODC Morocco 2007). However, no such price changes were reported from European countries in 2005 (UNODC Morocco 2007)."

<sup>7</sup> Gamella and Rodrigo's (2008) cost figures are actually undated. While their work was published in 2008, other cost figures they quote are from 2003. Thus, our calculations may under- or overstate inflation.

### **Wholesale price in Spain**

Most of the Moroccan hashish destined for the European market passes through Spain (Gamella and Rodrigo, 2008). Data reported to the UNODC suggest the wholesale price for a kilogram of hashish in Spain ranges from \$1,631.7 (for 2005; UNODC 2007) to \$1,660 (for 2004; UNODC 2006). After currency conversions and inflation adjustments, this gives a range of approximately €1,386 to €1,509.

### **Wholesale price in The Netherlands**

While there is evidence of resin production in the Netherlands, the vast majority of resin in the Netherlands is imported from Morocco (Lap 2010).<sup>8</sup> Data reported to the UNODC put the wholesale price of a kilogram of resin at \$2,604 in 2007 (UNODC 2010). Coffee shop owners paid approximately €4,000 for a kilogram of resin in late 2011 (Kilmer personal communication with coffee shop owner). This corresponds to a range of about €2,177 to €4,000.

### **Retail price in The Netherlands**

The retail price of imported hashish in the Netherlands ranged from €6.60 to €7.30 per gram between 2004 and 2006 (based a random sample of Dutch coffee shops: Niesink et al. 2010, as cited in van Laar et al. 2011). After adjusting for inflation, the range comes to €7,777 to €8,235 per kilogram.

### **Summary**

This chapter describes how cannabis prices increase across the supply chain in the EU as distributors take additional mark-ups to compensate themselves not only for labour and shipping costs but also for the risks they assume. In Morocco it costs about €90-€180 to purchase the 36kg of cannabis needed to produce 1kg of cannabis resin; that same 1kg generates about €8,000 in gross revenues in a Dutch coffee shop.

To help put the distribution costs in context, we can compare the export and import prices with what it would cost to ship a similarly sized package via legal channels. The difference in the midpoint estimates for the export price in Morocco (~€600/kg) and import price in the Netherlands (~€3,000/kg) is in excess of €2,000; shipping a 1kg package via FedEx from Marrakesh to Amsterdam costs less than €200. Given the wide ranges surrounding these numbers, it is better to focus on the order of magnitude than the specific estimates.<sup>9</sup> This difference highlights that prohibiting the distribution of cannabis can dramatically increase the shipping costs.

## **4 Cost of legally producing cannabis**

This chapter sheds light on what is known about cannabis production costs in environments where the producer is not subject to legal risks. While no country has removed the prohibition on cannabis production for recreational purposes, we do have information from some countries that allow cannabis to be grown for medical purposes. Further, the serious discussion about cannabis regulation in the United States has generated some insightful projections<sup>10</sup>. Finally, we include information about Spain's Cannabis Social Clubs which exploit a grey area in Spanish law.

It is critical to note that many of these cost estimates are not directly comparable since they include different inputs and were collected from different sources. Chapter 4.6 summarizes the costs and, when possible, reports the factors included in the estimates.

<sup>8</sup> According to Potter, large-scale resin production was also believed to be very rare in the UK (p. 130).

<sup>9</sup> There also appear to be large differences in wholesale prices for a kilogram of resin in Spain and the Netherlands.

<sup>10</sup> This paper does not address the costs of industrial hemp. Caulkins (2010) notes there is not a large literature on this topic, but estimates from Canada suggest it costs less than \$500/acre to produce (Caulkins et al., 2012). These costs are based on seed farming and some have hypothesized that legal cannabis would probably favor high-potency sinsemilla that would start with the more expensive process of transplanting clones. However, these industrial hemp prices could be more relevant if farmers in a legal environment found that it was more cost-effective to farm with seeds and simply extract THC (or other cannabinoids like CBD) that could be added to consumer products (including, for example, fortifying lower quality buds; Caulkins et al., 2012).

## 4.1 Production of medical cannabis in the Netherlands

While cannabis production for commercial purposes and distribution is illegal in the Netherlands and laws against upper-market suppliers are enforced, an exception is made for medical cannabis. The Dutch Ministry of Health, Welfare, and Sport created the legal infrastructure for medical cannabis in the early 2000s and makes it available in pharmacies to patients with a valid prescription. The system is highly regulated, especially with respect to quality (The Office for Medicinal Cannabis, undated):

The “[m]edicinal cannabis contains no pesticides, heavy metals, bacteria, mould or other potential pathogens. The active substances are the same in each individual harvest of any given product, ensuring that the strength of the product supplied to the user is always the same. To this end the OMC has set a number of requirements that must be met by all supply chain partners (including the producer and the logistical service provider). The cannabis is cultivated under controlled circumstances, in line with the rules for Good Agricultural Practice (GAP).”

There are now approximately 1,000 medical patients in the Netherlands, and all medical cannabis is currently provided by the Dutch company Bedrocan BV. As a part of this project, the first author toured this facility and interviewed the operator. This yielded a number of insights that are useful for those seeking to learn more about the economics of cannabis production.

### ***Background and products***

Bedrocan BV started as a company that farmed other products and also produced cannabis seeds (which was legal in the Netherlands at that time). By the end of 2002, they had a license from the government, and made cannabis available by September 2003. The company now produces four strains of medical cannabis (Bedrocan, undated):

Bedrocan<sup>®</sup>. THC = 19%; CBD = 1% (Sativa)

Bedrobinol<sup>®</sup>. THC = 12%; CBD = <1% (Sativa)

Bediol<sup>®</sup>. THC = 6%; CBD = 7.5% (Sativa)

Bedica<sup>®</sup>. THC = 14%; CBD = <1% (Indica)

The interview revealed that the Bedrocan strain accounts for roughly 75% of all of their sales.

### ***Growing and yields***

The indoor facility has an automated irrigation system, lights, and internal and external ventilators (they do not need to hide the plants' odours since they are not violating any laws). Bedrocan BV does not use pesticides.

Figures 1 through 3 are pictures taken at the facility. Clones from a mother plant are nurtured in a sterile and humid room (Figure 2) before they are moved to a separate room for vegetative growth (Figure 3). Figure 2 displays a picture of one “batch” (130 plants) in the vegetation room which is about 56 square meters (~600 square feet). These plants are eventually moved to a similarly sized room next door for flowering (Figure 4). These 130 plants will yield 17 kilograms (~40 pounds) of useable cannabis bud, a figure which is consistent across harvests. There is, however, variation in per plant yields based on where the plants are placed in the room; per-plant yields vary from 90g to 180g. The average yield is approximately 123g per plant, depending on the strain. As of late 2011, Bedrocan harvested 11 batches per year, but had the capacity to produce up to 19 batches. After the trimming the buds, Bedrocan employees place the final product in 250g packages stored in industrial freezers, until it is picked up by OMC for distribution.

**Figure 2:** Room full of clones at Bedrocan BV



**Figure 3:** Room for vegetative stage at Bedrocan BV



**Figure 4:** Room for flower stage at Bedrocan BV



**Notes:** *There were two different batches in the room photographed in Figure 4; typically there is only one batch.*

### Production costs

As of December 2011, there were three full-time staff (a pharmacist, a horticultural specialist, and a general manager) and seven part-time employees who help trim and package the cannabis flowers. It is estimated that one batch requires about 150 production labour hours at the harvest time, which is roughly 10 hours per kilogram. There is also an additional 4 labour hours per kilogram during the growing period.

Figure 5 presents the distribution of the average variable costs of producing medical-grade cannabis at Bedrocan, which is based on a document Bedrocan operators produced:

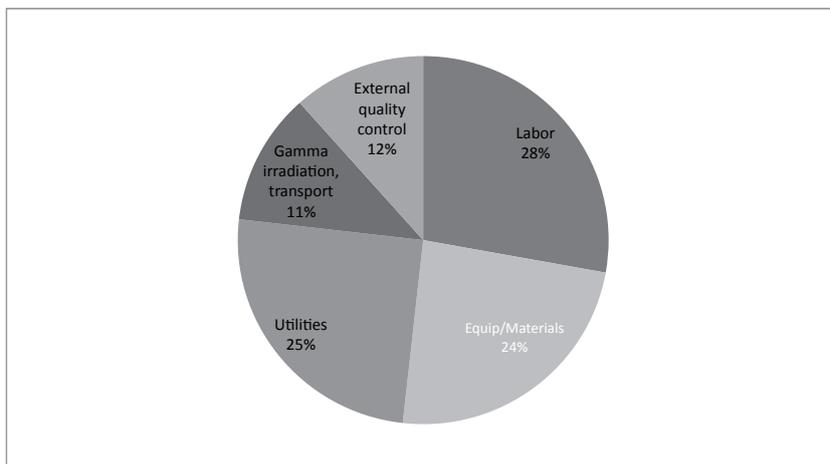
“Due to contractual obligations with the Dutch government, Bedrocan cannot provide detailed information on pricing of their products. Providing this kind of information is reserved to the Dutch Office of Medical Cannabis (OMC). However, we can give some specific information on direct cost of goods per gram regarding medicinal cannabis as produced by Bedrocan BV without fixed costs for overhead, on a minimum batch size of 16,000 grams [16 kg].

1. Personnel (growth and processing):	0.30
2. Growing equipment:	0.258
3. Utility costs	0.27
4. Gamma irradiation, transport:	0.125
5. Quality control (external)	0.125
<b>Total direct costs per gram:</b>	<b>€1,053<sup>11</sup></b>

Costs 4 and 5 are part of the costs made by the OMC in the Netherlands. The information presented here is not made available by the OMC but only based on inquiries made by Bedrocan BV among certified companies.

Beyond these costs, there are a number of fixed costs that will raise prices depending on the number of standard batches (of 16,000 grams [16 kg]) being produced annually. Costs such as interest and depreciation, costs of managing staff (pharmacists, horticultural manager, and general manager), possible licensing of specific plant varieties, maintenance and a profit percentage will all to some degree add to the gram price.”

**Figure 5: Distribution of the average variable cost of producing medical-grade cannabis at Bedrocan**



**Source:** Interview with Bedrocan owner

This suggests that the average variable cost of a kilogram of high-potency, medical grade, organic cannabis that has been professionally tested and packaged, and is produced in a relatively small facility in a country with a high cost of living, would be in the vicinity of €1,000. Considering that a kilogram of high-potency Nederwiet (Dutch-grown cannabis) in the Netherlands can cost between €3,000-4,000 at the wholesale level (Spapens 2011; UNODC 2012), this suggests legally grown cannabis could sell at a wholesale price much lower than what is currently charged on the black market.

<sup>11</sup> There was a very minor mistake in this document:  $0.3+0.258+0.27+0.125+0.125=1.078$ , not 1.053.

## 4.2 Production of medical cannabis in Israel

Israel has had a medical cannabis program since 1994 (Kloosterman 2012) and it now serves over 10,000 patients (Bohn 2012). As of 2012, only six physicians were authorized to prescribe cannabis to cancer patients, with another two physicians authorized to prescribe cannabis to alleviate pain and suffering (Siegel-Itzkovich 2012).

To avoid the high costs of imported cannabis, the Health Ministry decided in 2011 to allow legal, domestic production, as it was expected to cost an order of magnitude less than available imports (Siegel-Itzkovich 2011). As of 2012, medical cannabis is grown by about eight licensed providers (Bohn 2012) supervised by the Health Ministry (Gieringer 2012). They produce both THC-dominant and CBD-dominant strains (Bohn 2012), at least some of which are grown outdoors. An organization named Tikum Olam has a nearly three acre farm which supplies nearly 2,000 patients (Associated Press 2012a).<sup>12</sup> While outdoor farming can reduce production costs, it can also increase the possibility of diversion. One representative of the Israeli Police reports that about 15 tons of Israeli-grown medical cannabis are stolen each year, due in part to visibility and lax security measures, while a second argues that it would be preferable to import the cannabis (Harkov 2012).

Gieringer (2012) reports that the cost of producing outdoor-grown medical grade cannabis in Israel is about €0.61 per gram, or roughly €17 per ounce. According to Běláčková and Záborský (2011), patients pay approximately €75 monthly to get the dose they need, which is usually 100g per month. In 2009, a separate Israeli medical marijuana supplier, who at the time was setting up the second legal production outfit in the country, estimated that producing one gram of cannabis costs about NIS 15, or €2.82 (Shadmi 2009). We do not have an explanation for this difference.

## 4.3 Model-based projections about indoor production costs from the United States<sup>13</sup>

Projections about state-level legalization in the U.S. are complicated by the fact that even if a state does legalize production, it will still be prohibited by the federal government. During the debate about California's Proposition 19 in 2010, which would have legalized cannabis and allowed each of California's 500+ jurisdictions to come up with their own policies about production and taxation (it received 46.5% of the vote), a group of researchers attempted to project what the production costs would be assuming that the federal government would not aggressively enforce laws against grow houses (Caulkins 2010; Kilmer et al. 2010). They calculated that the post-legalization house-based production costs would be on the order of \$400 per pound for high-quality sinsemilla, which is only a fraction of the current wholesale price. They note several reasons to anticipate such a sharp decline:

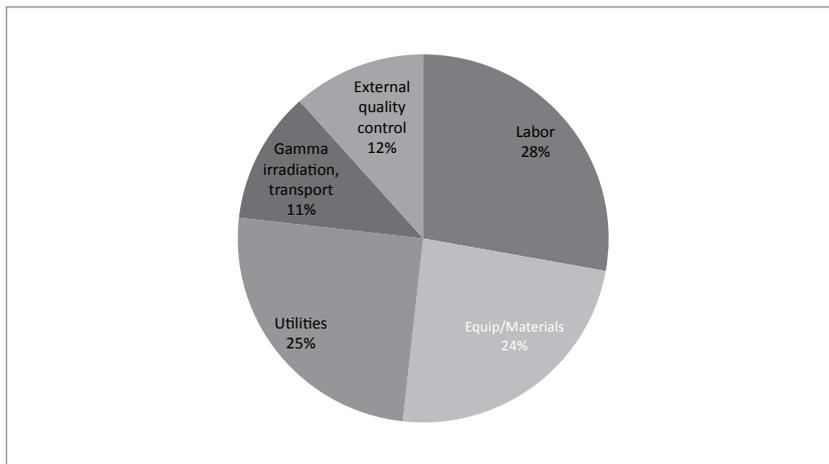
First, we anticipate that workers' wages will fall because employers will not have to pay a risk premium to employees for participating in an illegal activity. Second, there will be greater ability to use labour-saving automation, especially in the manicuring stage. Third, production at the level of an entire grow house, or several houses operated together, permits economies of scale not available to grows kept small enough to avoid attracting the attention of not just federal but also local law enforcement. Fourth, assuming that growers avoid attracting federal law-enforcement attention, they will face minimal risk of arrest and forfeiture.

A scenario that assumed producer and retailer mark-ups of 25 percent and 33 percent, respectively, and allowed and additional \$40 per pound for logistics and distribution, generated a pre-tax price that was close to \$40 per ounce (Caulkins 2010).<sup>14</sup> Figure 6 breaks down the components of the retail price that included a \$50 per ounce excise tax. While that level of taxation may not be sustainable in the U.S. (Caulkins et al. 2012a), it was level that received a lot of attention in 2010.

<sup>12</sup> Assuming each acre is able to produce 1,320 kg (600 lbs) of dried buds each year, a three acre farm could produce 3,960 kg of high-quality cannabis annually. This would be enough to supply over 5,000 medicinal users, assuming each user consumed, on average, two grams (about four joints) per day.

<sup>13</sup> We do not include estimates of the cost of producing medical marijuana in the U.S., which are difficult to find, and would be of limited relevance given that medical producers still must make costly efforts to avoid detection by federal authorities.

<sup>14</sup> The price for an ounce of sinsemilla at a medical marijuana dispensary in California is roughly between \$250-\$350 (Kilmer et al. 2010b, annex). This is similar to the black market price.

**Figure 6: Components of the taxed legal price of cannabis in a grow-house model**

#### 4.4 Projections for legal outdoor production costs from the United States

If cannabis is allowed to be grown outdoors on large commercial farms like other agricultural products, the production costs will be extremely low. The head of the California chapter of the National Organization for the Reform of Marijuana Laws testified if cannabis production was unregulated, “[T]he price of marijuana would presumably drop as low as that of other legal herbs such as tea or tobacco—on the order of a few dollars per ounce . . . or a few cents per joint” (Gieringer 2009). Caulkins et al. (2012) also make comparisons with licit (and transplanted) crops, with a special focus specifically on production costs: Agricultural experiments show that outdoor farming can readily achieve yields of 2,000–3,000 pounds of usable dry marijuana per acre per year, of which roughly 600 pounds would be buds, as opposed to leaves and other lower-quality material. Marijuana is often grown from transplanted clones, not seeds, and production costs for crops that need to be transplanted, such as cherry tomatoes and asparagus, are generally in the range of \$5,000–\$20,000 per acre. This suggests production costs might be under \$20 per pound of sinsemilla (\$10,000 per acre divided by 600 pounds per acre) and under \$5 per pound for commercial grade (same cost divided by 2,500 pounds per acre).

These comparisons suggest that the cost of producing a kilogram of high-potency cannabis could drop below €100 in developed countries if cannabis was allowed to be commercially farmed outdoors like other crops that need to be transplanted.

#### 4.5 Spain’s Cannabis Social Clubs

Since 2002, Cannabis Social Clubs (CSC) have allowed Spanish cannabis users to manufacture and distribute cannabis within a non-profit “co-op” framework that is closed to non-members. These clubs exploit a gray area in Spanish law, which prohibits trafficking, but not the consumption of cannabis in private places or the growing of cannabis for personal use (Barruso 2011; Munoz and Sota 2001). While it is unknown exactly how many clubs exist, estimates range from a couple dozen (Arana and Sánchez 2011) to between 100 and 300, with the greatest concentration in Catalonia and the Basque country (Barruso 2011).

While exact membership rules vary by club, there are some general commonalities (Barruso 2011; Caulkins et al. 2012a). In order to gain membership into a particular club, a confirmed regular cannabis user must be invited to enter into the co-op by an existing member and must not be a member of another club. Medical users may apply directly without an invitation, provided that they can produce a medical letter confirming that they would benefit from the use of cannabis. Minors are prohibited from membership, purchase, and consumption, as are non-member “tourists”.

The cannabis itself is produced by members of the club, or by professional cultivators hired by the club (Barruso 2011). Production targets are based on the estimated consumption of each member (Barruso 2011). The arrangement offers users access to more strains and derivative products than would be available if users had to produce solely for themselves (Caulkins et al. 2012a), somewhat mimicking the variety of cannabis-related products available in the Dutch coffee shops.

The clubs offer premises where members may purchase and consume cannabis produced by the club. Purchase limits of approximately 2-3 grams per day are used to discourage diversion outside of the network, allowing for only a few days' worth of a personal supply to be purchased at a time (Barruso 2011). Additional limits may be placed on monthly purchases, e.g. 60 grams per month (Buxton 2011). Exceptions to these limits can be made in the case of medical users who require a greater personal supply (Barruso 2011). Resale is prohibited.

The manager of the Pannagh Association, a social club in Bilbao that was closed by police intervention in 2011, reports that its former 200 members consumed under 0.5g of cannabis per day on average (Barruso 2011). He further estimates that the production costs of high-potency cannabis come to approximately two to three Euros per gram (Caulkins et al. 2012b). Prices charged to members are higher, at approximately €4 to €6 per gram (Buxton 2011; Caulkins et al. 2012b).<sup>15</sup>

## 4.6 Summary

Table 1 summarizes these estimates of the costs of legally produced cannabis. Some of these estimates, such as those for medical production in the Netherlands or Israel, or the Cannabis Social Clubs of Spain, are based on actual experience, while others, such as the costs of legal grow houses or farms in the United States, are based on modelling exercises or comparisons with licit crops.

**Table 1: Various production cost estimates of legally-produced cannabis**  
(Numbers not directly comparable since they do not cover the same cost components)

Country	Attributes	Costs Component	Approximate cost per gram	Source
Netherlands-Medical	Indoor, medical grade	Personnel (growth and processing), Growing equipment, Utility costs, Gamma irradiation, transport: Quality control (external)	€1.08 per gram	Calculated
Israel-Medical	Outdoor, medical grade	Unknown	€2.82 per gram	Yohai Golan-Gild, as cited in (Shadmi 2009)
Israel-Medical	Outdoor, medical grade	Unknown	€0.61 per gram	Gieringer 2012
U.S.-Legal Grow House	Indoor, high-quality sinsemilla	Materials, lighting, labour, space	\$0.44-\$0.88 per gram	Caulkins 2010
U.S.-Legal Industrial	Outdoor, high-quality sinsemilla	Based on cost of crops that need to be transplanted	\$0.04 per gram	Caulkins et al. 2012b
Spain-Cannabis Social Clubs	"[H]igh-potency cannabis"	Production costs, including pay for manager, growers	€2-3 per gram	Caulkins et al. 2012b

In a licit market, the wholesale price will be shaped by production costs, producer mark-ups,<sup>16</sup> distribution costs, and possibly fees and taxes. With the EMCDDA (2012) reporting that wholesale prices of herbal cannabis ranged between €800-€9,000 per kilogram in the EU circa 2008,<sup>17</sup> alternative production policies could lead to a large reduction in the wholesale price even after accounting for the mark-up and extra costs associated with producing in a licit market.

<sup>15</sup> From Buxton (2011): "Pannagh (which means cannabis in Sanskrit) has 300 members who each pay 40 euros a year membership and then four euros per gram, about half the rate on the black market. Some take a bag of five grams, others 10. The maximum allowed is 60 grams per month."

<sup>16</sup> A mark-up of 25% is not unreasonable for agricultural producers (Caulkins 2010).

<sup>17</sup> Black market wholesalers currently charge €3,000-€4,000 for a kilogram of high-potency domestically produced herbal cannabis in the Netherlands (Korf 2011; Spapens 2011; UNODC 2012).

## 5 Some possible consequences of reducing the costs of producing and distributing cannabis

The previous sections make a strong case that in a commercial market, the cost of producing and distributing cannabis like other agricultural products will fall dramatically in developed countries. This could lead to a decrease in retail prices that will have implications for consumption (users and non-users are sensitive to the price of cannabis; see summary in Pacula 2010; Gallet 2013), which in turn will have implications for tax revenues and public health.<sup>18</sup>

Whether or not these “savings” get passed on to consumers largely depends on the regulatory structure of the market. Of course, taxes and regulations should be able to inflate the prices faced by consumers; however, if the taxes are set too high, there would still be an opening for a black market, which would mute the price increase, reduce tax revenues, and make it harder to regulate the product. It might be possible for a regime to maintain high tax rates if it devoted significant resources to arresting and punishing illegal producers.

Related to this, Caulkins et al. (2012a) note that one way to offset the large reduction in production costs would be to have something akin to a state monopoly. This would reduce competition and allow the government to set the price close to the pre-legalization levels (or possibly higher). While it would probably be politically unfeasible for a U.S. state to implement this strategy in the face of federal prohibition (the U.S. federal government would most certainly have a problem with such a flagrant violation of federal law), this could be a possibility in jurisdictions outside the United States.

Decisions about cannabis production in one country can also influence other countries. If one Member State decided to legalise and regulate production and distribution of cannabis, this could have important ramifications for cannabis markets in neighbouring states and beyond. Much will depend on:

1. Size of the wholesale/retail price drop in the regulating country
2. Whether the market is limited to the residents of the regulating country
3. If there are residency requirements, the amount of enforcement resources devoted to identifying and sanctioning those who sell to non-residents
4. Whether there are quantity limits on retail purchases
5. Expected sanction for producing without a license in the regulating country
6. Whether marketing and/changes in social acceptability in the regulating country would influence users and potential users elsewhere.

If residents from a non-regulating country (Country B) are able to come to the regulating state (Country A) for lower prices and/or lower enforcement risks, then this will reduce the full price faced by purchasers from Country B, which would presumably increase consumption.<sup>19</sup> Depending on the amount of the Country B consumption fulfilled by purchases made in Country A, in the short-run this could depress prices in Country B as existing suppliers face lower demand.<sup>20</sup>

However, the larger impact of Country A legalizing on Country B would be a possible reduction in the wholesale prices faced by those who sell to consumers in Country B. To make the example more tangible, let's consider neighbours Belgium and Germany. Belgium reported that the wholesale price for a kilogram of herbal cannabis was €4,522 in 2010 (UNODC 2012). This is slightly larger than the wholesale price reported by Germany for 2010: €4,122 (UNODC 2012);<sup>21</sup> however, given that these data are based on enforcement sources and are not collected and reported by the same agencies, it is hard to say whether there really is a difference in wholesale prices. But for the sake of this example, let's assume this difference is real and represents the prices of markets along the Belgian-German border. Let's also assume that the risk of arrest and sanction is identical in both countries. For German retailers looking to buy herbal cannabis to sell on the retail market, it is cheaper to make the purchase on the German side of the border.

But if Belgium legalises and the post-tax price falls to roughly €2 gram—a reasonable amount for cannabis with a THC level of 8%, but clearly neither a lower nor upper bound—it would definitely be to the advantage of the German dealers to cross

<sup>18</sup> Note that the public health effects of an increase in cannabis use are ambiguous. For reviews of the evidence see Hall and Pacula (2003); Hall and Degenhardt (2009); Room et al. (2010); Caulkins et al. (2012).

<sup>19</sup> Of course, this could be partially offset by the increased travel costs.

<sup>20</sup> The increased demand could also serve to eventually increase prices in Country A. Much depends on the amount of competition allowed in Country A.

<sup>21</sup> The reported potency reported for wholesale herbal cannabis was 8% THC for both countries.

the border and purchase a kilogram for €2,000 and sell the product back in Germany. If there are restrictions on quantities and/or residents, straw purchasers could be used, although this would increase the costs and risks to the German dealers (e.g. the possibility that one of the straw purchasers will be an informant).

Another issue is how the law will be enforced against unlicensed producers in Belgium. If enforcement is lax or simply involves a small fine, this could create incentives for illegal producers to concentrate in Belgium. The reduced risk and increased access to technology that would likely be more available after legalization could reduce the wholesale prices charged by the illegal producers, thus making it more attractive for the German dealers to cross the border to make their purchases (or pay to have them delivered). Of course, if German law enforcement officials increased efforts to target individuals smuggling cannabis from Belgium, this could also affect the decisions of the German dealers.

This example is intended to highlight the myriad ways that legalisation in one country could influence the dynamics of the cannabis markets in others. Indeed, in this toy example with Belgium and Germany, if Belgium did see post-legalization prices fall to €2 a gram for herbal cannabis with 8% THC, this would likely have implications in other countries—including the Netherlands.

## 6 Conclusion

Until November 2012, no modern jurisdiction in the world had removed the prohibition on commercial cannabis production, distribution, and possession for non-medical purposes—not even the Netherlands. Whether or not we get to learn from the experiences in Colorado and Washington State will largely depend on the actions of the U.S. federal government (which still prohibits cannabis; see Annex 1). However, enough is known about the black market and medical cannabis industries to state conclusively that policy options regarding production and distribution may have profound effects on outcomes of interest to policy makers.

This chapter demonstrates how cannabis prices increase across the supply chain in the EU as distributors take additional mark-ups to compensate themselves not only for shipping costs but also for the risks they assume. A jurisdiction that allows a commercial market for cannabis may depress prices not only for itself but for neighbouring areas. As discussed in chapter 5, these effects will depend largely on how governments decide to regulate their newly legal markets, and on how neighbouring governments react to these reforms. Indeed, one regulatory approach that could offset a cannabis price drop under regulation could be to run a state-sponsored monopoly. Alternatively, the cannabis “club” model could allow for small-scale transactions while prohibiting widespread commercialization and marketing.

Allowing commercial production and distribution can dramatically reduce their costs; however, the size of the decrease will largely depend on the type of production that is allowed. If the cannabis can be grown like regular agricultural products on industrial farms or large greenhouses, the costs of producing and distributing cannabis would dramatically decrease. Even if production is limited to small indoor facilities, the Dutch and Israeli experiences with medical cannabis show that these costs for high-potency, medical-grade, organic sinsemilla could be small compared to comparable costs in the black market.

However, the size of the drop will also depend on the economic and legal situation of the producing countries. We would expect to see larger drops in industrialized countries where there are significant risks associated with being arrested; this would be less likely in developing countries with low labour costs and minimal risk of confiscation.

Those considering alternative cannabis policies have many options from which to choose. While production and retail costs for cannabis would be reduced under some scenarios, the extent of this reduction would depend largely on details of the implementation. When evaluating the strengths and weaknesses of competing regulatory regimes, the cost and price implications of each should not be overlooked.

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## Annex 1: Recent changes in the United States

On November 6, 2012, voters in the American states of Colorado and Washington approved ballot measures to fully legalise cannabis. These changes are truly revolutionary—no modern country has ever removed the prohibition on production, distribution, and possession of cannabis for non-medical purposes (Caulkins et al. 2012b). While there are important differences between these two initiatives, both call for the creation of a legal regime that will regulate and tax cannabis in a fashion similar to alcohol. The state agencies will not produce or sell cannabis; they are tasked with creating the infrastructure for private companies do so.

It is now be legal for those aged 21 and older to possess up to one ounce of cannabis in both states; however, it is still be illegal to consume cannabis in public. The initiatives allow for cannabis to be purchased from licensed retail facilities, but the regulatory regimes need to be developed by state agencies (State Liquor Control Board in Washington and the Department of Revenue in Colorado) and they probably will not be place until late 2013 (at the earliest). In Washington there will be a 25% tax applied at three levels of the market (production, processing, and retail) and in Colorado there will be up to a 15% excise tax at the wholesale level (these are in addition to regular sales taxes).

In the meantime, adults in Colorado can grow up to six plants and give away—not sell—up to an ounce to other adults. This will still be legal even after the commercial industry is set up. In Washington, it is less clear how users will “legally” obtain cannabis before the retail stores open. Since both states already have flourishing medical marijuana industries, in practice it will hardly be difficult to get access to high-potency cannabis.

There is uncertainty about what the legal cannabis industry will look like since we do not know what these states' agencies will decide to do. But there is also another large source of uncertainty surrounding these issues: Cannabis still remains prohibited by the federal government. Thus, even if someone over the age of 21 is consuming cannabis in their home in Colorado and Washington, they could still be arrested by federal law enforcement officials. While the U.S. federal government neither has the resources nor interest in targeting cannabis users (as evidenced by their responses to medical marijuana users in several states), they have a number of options with respect to how they address those producing and distributing cannabis (Caulkins et al. 2012a; 2012b; Hawken en al. In Press); including taking no action.

Even if the federal government works hard to prevent a commercial industry from developing in Colorado and Washington, the symbolism of the votes has resonated with many who view the United States as a barrier the changing drug policy internationally (e.g. Booth 2012). Whether or not this will have a lasting and meaningful effect on conversations, and possibly policies, in other countries remains to be seen.



## Part III: Drug policy issues

- 1 Impact of decriminalisation of personal possession offences in Portugal**  
Tiggey May and Oonagh Skrine
- 2 Impact of changes in the Netherlands coffee shop policies on local markets: politics, policies, confusion and chaos: the problems associated with implementing the Dutch weed pass**  
Tiggey May and Oonagh Skrine
- 3 Exploring trends in the illicit drugs market and drug policy responses in the EU**  
Franz Trautmann



# Report 1

## Impact of decriminalisation of personal possession offences in Portugal

Tiggey May and Oonagh Skrine

### Abstract

Combining data from a literature review, 323 Web-Based Survey respondents and four in-depth interviews with Portuguese drug policy experts we sought to bring together data to assess the impact of the decriminalisation of personal possession in Portugal which took place in 2001. Included in the drug policy reforms was an agreement to expand and improve access to treatment facilities. Since 2001, individuals found in possession of small amounts of illicit drugs are referred to the Commission for the Dissuasion of Drug Addiction (CDT). This panel assesses each individual and recommends an appropriate course of action. Most individuals are referred to a drug service to be assessed by health professionals. Findings from this small qualitative study found that respondents answering the web-based survey tended to be confused about the difference between decriminalisation and legalisation, many believed that personal possession had been legalised. Decriminalisation was, however, widely supported by both the web-based respondents and our small group of experts, particularly in light of the fact that health interventions replaced most criminal justice interventions. One concern, raised by the key experts, was whether CDTs are the best place to refer recreational cannabis users to. Transferability to other European countries was seen as feasible on condition that appropriate health services are put in place to refer drug users to and the cost implications are fully understood.

## 1 Aims

The aims of this small qualitative case study were to:

- Examine the impact of a national policy change in drug laws on the user, i.e. the decriminalisation of possession of small quantities of illicit substances for personal use.
- Assess the measurable impact (change in behaviour) and users' perceptions of the changes
- Capture the views and opinions of Portuguese drug users (recreational and problematic) and key experts eleven years after the policy was implemented and supplement these data with a review of the literature.

## 2 Methods

To answer the above aims we:

- Conducted a review of the literature
- Included 11 additional questions on the Web-Based survey (WBS) which were asked to respondents from Portugal (n=323)
- Invited four Portuguese drug policy experts to take part in an in-depth interview.

### 2.1 A review of the literature

The literature review examines the decriminalisation of possession of small quantities of drugs in Portugal, which was established in the 1999 National Drug Strategy and enacted in 2001.<sup>1</sup> The review comprises:

<sup>1</sup> All of the evidence reviewed was in English. We were unable to review any evidence written in Portuguese or any other European language.

- A description of the search strategy which underpinned compilation of the material included
- Background to the decriminalisation of possession of drugs in Portugal
- A summary of the reported impact of decriminalisation on the criminal justice system, the health of opiate and stimulant users, and new drug users
- A review of the available evidence on the long-term impact of decriminalisation.

The following databases were consulted as part of the review:

- Pubmed (a bibliographic database of biomedical literature)
- Criminal Justice Abstracts (a bibliographic database of criminology literature)
- EBSCO Academic Search Complete and PsychInfo (a bibliographic database covering social, behavioural, psychological and health sciences).
- LexisNexis (an international database of news reports)
- Drugtext (a database on substance use, dependence, harm reduction, international and national drug policy).

The database search was supplemented by consulting the following peer-reviewed and well-regarded journals:

- Journal of Drug Issues
- Drug and Alcohol Dependence
- Addiction
- International Journal of Drug Policy
- Addictive Behaviors
- Journal of Public Health Policy
- European Journal on Criminal Policy and Research
- Drugs: Education, Prevention and Policy
- British Journal of Criminology
- Substance Use and Misuse.

In addition, searches were conducted of the websites of several well-established drug policy research institutes. Among these were EMCDDA, The Beckley Foundation, DrugScope, Eurocare (European Alcohol Policy Alliance), Instituto Português da Droga e da Toxicodependência (Portuguese Drug Research Institute), the Pompidou Group of the Council of Europe (a group which shares expertise on drug use and trafficking between member states), and finally two UK based groups - Release and Transform who campaign for progressive drug policy.

**Box 1: Main search terms**

Portug\*; decriminal\*; drug use; HIV

## 2.2 Additional web-based survey questions

As part of the web-based survey, ICPR, in collaboration with colleagues at the Trimbo Institute, included 11 additional questions, which all Portuguese respondents were invited to answer.<sup>2</sup> The questions enquired about respondents' views on decriminalisation and any experience they may have had with the Comissões para a Dissuasão da Toxicodependência - the Commission for the Dissuasion of Drug Addiction (CDT). Three-hundred and twenty-three Portuguese respondents answered the additional questions. This number is greater than the number of respondents who answered the general Web-based survey. The general survey, which asked respondents about their recent drug use, resulted in 220 eligible respondents. The additional respondents (n=103) in this case study include individuals who had not used drugs in the year prior to accessing the web-based survey. Recent drug use was not a requisite for inclusion. We asked all 323 respondents:

- Whether they understood the difference between decriminalisation and legalisation.
- Whether decriminalisation had affected the cannabis, heroin and cocaine markets.
- Whether they believed the government was right to decriminalise drug use; and
- Whether they had been referred to a Commission for the Dissuasion of Drug Addiction and whether they had attended the meeting.

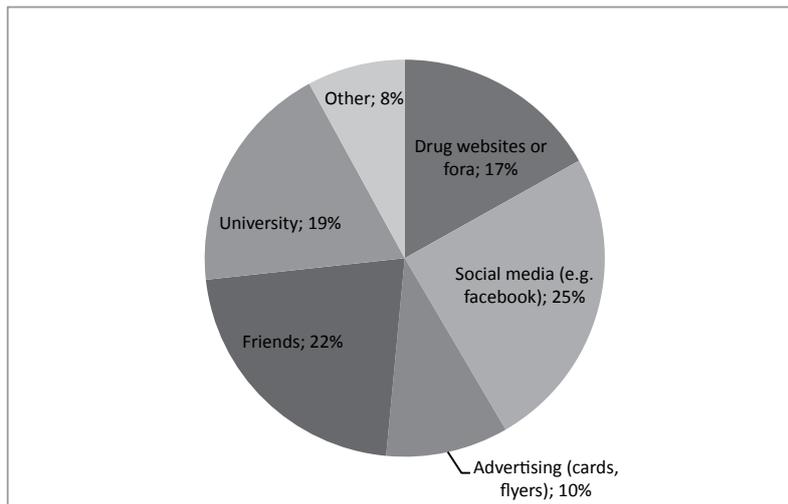
<sup>2</sup> The survey was conducted in Portuguese and translated into English for analysis.

In addition, we asked those who had attended a meeting their views regarding the usefulness and impact about the Commissions and the impact the meeting had on their subsequent drug use.

The web-based survey was live for approximately ten weeks at the beginning of 2012. Recruitment focused mainly on online methods and therefore excluded many of those without access to the internet. Almost half the sample was recruited online using social media and drug websites.

Figure 1 illustrates where respondents were recruited from.

**Figure 1**



As highlighted in the introduction of Part I of this study recruiting respondents via the internet is extremely likely to create a response bias. The Portuguese sample is likely to contain a disproportionate number of non-problematic drug users, young people, frequent internet and social network users.

### 2.3 In-depth interviews with Portuguese drug policy experts

A small number of Portuguese drug policy experts were interviewed as the final part of the case study. The aim of the expert interviews was to elicit a range of expert opinion regarding the introduction of decriminalisation and its effects – focusing in particular on the health and criminal activity of drug users and any perceived effects on illicit drug markets. Interviewees were selected for their knowledge of Portuguese drug policy based on the literature review and suggestions we received from our key contacts. Interviewees were invited to take part by email and were provided with an interview schedule and information sheet about the study. The interviews lasted between 30 and 40 minutes and were conducted by telephone, recorded and transcribed. The interviews explored themes including:

- Trends in Portuguese drugs policy
- Public opinion regarding decriminalization
- Drug tourism
- Successes and limitations of the policy, regarding drug markets, health and impacts on local communities
- The population seen by Commissions for the Dissuasion of Drug Addiction.

## 3 Structure of this chapter

This chapter is separated into four distinct sections. First, we provide a review of the literature charting the introduction of decriminalisation followed by a review of the impact of this particular policy change; we then present findings from the web-based survey and conclude our findings with the views and opinions of our expert interviewees. The final section of this chapter discusses the findings and offers some thoughts on the efficacy of decriminalisation.

## 3.1 Decriminalisation of drug possession

This literature review examines the decriminalisation of drug possession in Portugal, which was established in the 1999 National Drug Strategy and enacted in 2001. The 1999 strategy, however, comprised a number of elements and was not simply the decriminalisation of drug use. Included in the strategy was the expansion of treatment facilities, drug prevention campaigns, and drug prevention initiatives, the introduction of CDTs were also proposed as were proposals regarding supply reduction<sup>3</sup>. This review begins by describing the search strategy used and the nature of the material found. It then provides the context in which decriminalisation took place, including the political situation, levels of drug use in Portugal and related policy from the 1970s to 1990s. It then moves on to describe the policy and the views of those who supported or objected to its implementation. The impact of decriminalisation on the criminal justice system, the health of Class A drug users and new drug users is also examined. Finally, consideration is given to the long-term impacts of the policy.

### 3.1.1 Methodology

The following databases were searched using the terms 'Portug\*', 'decriminal\*' and 'drug use', 'HIV' was added in the PubMed search:

- Pubmed
- Criminal Justice Abstracts
- EBSCO Academic Search Complete and PsychInfo
- LexisNexis, newspapers
- Drugtext.

The following websites were searched for material:

- European Monitoring Centre for Drugs and Drug Addiction EMCDDA
- Beckley Foundation
- DrugScope
- Eurocare (European Alcohol Policy Alliance)
- Instituto Português da Droga e da Toxicodependência (IDT)
- The Pompidou Group of the Council of Europe
- Release
- Transform.

The databases produced very few hits, despite the openness of the search terms. Criminal Justice Abstracts returned ten results and the EBSCO databases 23, many of which were brief and few relevant. The EMCDDA, Beckley Foundation and IDT were the most fruitful databases. Bibliographies were hand searched. The material available for the literature review was limited by the necessity that it be written in English. However, it is likely that this limitation has excluded few significant contributions. A number of external researchers and academics have highlighted that few evaluations of the policy have been conducted despite the high level of global political interest in the reforms; indeed, evaluations that have been conducted have often been commissioned, managed and overseen by external stakeholders (Hughes and Stevens 2012). The National Drug Strategy describes a division between administrative and academic research in Portugal, with most of the research before the reforms being administrative (Government of Portugal 2000). Although the IDT has produced some English language material, the bulk of the available data from within Portugal comes from administrative reports to the EMCDDA. Some material from outside Portugal has appeared in academic journals, more is available through charities and the press.

### 3.1.2 Background

Portugal underwent political upheaval in the 1970s, which was generally associated with the sudden expansion of illicit drug use in the country. Prior to 1974 Portugal was ruled by the right-wing Salazar dictatorship, under which it remained relatively isolated from cultural changes in the rest of Europe and retained a strongly Catholic culture. Personal possession of narcotics was punishable by up to two years in prison (Moreira et al 2011). A military coup in 1974 brought in a democratic govern-

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3 The 1999 National Drug Strategy comprised a number of different strands, it is therefore extremely difficult to disentangle the impact of decriminalisation (alone) as all of the different elements that were introduced will have had an effect on the health of drug users, the take-up of treatment options, the decline in reported HIV cases and a reduction in the burden on the criminal justice system.

ment and greater openness to the outside world. The 1970s also saw the collapse of the Portuguese empire, resulting in the return of military personnel and thousands of citizens from countries such as Angola. João Goulão, chair of the EMCDDA and former head of the IDT, actively involved in the formation of Portuguese drug policy and widely quoted on the subject, suggests that drugs, as well as being more easily available due to the increased international mobility of young people, were associated with the idea of freedom (Queiroz 2012). Van het Loo et al described the political philosophy favouring individual liberty, which emerged following the revolution, as a reaction to the fifty-five years of dictatorship which preceded it (van het Loo et al 2002).

Although the rate of drug use in Portugal remained lower than in much of Europe, the gap between total prevalence of drug use and problematic drug use was one of the narrowest, with one per cent of the population using drugs problematically (Domosławski 2011, House of Lords 2012). Some authors have suggested that heroin was used extensively by the mid-1980s (van Beusekom et al 2002). Portuguese institutions were not equipped to respond to the rapid increase in drug use, and continued the repressive law enforcement started in the early 1970s, with inadequate health facilities. In the 1980s the outbreak of HIV made the situation more pressing, particularly considering the high rate of intravenous drug use. In 1999, Portugal had the highest incidence of drug related AIDS cases (in the European Union) and remained second only to Spain for HIV infections among injecting drug users. It is also notable that in other countries, with reported high rates of drug-related AIDS (Spain, Italy and France), the figures declined from around 1994, in Portugal, however, numbers were still rising in 1999 (EMCDDA 2000). The Health Ministry's first rehabilitation centres were opened in 1986 and 1987 (Queiroz 2012). Low-threshold methadone substitution treatment was introduced into pharmacies from July 1998, although methadone had been available since 1977 (Trigueiros et al 2010, IDT 2001, Reitox National Focal Point 2009).

The two decades which followed the revolution saw a worsening of the drug situation. Annual drug related deaths tripled and HIV infections attributable to drug use rose from 73 in 1991 to 505 in 1998 (Allen et al 2004). Between 1993 and 1997 the number of prison inmates sentenced for drug related crime more than doubled, from 1,526 to 3,653 (Government of Portugal 2000). Although the problem was widely acknowledged, there is little hard data on how serious it became (van het Loo et al 2002). A Eurobarometer survey conducted in 1997 found that drug-related issues were considered the country's main social problem (Domosławski 2011). Drug use became particularly visible in certain areas, with Casal Ventoso in central Lisbon becoming infamous for open drug dealing and the makeshift accommodation inhabited by heroin users (Tremlett 2001). Drug prevention professionals are quoted as saying that the problem reached all levels of society, with most of the population in contact with someone addicted to heroin (Queiroz 2012, Tremlett 2001). Although the first survey conducted of the population's drug use, in 2001, found that the percentage of people in Portugal who had used illicit drugs was amongst the lowest in Europe, the level of problematic drug use was amongst the highest (Domosławski 2011).

Portugal's long Atlantic coast and proximity to North Africa make it a transit route for drug traffic entering Europe. It is estimated that 77 per cent of the drugs seized in Portugal are in transit to an external market. Hashish from Morocco and cocaine from Brazil and Mexico are the two biggest challenges (Hughes and Stevens 2010). Van het Loo et al wrote that, although there is not really enough data from which to draw conclusions, there were surprisingly low numbers of heroin seizures in the late 1990s, considering its attractiveness as a transshipment country: while Portuguese police seized heroin 37 times per million inhabitants, the Spanish seized 337 times (Van het Loo et al 2002).

### **3.1.3 Decriminalisation**

Decriminalisation of drugs was first discussed in Portugal in 1976, with Law No. 792/76 creating the Centre for the Study of Drug Prophylaxis. The Preamble of Law No. 792/76 stated that a drug user should be viewed as a patient and not as a criminal (Trigueiros et al 2010). In 1983 Law No. 430/83 allowed punishment for some drug related offences to be suspended if the offender went into a treatment programme (van Beusekom et al 2002). In 1987 the progression towards decriminalisation took a further step forward, with the establishment of *Projecto Vida*, the National Drug Abuse Prevention Programme. *Projecto Vida* decentralised management of drug policy, spreading it across six government ministries. It became rare for occasional or young users to face prosecution, with minor offenders generally given non-criminal sanctions. Treatment facilities expanded throughout the 1990s, with treatment episodes increasing five-fold (Van Beusekom et al 2002).

In 1998, against the backdrop of public unease with levels of drug use, the Commission for a National Drug Strategy was convened to make recommendations for a national strategy, led by the then Deputy Prime Minister José Sócrates. The committee concluded that criminal sanctions were inappropriate for drug users and often worsened their problems. Increased

efforts towards prevention and social reintegration were recommended. The most striking of the committee's recommendations was the decriminalisation of private drug use, as well as its possession and purchase for this use. In 1999 the National Strategy for the Fight Against Drugs was approved by António Guterres's government in 1999 (Valdares Tavares et al 2005).

In 1999 the IDT replaced *Projecto Vida*. The national strategy was based on eight principles: international cooperation, prevention, humanism, pragmatism, security, coordination and rationalisation of resources, subsidiarity (decentralisation), and participation. Importantly, drug addiction was seen as a disease. Its thirteen 'strategic options' included: decriminalisation, extension of healthcare and harm reduction (Government of Portugal 2000). Several new laws were put in place to implement the action plan: Law No. 30/2000 decriminalised drug use; Law No. 183/2001 focused on harm reduction measures and describes the institutions responsible for this (Hamers et al 1997, van Beusekom et al 2002). The decriminalisation law, which became statute in July 2001, required users with less than ten days supply of an illicit drug to be dealt with by an administrative rather than criminal system. People caught with below the maximum amount of a drug and not suspected of dealing were to be referred to a Drug Addiction Dissuasion Commission (CDT). The CDTs consist of three members, generally a mix of psychologists, sociologists, social workers and lawyers. They decided on the most appropriate course of action for the drug users brought before them, be it treatment or an administrative sanction, such as a fine. The motto of the CDTs became 'rather treat than punish' (Trigueiros et al 2010). Proceedings were generally suspended by the CDTs for non addicts and addicts who agreed to enter treatment.

UN conventions clearly prohibit the creation of a legally regulated market of scheduled substances for non-medical purposes (Bewley Taylor and Jelsma 2012). An awareness that the new policy may push the boundaries of international law is highlighted in the 1999 National Drug Strategy, which quoted the committee's intention not to isolate Portugal or break international strategies, but to support 'a progressive evolution in the positions of international authorities' (Government of Portugal 2000). The National Drug Strategy found that the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances did not prevent the replacement of criminal penalties with administrative penalties for drug use, possession and purchase, as long as it remained prohibited in law (van Beusekom et al 2002). Portugal remained within international law by replacing criminal penalties for drug use with civil penalties, the use of drugs remaining illegal. The International Narcotics Control Board (INCB) initially accused Portugal of disrespecting relevant UN conventions but in 2009, following a study tour, noted that the decriminalisation of drugs in Portugal fell within convention parameters (Trigueiros et al., 2010). In 2007 the INCB expressed concern about the national plan to establish injecting rooms (International Narcotics Control Board 2008).<sup>4</sup>

### ***Who supported and who opposed decriminalisation***

There appears to have been widespread support for the policy of decriminalisation. João Goulão claimed 'that social sentiment in favour of decriminalisation was something that arose from society', inferring widespread support for the changes (Queiroz 2012). Although several years after decriminalisation came into force, the 2004 annual report to the EMCDDA provided statistics showing that media coverage was 75 per cent positive and only eight per cent negative of the policy, although public support was less overwhelmingly supportive, with 47 per cent positive and 37.5 per cent negative about decriminalisation (Reitox National Focal Point 2004). There was also a lack of criticism of the policy in the British press: The Times, despite generally sceptical coverage, quoted only an opposition politician critical of the policy (McGrory 2001); The Guardian found a police officer who considered it 'better before' (Tremlett 2001). Domosławski writes that the police were initially concerned about the new measures, as the offer of not giving a criminal sentence had sometimes been used as a bargaining tool to gain informants (Domosławski 2011). Although opposition might have been expected from the Catholic Church, Domosławski's interviewees considered it to have maintained a low profile.

The Social Democrats, the main opposition party at the time of the reform, called for a referendum on the changes but have generally been described as not 'excessively critical' by Allen et al (2004). Overall, political support for the measures has been confirmed by the continuation of the policy after power was passed over to a centre-right coalition in 2002 and returned to the socialists in 2005 (ElectionGuide 2011). The main opposition to the measures came from the conservative Partido Popular (Allen et al. 2004). Paulo Portas, of the Partido Popular, expressed concern that Portugal would become a destination for drug tourists, describing the policy as a promise of 'sun, beaches and any drug you like' and predicting 'planeloads of students heading for the Algarve to smoke marijuana and take a lot worse' (McGrory 2001, Tremlett 2001). Since decriminalisation the main source of criticism has been the Association for a Drug Free Portugal, chaired by Manuel Pinto Coelho. A report by the British Home Affairs Committee (a cross party group set-up by the Government to examine particular issues) described

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<sup>4</sup> The proposed injecting rooms were never established.

'a broad consensus in support of the policy', including among politicians who had originally opposed the measures (Home Affairs Committee 2012).

### ***The impact of decriminalisation***

The impact of the Portuguese strategy is hard to disentangle from wider European trends and changes that had already started taking place within Portugal. Despite this, international interest in the reforms and limited evaluations by the Portuguese government have led to several accounts of the effects being produced, providing opposing versions of almost every outcome of the policy.

The most prominent of these are Glen Greenwald's report for the Cato Institute in 2009, *Drug decriminalisation in Portugal: Lessons for creating fair and successful drug policy* and Manuel Pinto Coelho's response published by the Association for a Drug Free Portugal, *The "resounding success" of Portuguese drug policy: The power of an attractive fallacy*. The annual reports on the situation to the EMCDDA provide a picture of trends from 2001, but those available in English do not speculate about the role of decriminalisation.

### ***Impact of decriminalisation on the criminal justice system***

There are three main areas of criminal justice in which the policy of decriminalisation might be expected to have an effect. Firstly, the CDTs' motto, 'rather treat than punish', encapsulates the intention to move drug users from the criminal justice to health system, with the added benefit of lightening the work load of the criminal justice system. Secondly, the 'humanistic' principle of the strategy includes 'guaranteed access to forms of treatment for all drug addicts who seek treatment, including those who may for any reason be in prison'. Thirdly, the commitment to 'reinforce the combat against drug trafficking and money laundering' (Government of Portugal 2000 p. 3-4).

Although drug users were rarely sentenced to a prison term in the 1990s for use or possession alone, increasing numbers of imprisoned traffickers and user-traffickers contributed to the growth in the prison population from 11,332 in 1993 to 14,634 in 1997 (Government of Portugal 2000). Portugal's annual reports to the EMCDDA from 2001 onwards report an overall fall in the number of people in prison for drug offences (IDT 2001). The number fell between 2000 and 2008, from 3,829 to 1,849 individuals (IDT 2001, Reitox National Focal Point 2009). A rise then occurred in 2009. Pressure on the courts was also reduced: from 2000 onwards the number of people arrested and sent to a criminal court for sentencing for a drug related offences declined from 14,000 in 2000 to an average of 5,000 to 5,500 from 2002 – 2008, due to the move of drug consumers from the criminal to administrative process (Hughes and Stevens 2010). Throughout the period the majority of drug related CDT rulings were suspended, either due to individuals not being considered addicted, or addicted drug users who agreed to undergo treatment (84% in 2010) (Reitox National Focal Point 2011).

Allen et al., writing in 2004, noted the increased speed of processing drugs offences, with cases that may previously have taken years instead taking weeks. In evidence to the House of Lords European Union Committee, José Sócrates described savings made to the criminal justice system by the time freed up by the accelerated process (House of Lords 2012). Although acknowledging the complexity of measuring drug related crime, Hughes and Stevens concurred that decriminalisation had removed some of the pressure from the criminal justice system, citing a fall from 44 per cent of the prison population having committed offences under the influence of drugs or to fund drug consumption in 1999 to 21 per cent in 2008 (Hughes and Stevens 2007, 2010).

The number of prisoners enrolled on treatment programmes increased throughout the decade, reaching 1,300 by December 2009, of which 1015 were in substitution treatment. Continuity of treatment started before imprisonment is ensured and since 2009 the importance of continuity of treatment after release has strengthened. The National Prison Survey on Psychoactive Substances, which was carried out in 2001 and 2007, on a random sample of twenty per cent of Portugal's prison population, found a decrease in drug use after prison entry more pronounced in 2007 than 2001, but regular consumption of illicit substances in prison increased in the period. However, the regular use of heroin in prison declined, as did intravenous drug use in prison (11% in 2001 and 3% in 2007) (Reitox National Focal Point 2010).

IDT statistics show increases in the quantity of heroin seized between 2003 and 2009, but a decline in the quantities of other illicit substances (Goulão 2011). Hughes and Stevens point to spikes in seizures of particular substances, with different periods (pre and post reform) seeing large seizures of ecstasy, hashish and cocaine (2010). Hashish remained the most frequently seized illicit substance followed by cocaine then heroin (Reitox National Focal Point 2011). Ana Tavares used a synthetic control method to demonstrate that decriminalisation contributed to a reduction in the number of heroin and cocaine seizures,

which could be attributed to the police focussing on fewer larger seizures, particularly considering the increase in the quantity of heroin seized (Tavares 2012). This is supported by the 2010 annual report to the EMCDDA, which reported that a minority of seizures of significant quantities accounted for the vast majority of the overall quantity seized, in the case of heroin five per cent of seizures account for 91 per cent of the quantity (Reitox National Focal Point 2010). The 2011 annual report found that 79 per cent of seizures were of a 'significant quantity' (Reitox National Focal Point 2011).<sup>5</sup>

An unexpected consequence of the policy was suggested by Manuel Pinto Coelho. Taking figures from the World Drug Report, Pinto Coelho, claimed that decriminalisation had led to a forty per cent increase in drug related homicides (Pinto Coelho 2010). Hughes and Stevens, however, point out that the World Drug Report speculatively suggested that the rise in homicides 'might be related' to drug trafficking and that Coelho's assertions is counter to the declining trends in drug-related crime (Hughes and Stevens 2012).

### ***Impact of decriminalisation on the health of drug users***

One of the primary arguments for decriminalising drug use in Portugal was to remove the stigma and fear of prosecution which prevented drug users from accessing medical services (Reitox National Focal Point 2010). Goulão was keen for the Portuguese policy to be seen as much about increased provision of services as about decriminalisation, with one of the most significant achievements being that the most disorganised users come into contact with treatment services (Queiroz 2012). Although researchers report that treatment episodes increased five-fold during the 1990s (van het Loo et al. 2002). The 2000 EMCDDA report highlighted that there was a simultaneous increase in infectious diseases and drug related deaths. Following decriminalisation, the number of drug users in treatment did, however, continue to rise between 1998 and 2008 from 23,654 to 38,532 (Hughes and Stevens 2010). Undoubtedly, the expansion of harm reduction services (alongside decriminalisation) played a significant part in contributing to the increasing number of users seeking treatment. Surprisingly, whilst there was a rise in the number of individuals entering treatment, those seeking treatment for the first time declined from 2000 until 2007, when this trend was reversed (Reitox National Focal Point, 2010). A 2005 evaluation of the policy attributed this decline to the decline in new heroin users (Valadares Tavares et al. 2005). In the same period that treatment services expanded and decriminalisation took place the number of newly diagnosed cases of AIDS among drug users declined from 482 in 1999 to 88 in 2010, there were 149 cases of HIV infection in 2010 (Reitox National Focal Point 2000, 2011).

Substitution treatment was not widely available in the 1990s, indeed, low threshold substitution programmes were not introduced until 1998. Despite the relatively late arrival of low-threshold treatment, 21.8 per cent of drug using individuals were recorded as receiving substitution treatment in 1999. Interestingly, Van het Loo and colleagues, described treatment professionals working in Portugal as being traditionally reluctant to use such programmes (van het Loo et al., 2002). Following the implementation of decriminalisation and the expansion of treatment programmes, the number of people in substitution treatment increased by 146% between 1999 and 2003 (Valadares Tavares et al., 2005). Whilst Pinto Coelho does not dispute the rise in the number of drug users in substitution treatment, neither does he consider it a success, as he considers abstinence from all drugs to be the ultimate goal (2010).

### ***Reduction in HIV and other infectious diseases***

Drug related infectious diseases have declined since the decriminalisation of drug use (Hughes and Stevens 2010). Diagnoses of HIV rose rapidly amongst intravenous drug users between 1990 and 1998 reaching over 16,000, and then began to fall. By 2009 new cases of HIV had fallen to around 200, in line with the level of 1990. The fall in the number of drug users reporting HIV/AIDS, post decriminalisation, was most noticeable when compared to the rise amongst non-drug users. Although the rates of drug related infectious diseases had begun to stabilise by 2000, before decriminalisation, a continuing decline was particularly evident from 2005 (IDT, 2001, Reitox National Focal Point 2010, 2011). The decline in infectious disease notifications took place alongside a steady decline in injecting, indicated by the fall from 36% to 7% in new patients who had injected in the thirty days prior to their first consultation (Goulão 2011). Figures from the EMCDDA and World Health Organisation in 2007 show that although Portugal had one of the highest HIV infection rates among intravenous drug users in Europe (second to Estonia), it had the fourth lowest percentage of young (under 25 year olds) and new (injecting for less than two years) intravenous drug users (Wiessing and Giraudon 2009).

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<sup>5</sup> The report follows UN criteria in which 100g or over of heroin or cocaine, 1000g of cannabis, and 250 ecstasy pills are considered significant.

### ***Drug related deaths***

Changes in the number of drug related deaths were used by both Pinto Coelho and Greenwald to support their arguments for and against the success of decriminalisation. While Pinto Coelho finds evidence of an increase in drug related deaths following decriminalisation, Greenwald finds evidence of a decrease. Hughes and Stevens draw attention to the selective use of time frames by both Pinto Coelho and Greenwald: although the number of reported drug related deaths remained lower at the time of Greenwald's 2009 publication than in 2001, the number was at its lowest between 2002 and 2004 and had started to rise again, which was the figure used by Pinto Coelho (Hughes and Stevens 2012). In addition, there are two differently measured sets of data available for drug related deaths, the first which is the number of toxicological autopsies which found traces of illicit drugs, the other of drugs as the cause of death. The second measurement was only introduced at the time of decriminalisation, which renders it a less useful measurement when examining the effects of decriminalisation; it is, however, the only measurement that conforms to standard international classifications for recording drug-related deaths. The use of autopsies finding traces of drugs, however, is subject to the number of toxicological autopsies performed, which rose between 2005 and 2009, as did the number of positive results (Hughes and Stevens 2012). When using the internationally recognised system for recording deaths the number of people determined by physicians to have died due to drug use decreased from 2001, with a slight increase from 2005 to 2008/09 (to levels that remain much lower than at the time of decriminalisation) (Hughes and Stevens 2012). Tavares' synthetic control model, suggested that the policy of decriminalisation contributed to a decline in drug related deaths (Tavares 2012).

### ***Impact of decriminalisation on new drug users***

The National Population Survey on Psychoactive Substances was carried out in 2001 and 2007, using a sample of 15,000 individuals, representative of the population. As the 2001 national survey was the first time drug use in Portugal had been assessed at the general population level, it is hard to thoroughly measure the impact of decriminalisation on drug use. The national survey showed that although the life time prevalence of illicit drug use continued to rise, last year and last month prevalence stabilised, with the exception of slight rises in cocaine, heroin and LSD use (Reitox National Focal Point, 2011). Hughes and Stevens drew attention to the superiority of recent use over lifetime prevalence in indicating current trends (Hughes and Stevens 2012). Neither Greenwald nor Pinto Coelho, who provided the most polarised version of results, used this measure. Overall, despite a spike in experimentation at the time of the reform, between 2001 and 2007 drug use among 15-64 remained practically unchanged, although there was some evidence of an increase in the discontinuation of drug use (Hughes and Stevens 2012).

### ***New users of heroin and crack***

The 2010 report to the EMCDDA draws on a 2006-2007 study of problematic drug use, using estimates from public treatment agencies and multipliers. In this period the estimates of problem drug use show 'a clear decline', particularly for injecting drug users. Pinto Coelho also notes a decline in the number of heroin users in the mid-2000s, but added that 'there is a general sense that numbers are ascending yet again' (2010). The average age at first use of heroin remained the same in 2010 as it was in 2001, although first treatment data suggested an aging population of drug users, visible from 2000 onwards (Reitox National Focal Point 2010, 2009, 2011).

### ***New users of recreational drugs***

The average age of initiation for licit drugs and cannabis decreased between 2001 and 2007, but increased by a year or two for other recreational drugs (Reitox National Focal Point 2010). Drug use by Portuguese students is generally similar to that of their European counterparts, according to the European School Survey Project on Alcohol and Other Drugs (ESPAD), although lifetime use of illicit drugs other than cannabis is slightly higher than average (Hibell et al 2011). In 2007 the Estudo sobre o Consumo de Álcool, Tabaco e Drogas was conducted, and included the core ESPAD questions and additional questions. The more detailed results provided in the report (to the EMCDDA) show that life time prevalence of ecstasy, cocaine and hallucinogens remained stable or slightly declined for under seventeen year olds and rose slightly for the seventeen to eighteen age group. Both lifetime prevalence and recent use of cannabis declined across the eighteen and under age groups. The most recent ESPAD results for Portugal (2011) show that young people have a slightly lower than European average lifetime use of cannabis and inhalants, but a slightly higher use of other illicit drugs (ESPAD 2012). School children, surveyed for the 2011 ESPAD report, believed that they would be able to buy drugs easily but rate the risks involved in taking them as high (Domoslawski 2011).

### ***New challenges***

Since the introduction of the low threshold methadone maintenance pilot in 1998 and the introduction of the 1999 drug policy, substitution treatment has become widely available in Portugal (EMCDDA 2011). For Pinto Coelho, the widespread use

of substitution programmes represented a failure, detracting from abstinence and preventative work (Pinto Coelho 2010). An article in *The Wall Street Journal* in 2010 suggested that unease with the extent of substitution treatment was becoming more widespread, reporting that some Portuguese people were beginning to voice their concern regarding long-term substitution therapy. Dagmar Hedrich, an analyst with the EMCDDA, was quoted as raising the question of what happens to people in long-term substitution therapy, now that the heroin epidemic has been brought under control (Ferreira 2010).

Portugal's policy provides one example of a decriminalisation model, which has become widely used in arguments supporting decriminalisation (Domosławski 2011; Greenwald 2009; Rosmarin and Eastwood 2012). The polarised accounts of the effects of decriminalisation, put forward by Greenwald and Pinto Coelho provide ammunition for either side of the debate (Hughes and Stevens 2012). Regardless of the two opposing views on decriminalisation the Portuguese model has attracted a number of supporters both within and outside Portugal. The initial fears that Portugal would become a destination for drug tourists, which was portrayed as inevitable by decriminalisation detractors, have proved unfounded and discussion of this potential side effect appears to have ceased (Allen et al 2004). In 2012 Goulão listed the achievements of the reforms, which included: chaotic users entering treatment, a reduction in the use of illegal substances amongst young people, and a drastic fall in intravenous drug use and the spread of AIDS (Queiroz 2012). Despite the difficulties in separating the effects of decriminalisation from other factors, framing drug use as a health rather than a criminal problem seems to have had a positive effect on a number of drug-related problems in Portugal.

In 2011, João Goulão, one of the architects of Portugal's decriminalisation policy voiced his concern regarding the long-term success of decriminalisation stating that he feared that the successes that had been achieved might be jeopardised by the financial crisis in Portugal, envisaging a rise in relapses and new users with increasing levels of unemployment (Goulão 2011). Unfortunately, in the same year (2011) the EMCDDA reported that Portugal's financial difficulties had already reduced drug-related public expenditure, which Moreira suggested may lead to a reduction in harm reduction provision and the work of the CDTs (Moreira et al 2011). At the time of the EMCDDA 2012 Annual Report, Portugal did not have a budget for its current drug action plan (EMCDDA 2012).

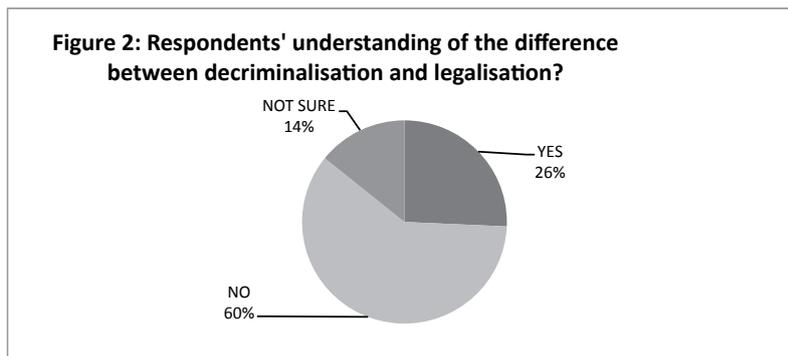
## 3.2 The web-based survey

Additional questions were added to the WBS for all of the Portuguese respondents to answer. In total 323 people answered these questions, just over half were male (54%) the remainder female (46%). The average age of the respondents was 30. As outlined in the methodology, around a fifth of respondents were recruited through universities and a quarter through social media. It is highly likely that this resulted in a computer literate, well-educated sample, possibly under-representing problematic drug users and many other socially marginalised groups. Respondents were asked a number of questions which aimed to elicit their views on the Portuguese government's decision to decriminalise personal possession of illicit drugs in 2001. Themes on the WBS included:

- The difference between decriminalise and legalise
- The impact of decriminalisation on cannabis markets
- The impact of decriminalisation of heroin, cocaine and crack cocaine markets
- Respondents' views on the government's decision to decriminalise
- Respondents' experiences and views on dissuasion panels (CDTs).

Respondents' understanding of the difference between decriminalisation and legalisation was somewhat confused: just over a quarter (26%) reported that they understood the difference while 60 per cent admitted not knowing what each term implied, the remainder, 14 per cent, were unsure. Men in the sample reported that they possessed a greater understanding of the difference between legalisation and decriminalisation than women. Of the 174 men in the sample, 32% stated that they understood the difference, whereas just under a fifth (19% of 149) of the women who answered the survey stated that they did. Figure 2 illustrates respondents' understanding.

Figure 2: Respondents' understanding of the difference between decriminalisation and legalisation?



### 3.2.1 The impact of decriminalisation on drug markets

Respondents were asked for their views regarding the effect of decriminalisation on cannabis and the more harmful heroin, cocaine and crack markets. Understandably, respondents' views varied quite considerably. With regards to cannabis, there was a fairly even split between those believing the market had been affected (34%), not been affected (34%), or were unsure of the affect (32%). Of those who reported that they believed the market had changed, nearly a third (32%) reported that they thought more users were growing their own cannabis and a quarter reported an increase in new cannabis users. Interestingly, and in support of these views, a rise in cannabis use was reported in the 2010 Reitox report to the EMCDDA (Reitox National Focal Point 2010).

When respondents were asked about their views regarding the impact of decriminalisation on heroin, cocaine and crack cocaine markets and users, over half (52%) were unsure whether or not these markets had changed, 29 per cent believed the markets were unchanged and 17 per cent believed a change had taken place. Of those who thought these particular markets had changed, 20 per cent believed that the incidence of new users had increased; although, 25 per cent thought that new users into this type of market had decreased. It is likely that the rather opaque picture that emerged from these answers reflects the lack of problematic or socially excluded respondents within the sample, the over-representation of non-problematic users, students and graduates and the complex nature of the question.

### 3.2.2 Respondents' views and experiences of CDTs

As part of the survey we asked all respondents if they had been referred to a CDT, of the 323 individuals in our sample only six per cent (18) had any experience of a CDT. With the exception of two people who reported their age as over 60, all of those who had been referred were aged 32 and under and all but two were male. Of the eighteen individuals who had been referred, 16 had attended. Of these, ten expressed their views about the meeting in rather neutral terms neither expressing particularly negative nor positive thoughts about the process. Three respondents believed the process had been a positive one and two believed the process wasn't a particularly positive one. Interestingly, 14 of the 16 estimated that the quantity of drugs they used had remained unchanged.

### 3.2.3 Respondents' views of decriminalisation

Finally we asked respondents if they supported or opposed the government's 2001 decision to decriminalise personal possession of illicit substances. After an initial closed (yes, no, unsure) question, respondents were invited to expand upon their answer in a free text box. Perhaps one of the most interesting elements of this question was the insight it provided into public opinion of the policy 11 years after its implementation. Open ended text was coded by researchers and then analysed.

Overall 315 respondents<sup>6</sup> answered the question regarding their position on whether the government was right to decriminalise possession. Of these, the majority (61%) supported decriminalisation, with those unsure about the matter (25%)

<sup>6</sup> All percentages have been rounded up when .5 or above or down when .4 or below.

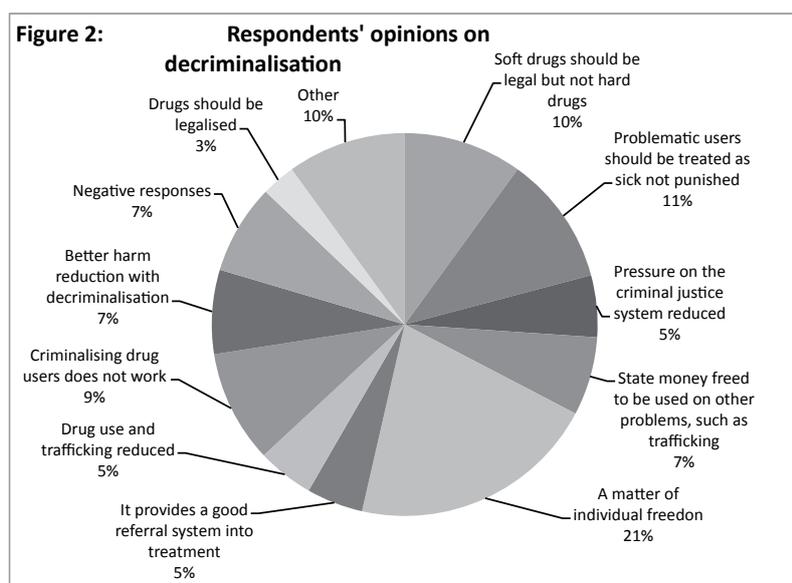
outnumbering those who opposed it (14%). Support was higher among male respondents (70% of men in favour of the measure compared to 51% of women) and among older respondents (69% of those aged 34 and over, compared to 51% of those younger than 25). Table 1 illustrates these findings.

**Table 1: Was the government right to decriminalise?**

Was the government right to decriminalise?	Male	Female	Under 18	18-24 yrs	25-33 yrs	34 and over
Yes	118 (70%)	74 (51%)	2 (67%)	64 (51%)	61 (66%)	65 (69%)
No	20 (12%)	23 (16%)	1 (33%)	25 (20%)	14 (15%)	3 (3%)
Unsure	31 (18%)	49 (34%)	0	37 (29%)	17 (18%)	26 (28%)
<b>Total</b>	<b>169</b>	<b>146</b>	<b>3</b>	<b>126</b>	<b>92</b>	<b>94</b>

Of the 315 respondents who submitted their views on whether the government was right to decriminalise possession offences, 156 provided further information regarding their support or opposition which produced 211 responses. Of the 156, 40 per cent were female, 60 per cent male. Interestingly, only 45 respondents (of the 156) reported understanding the difference between decriminalisation and legalisation. Figure 2 below provides an illustration of respondent's views on whether the government of 2001 was right to decriminalise personal drug possession.

**Figure 2: Respondents' opinions on decriminalisation**



Eight per cent (n=16) of responses opposed decriminalisation, half of which highlighted that decriminalisation promotes drug use. An additional three respondents, who disagreed with decriminalisation, believed that 'soft drugs should be legal but not hard drugs'. Aside from a concern about the promotion of drug use, the following responses were typical of the negative category:

- "Because it does not solve anything, it only creates blindness"*
- "Because they are damaging to health"*
- "Because it increases the number of younger users"*

Ten per cent (n=21) of respondents were supportive of decriminalising drugs such as cannabis, but not substances such as heroin, cocaine or crack cocaine. Almost all (n=19) of the respondents who supported the legalisation of 'soft' drugs but not heroin, cocaine or crack were male.

The category which elicited the most responses (21% n=44) in support of decriminalisation, was the argument that drug use is a matter of individual liberty. A common theme of this category was that drug use harms only the individual concerned not the wider public. Three respondents (within this category) believed that decriminalisation had prompted a reduction in the stigmatisation of drug users in Portugal. Respondents' thoughts on the impact decriminalisation has had on an individual's freedom are outlined below.

*"Because the use of psychoactive substances should be left to a citizen's free will"*

*"Each person should decide what to do since no one else will be harmed"*

*"Smaller stigmatisation of drug users."*

Eleven per cent (n=23) of respondents believed that decriminalisation was the correct policy path to take as it allowed drug users to be treated in the health care system rather than the criminal justice system. Interestingly, this view reflects the original government position when it decided to decriminalise possession offences. In a similar vein, seven per cent favoured decriminalisation as it promoted harm reduction and five per cent because the criminal justice system could provide an effective route into treatment services which might not necessarily be accessed by some drug users. Typical responses included:

[Decriminalisation] *opens "the doors to intervention, for instance harm reduction and risk minimisation"*

[Decriminalisation is] *"reinforcing human rights and better access to healthcare"*

[Decriminalisation was right] *"because drug addicts need help, not to go to prison"*

[Decriminalisation was right] *because "in this way funding will be available to support prevention and treatment for drug addicts instead of spending on ineffective policing or incarceration policies."*

Further comments included the opinion that criminalisation was an ineffective way to control drug use and that drug use and trafficking had decreased since decriminalisation. The policy was also seen to have reduced pressure on the criminal justice system and to have made money available for other purposes, such as pursuing traffickers.

### 3.3 Portuguese decriminalisation: experts' views

The final part of the case study involved interviewing a very small number (n=4) of Portuguese drug policy experts, who were selected to represent a range of views regarding the implementation and impact of decriminalisation. The aim of this element of the research was to elicit expert opinion on the introduction and implications of decriminalisation of possession of illicit drugs in 2001. Themes explored during the interview included:

- The political context of decriminalisation
- The level of support for decriminalisation
- The impact of decriminalisation on drug tourism
- The impact of decriminalisation on drug use and drug markets in Portugal
- Successful outcomes and limitations from decriminalising possession
- The operation of drug dissuasion panels
- The transferability of the Portuguese model to other European countries
- Future directions for Portuguese drug policy.

We asked all four key experts whether decriminalisation of possession offences in 2001 was a formal recognition of policing practices that had been in existence for some time or whether the decision to decriminalise was a new uncharted policy change. The four respondents were divided, two interviewees believed that the legislative change was a marked change from the previous status quo; one respondent stated that decriminalisation was a positive change for drug users and Portuguese drug strategy; opposing this view another interviewee believed the new policy indicated "the trivialisation of drug use in my [Portugal] country". The remaining two interviewees thought that the move signified both a recognition of existing policing practices and a clarification that drug users would be actively referred to a CDT rather than simply processed through the criminal justice system. The following quotes illustrate these views:

*"Combination of both. Police had already stopped enforcing the law, so not many people were being searched or sent to prison. It was a formalisation of this..... The other big thing was that the decriminalisation was at the same time as a much broader expansion of the Portuguese drug strategy – so the expansion of treatment resources, preventative campaigns, initiatives."*

*"Definitely a marked change in policy – it was the trivialisation of drug use in my country"*

*"In terms of drug control it was a huge change because we not only decided to decriminalise drug usage but we also decided to remove the procedures, to replace the old criminal procedures, to remove it from the judicial system to the health system"*

In addition, one interviewee described why he thought it was possible for the Portuguese government to decriminalise possession at the turn of the century ahead of any other European county.

*"We were sort of lucky, because the government and the president were pretty much in tune in terms of drug policies. So there weren't major divisions between the two main powers in the political scenario. Also in the late 1980s and into the 90s we had a huge problem with heroin use and HIV epidemics. At one point one per cent of the population had tried heroin, which was a huge figure for us, although lower than the UK's. The huge majority of heroin users were injecting. People knew someone or had someone in the family using heroin. They knew that even though they might be doing criminal stuff for money, if they got into treatment and addressed their heroin use, all the other criminal issues would solve themselves, not automatically of course. It was easier for people to perceive drug users as sick people not as criminals... If you solve the addiction you eventually also solve the criminal things. People knew there was no real point sending them to jail, six months away then they would be back. The cycle was going on and we decided that we should eventually break that cycle and the way to do it was decriminalise.... So the government asked experts to make recommendations. That group made a wide range of recommendations – expanding treatment, substitute prescribing etc. and decriminalisation. It made more sense as a whole package of recommendations – the message was drug users shouldn't be ashamed to come out. It made it much easier for us to address it in the public health system not the criminal system. I think that's why we have good results. We have a consensus that the drug policies we have will not solve all the problems we have regarding drug use but it is a system that works better than the old system. It's because the government took all, or almost all, the recommendations, and passed them into law pretty much at the same time. If you just go to a country and decriminalise drug use, the only problem you solve is the criminal record. If you don't improve the treatment and change prevention campaigns etc. you will not get very good results just because you decriminalise drug use."*

Interviewees were then asked if there had been widespread support for the government's reforms and if the support – or lack of it – had changed since the new laws had been introduced a decade previously. One respondent commented that one of the limitations of a number of evaluations of the policy has been the omission of public opinion data; however, this particular interviewee commented that whilst there had been a number of vocal sceptics back in 2001 there now appeared to be widespread support for the policy. Another interviewee stated that support had not been widespread when the policy was first introduced but eleven years later - in 2012 - there was a general consensus that decriminalisation was working better. One of the critics of the policy stated that there was little support for the policy until 2009, when the international community lent its backing to the policy. The final interviewee thought that due to the widespread use of problematic (and recreational) drug use the policy elicited support from local communities since its inception; the political opponents of 2001 were now – a decade later - supporters of the policy. One criticism highlighted by a couple of interviewees was the shift in the work of the CDTs. Originally most of the referrals to CDTs were heroin users, however, ten years after the policy's inception the demographic population being referred has changed and now a significant majority of referrals involve cannabis users. A couple of our experts questioned whether these referrals were appropriate. The following quote highlights this issue:

*"At the time of the reform it [the drug most commonly seen by CDTs] was heroin, but the prevalence of people with heroin as a drug offence has really declined. Cannabis is now the major drug. This poses a challenge for the commissions because the treatment system was set-up to treat people with heroin problems; they haven't a clear way of responding to people in need of cannabis treatment. It's been one of the frustrations with the panels. Now, a lot of the panels will not only look at peoples' drug treatment needs, but other issues, such as if people are having trouble with their schooling or finding a job, there's a social welfare role to a lot of the panels now."*

During the interview, we asked our professional experts their views on the impact of decriminalisation on drug use and drug markets in Portugal. One interviewee believed that decriminalisation exacerbated many of the problems associated with drug use, including contributing to a rise in the number of drug related problems, deaths, reports of HIV and AIDS, a rise in criminality and drug related homicides. Another interviewee thought that whilst there was a slight rise in lifetime cannabis use, just after decriminalisation was announced, this was coupled with declines in the consumption of heroin and crack. This particular interviewee commented:

*"There was a general trend for slight increases in lifetime use, but much less increase in recent use. Most of the increases were in regards to cannabis, there have been declines in consumption of heroin and crack. There is some evidence of more experimentation among the younger groups but that seems to have dropped off. Surveys of the younger generation form a general picture that just after the reform there was a spike which dropped."*

The other two interviewees both concluded that overall there had been little or no impact on drug use and markets arising from the decision to decriminalise. Asked specifically about any positive outcomes, interviewees cited: reductions in problematic drug use, an expansion in treatment facilities/options and a reduction in the number of individuals being criminalised for possessing drugs. As the following quotes illustrate:

*"It's easier for people to access treatment and approach treatment facilities  
Certainly there are some very positive trends, like reduction in problematic drug use, although this isn't solely attributable to decriminalisation, also an expansion of treatment."*

*"One of the good aspects of the dissuasion commissions is that because they are not a very formal structure, like the court is supposed to be, it's easier for them to reach people and recommend counselling or advice because they are not actually imposing things on people like the court."*

*"This [decriminalisation] decision was really innovative in the international context. I think it was a good decision."*

The final interviewee believed that no benefits had transpired following the decision to decriminalise as the following quote highlights:

*"The positive outcomes were none, absolutely none. Aids percentage rose, deaths rose, substitution programmes rose."*

Finally, we asked interviewees whether they thought the Portuguese model was one that could transfer to other European countries and what issues, if any, Portuguese drug strategy should address in the future. Three of the four interviewees thought the model could be transferred, although all of them stated that each country in the European Union is unique and would need to adapt the model and understand the resource implications involved in setting-up dissuasion panels and expanding treatment services. The fourth interviewee thought it made no sense to transfer the model as it was a "fallacious model". The following quotes illustrate interviewees' thoughts on transferring the Portuguese model:

*"Portugal is a small country it only needs 18 commissions. If you're trying to replicate that in a country with a much higher population you would need to have a lot more, it would be very resource intensive. But I think the general principle of the reform is certainly transferable. One of the main lessons is that decriminalisation can involve all types of drugs not just cannabis and not lead to rampant drug use. The evidence suggests that it helps the police as much as health responses. Reforms can address problematic drug use. I think it's the mechanism for delivering the model which is very specific, and not so transferable."*

*"Sure. I think it's just a matter of political will. Actually the system that we are using now is not that different to almost all the European countries... It does need political will to change the law and how you view drug users, this might not be very well perceived in terms of political timing, because it might come across as being too soft on drug users."*

*"The Portuguese model is definitely fallacious, so it makes no sense to export it to other countries."*

With regard to possible next steps for Portuguese drug policy interviewees provided a number of suggestions. One interviewee believed that Portugal should back-track on their current policy and adopt a system more in line with Sweden, introducing drug free programmes not substitution programmes and adopt harsher penalties for those caught in possession. Another interviewee believed that Portugal must continue to reform their drug laws by consent, a practice that appeared to be producing positive results for the Government, users and communities; another interviewee believed that the use of cannabis amongst young people needed to be examined and the final interviewee believed that the current laws should remain unchanged but minor breaches of those sent to the dissuasion panels should be looked into. The quotes below highlight the direction our four interviewees believed Portuguese drug policy may want to move towards in the coming years.

*"There are new problems to address. There is big usage of cannabis amongst young people. Young people need a clear awareness of some of the risks of cannabis. Also the problem of new drugs must be addressed."*

*"In the direction of Sweden most definitely.  
In the near future I don't see it moving anywhere. We are going to stick to it for a couple more years and eventually,*

*it is ok, we will try to solve minor breaches. In the long run I wouldn't say. But no change in the near future. Although the international trends and discussion that eventually there will be some countries that decide to take the next step – regulation of drugs particularly cannabis – but I don't foresee it as us taking that step."*

## **3.4 Discussion**

Examining a change, to a national drug policy, a decade after it has become legislation allows respondents to reflect on its implementation, successes, challenges and overall effectiveness. Whilst this is a very small case study (and should be read as such) it has provided an insight into how a small number of individuals (those answering the WBS) and drug policy experts viewed the changes. In essence three themes emerged, these were:

- The public's understanding of decriminalisation
- The client group of the CDTs
- The transferability of the Portuguese model.

### **3.4.1 The public's understanding of decriminalisation**

One of the clearest findings from the WBS was the apparent confusion regarding what decriminalisation actually means; this should not be viewed as surprising as - even amongst the legally literate - the subtle nuances that differentiate legalisation and decriminalisation are often misunderstood. However, misinterpreting what decriminalisation actually entails has the potential to place drug users in a situation where they believe they can legitimately take drugs without any criminal justice repercussions, when the reality is that drug use is still illegal but not (routinely) punished by a criminal justice intervention but dealt with administratively. Whilst an advertising campaign - ten years after the event - might seem like implementing a strategy 'after the horse has bolted' it may be worthwhile. A clearer understanding of the difference between legalisation and decriminalisation and people's perceptions of the various subtle nuances of the current law (e.g. the amount users are allowed to carry before a criminal charge becomes a possibility) may also prove worthwhile if the Portuguese Government decide to conduct any public opinion polls on their current strategy.

### **3.4.2 The client group of the CDTs**

Portugal, like many other European countries, is seeing a steady decline in new heroin and cocaine/crack users. As highlighted by one of our interviewees the client group of CDTs appears to be changing from predominantly problematic heroin users to a younger cannabis based group. Whilst cannabis use can cause or exacerbate many health issues the CDTs were originally set-up to deal with heroin users. It may therefore be prudent for the Portuguese government to stock-take on the client group of CDTs and re-appraise the needs of all their clients. If younger cannabis users are a growing population for CDTs it might be that the work of these panels needs to re-focus to provide services and on-going referrals for both problematic heroin/cocaine/crack users and younger cannabis users.

### **3.4.3 The transferability of the Portuguese model**

The decriminalisation of personal possession is a model followed by a number of countries. UN conventions clearly prohibit the legalisation of controlled drugs, however, the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances does not prevent replacing criminal penalties with administrative penalties for drug use, possession and purchase, as long as these remain prohibited in law. Portugal has remained within international law by replacing criminal penalties for drug use with civil penalties; in essence the use of drugs remains illegal. Portugal did not, however, simply decriminalise personal possession but included in their national drug strategy an approach based on eight principles: international cooperation, prevention, humanism, pragmatism, security, coordination and rationalisation of resources, decentralisation and participation. If the Portuguese model is to be successfully transferred, jurisdictions wishing to do so, should also consider implementing – alongside decriminalisation - preventative strategies, appropriate referral mechanisms and suitable treatment services. As highlighted by one of our interviewees:

*"I think the big lesson from decriminalisation is that it is seen as part of, or an enabler, of broader strategy responses. I think that's the transferable message. If you just said decriminalise illicit drugs it might not have made any difference, but it worked because it was done as part of other strategies - treatment, healthcare and prevention."*

### 3.4.4 In conclusion

Decriminalisation in Portugal has become widely accepted in Portugal as a pragmatic and humane policy. Despite the widespread political support and a generally supportive public, the WBS suggested that decriminalisation is frequently misunderstood by the general public. The challenge posed in correctly informing the public of the legal technicalities of decriminalisation should not be underestimated and should remain on the agenda for Portugal and other countries considering such changes to their drug laws. A relatively new issue that Portugal should perhaps address is the relevance of CDTs. Changing drug use patterns have meant that the proportion of problematic heroin users, for whom the system was designed, has declined and the number of cannabis users being referred has increased. If CDTs are to be used to assess cannabis users in addition to heroin users an advisory panel should perhaps provide guidance on how to achieve what is best for both (potentially very different) groups of users. Policy makers, from other countries, interested in adopting the Portuguese model need to be mindful that decriminalisation was part of a wider range of strategies, including improving prevention, referral and treatment services not just decriminalisation.

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## Report 2

# Impact of changes in the Netherlands coffee shop policies on local markets: politics, policies, confusion and chaos: the problems associated with implementing the Dutch weed pass

Tiggey May and Oonagh Skrine

## Abstract

This chapter presents findings from a literature review of Dutch cannabis policy, analysis from the web-based survey and qualitative interview data from a small group of Dutch drug policy experts. The chapter highlights how the re-design of Dutch cannabis policy has been increasingly affected by politics and illustrates the difficulties governments experience when creating policies that need to satisfy the needs of individuals, communities, European law and international conventions. The chapter highlights the views of both Dutch drug policy experts and members of the public (current and past cannabis users as well as those who have never used the drug). The chapter concludes by discussing the importance of continuing the Dutch policy of drug market separation, the need to regulate how coffee shops purchase their cannabis and the problems associated with drug tourism.

## 1 Aims

The specific aims of this case study changed during the course of the research period. Initially our aim was to measure the impact of the introduction of what has popularly become known as the 'weed pass', on both the cannabis market and its buyers. The proposed changes were to involve a step-by-step tightening of the rules that regulated coffee shops based on modifications of the municipal regulations. In essence, the proposed policies that coffee shops were expected to follow involved:

- Stemming drug tourism by operating as 'closed clubs' with members rather than customers
- Only selling to patrons who possessed a membership card<sup>1</sup>
- Reducing the quantity of cannabis sold from five grams to three
- Only allowing customers to purchase on one occasion in any one day
- Limiting the number of patrons allowed to register with any one coffee shop
- Locating coffee shops over 350 meters away from schools.

However, during the course of the research the proposed changes were delayed, and in some cases, somewhat derailed.<sup>2</sup> In February 2010 the centre right coalition was forced to resign due to the Labour Party (PvdA) withdrawing its support. Replacing the previous centre right government was a new minority government led by the right-wing Liberal Party (VVD). This government favoured stringent measures being imposed on coffee shops; however, in April 2012 this particular coalition was dissolved due to a disagreement about the proposed austerity measures. In September 2012, a new coalition was formed comprising of the VVD and new left-wing colleagues. At the time of writing, the new government had announced that the running and regulating of coffee shops was to be re-cast as a local matter and therefore devolved responsibility back to local councils and mayors. In essence local areas are able to implement the weed pass, elements of the weed pass, or none of the weed pass.

<sup>1</sup> Proposed membership was to only be given to residents of the Netherlands who had registered with their local council.

<sup>2</sup> A comprehensive appraisal of the weed pass proposals is provided in the review of the literature.

This chapter therefore provides an illustration of how drug policies can be shaped, depending on who is at the helm and highlights how politicised drug policy design and implementation often is. It also offers an insight into the influence drug policies have on the cannabis smoking public in the Netherlands.

## 2 Methods

To answer the above aims we:

- Conducted a review of the literature
- Included 17 additional questions on the Web-Based survey (WBS) which were asked to respondents from the Netherlands (n=871)
- Invited five Dutch drug policy experts to take part in an in-depth interview, four of whom accepted the invitation.

### 2.1 A review of the literature

The review of the literature<sup>3</sup> presented in this chapter covers the periods before and since the introduction of the 'weed pass'. We start by setting out a chronology of the recent history of cannabis regulation in the Netherlands, including estimates of the extent of cannabis use. Following this, we outline the Dutch Government's reasons for introducing the weed pass legislation. As well as describing the consequences intended by the legislation's supporters, we discuss the possible unintended consequences highlighted by its critics. The review then discusses the passage of the new measure through Parliament, the projected coverage of the legislation, and the implementation timescales. It concludes by reporting initial reaction to the weed pass system since its introduction.

The following databases were consulted as part of the review:

- The EDDRA (Exchange of Drug Demand Reduction Action) database of the EMCDDA
- The CEDRO (Centre for Drug Research) database of the University of Amsterdam
- The Drug Policy Alliance Online Library
- The Cochrane database of systematic reviews (CDSR)
- National Criminal Justice Service Abstracts
- EMBASE (a bibliographic database of monthly-updated international coverage of drug-related literature)
- EBSCO (electronic journal, magazine and book service including PsycINFO, a bibliographic database covering social, behavioural, psychological and health sciences, and Criminal Justice Extracts)
- The Cumulative Index to Nursing and Allied Health (CINAHL).

The database search was supplemented by consulting the following peer-reviewed and well-regarded journals:

- Journal of Drug Issues
- Drug and Alcohol Dependence
- Addiction
- International Journal of Drug Policy
- Addictive Behaviors
- Journal of Public Health Policy
- European Journal on Criminal Policy and Research
- Drugs: Education, Prevention and Policy
- British Journal of Criminology and
- Substance Use and Misuse.

In addition, the websites of several research institutes which are well-established in the field of drug policy were searched. Among these were CEDRO, EMCDDA, the US National Bureau of Economic Research, RAND Drug Policy Research Center, Transform (UK), the Trimbos Institute (the Dutch National Institute of Mental Health and Addiction), and several UK-based academic institutes and criminology departments with specialisms in drug policy.

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<sup>3</sup> All of the evidence reviewed was in English. We were unable to review any evidence written in Dutch or any other European language.

Our final strategy was to check an assortment of other sources that appeared promising – especially in providing topical updates on how the legislation was received following implementation. Such sources included, but were not limited to:

- Google
- Google Scholar
- Release (UK centre of expertise on drugs and drugs law, and campaigner for changes to UK drug policy – [www.release.org](http://www.release.org))
- United Press International ([www.upi.com](http://www.upi.com))
- Radio Netherlands Worldwide ([www.rnw.nl](http://www.rnw.nl)) and
- [www.dutchnews.nl](http://www.dutchnews.nl) (English-language Dutch news website).

#### Main search terms

Amsterdam; Cannabis; Coffee shops; Decriminalisation/Decriminalization; Depenalisation/Depenalization; Drug markets; Drug policy; Drug tourism; Dutch/Netherlands drug policy; Legalisation/Legalization.

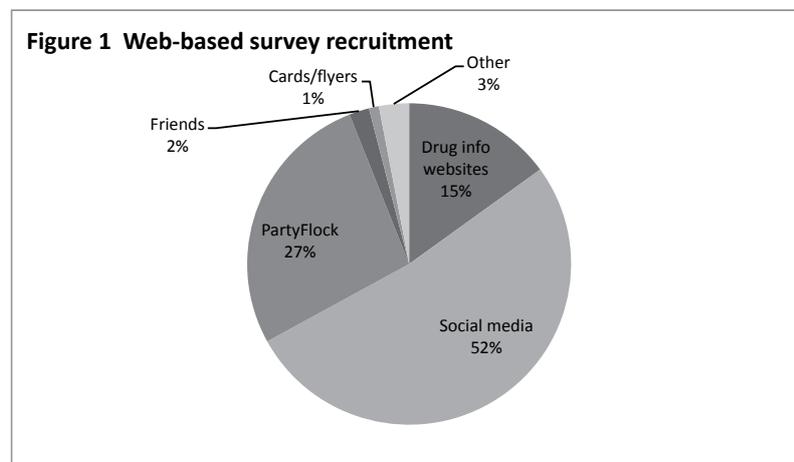
## 2.2 Additional web-based survey questions

As part of the web-based survey, ICPR, in collaboration with colleagues at the Trimbos Institute, wrote an additional 17 questions, which all Dutch respondents were invited to answer. The questions enquired about respondents' views on the introduction of the 'weed pass'. ICPR has responses from 871 Dutch cannabis users. In addition to basic demographic information, such as a respondents' gender, their province and whether their area was urban or rural we asked respondents:

- Whether they resided in a neighbourhood with coffee shops and if so, how many
- Whether they were aware of any changes in the number of coffee shops operating in their area
- About their awareness of any changes to the rules or regulations governing coffee shops
- About any changes they had consciously made to visiting coffee shops
- About their awareness of the proposed changes being brought in by the 'weed pass'
- If they expected to change their buying/smoking habits post 'weed pass' introduction and
- Respondents' opinions of current Dutch drug policy.

The web-based survey was live for approximately ten weeks at the beginning of 2012. Recruitment focused mainly on online methods and therefore excluded many of those without access to the internet. The majority of respondents were recruited from social media websites such as Facebook.

Figure 1 illustrates where respondents were recruited from.



As highlighted in the introduction of Part I of this study respondents via the internet is extremely likely to create a response bias. The Dutch sample is likely to contain:

- A disproportionate number of non-problematic drug users, young people, frequent internet and social network users
- Given the advertising on Partyflock, frequent party goers are likely to be overrepresented in the sample; therefore associated characteristics such as poly drug use may also be overrepresented

- Data analyses (conducted by the Trimbos Institute) suggests that distinct populations of cannabis users responded to the survey, i.e. younger ones with relatively more experience of using other substances and a population of older cannabis users.

## 2.3 In-depth interviews with Dutch drug policy experts

The final part of the case study involved interviewing a small number (n=4) of Dutch drug policy experts. The aim of this element of the research was to elicit expert opinion on the implications of the introduction of the weed pass and the impact of the pass on drug users and the cannabis market. Interviewees were selected for their knowledge regarding Dutch drug policy, drug markets, drug supply and/or coffee shops. Interviewees were invited to take part by email and were provided with an information sheet about the study and the interview schedule. The interviews were conducted over the telephone and - with consent - were recorded and then transcribed; the interviews lasted approximately 40 minutes. Themes explored during the interview included:

- Views on the correlation between drug policy and cannabis use
- Whether coffee shops insulate consumers from criminally involved drug traffickers
- The links between coffee shops and/or street vendors and organised crime
- The extent and nature of drug tourism
- The possible unintended consequences of tightening the regulations governing coffee shops
- The possible impact of the weed pass on neighbouring countries
- The impact of tightening the regulations on tax revenue
- The impact of a new government (Sept 2012) on the implementation of the weed pass.

# 3 Structure

This chapter is separated into four distinct sections. First we provide a review of the literature charting the proposed introduction of the weed pass and its subsequent path; we then present findings from the web-based survey and conclude our findings with the views and opinions of our expert interviewees. The final section of this chapter discusses the findings and offers some thoughts on the efficacy of tackling drug tourism and the supply of cannabis to coffee shops through policies aimed at cannabis consumers.

## 3.1 Dutch cannabis use and regulation: a recent history

Since the mid-1960s, the Netherlands has taken a distinctive approach to its drug policy compared with other jurisdictions. The country's treatment of the sale and use of cannabis exemplifies this distinctiveness. While other developed countries have used varying depenalisation models (Pacula et al. 2004), the Netherlands has stood alone in permitting a small, regulated cannabis market to develop. Retaining stiff penalties for those possessing large amounts of the drug, the policy has typically prioritised harm reduction (Garretsen 2010). The overall aim has been to limit the negative health consequences of drug taking. Drawing on the work of Koopmans (2011) this section charts an evolution of cannabis use in the Netherlands, and official policy towards it, over the last fifty years.

### 3.1.1 *Condoned use and market separation*

In the late 1960s and early 1970s, cannabis use by young Dutch people increased. The major source was an underground market bound up with youth counterculture and the hippie movement. This coincided with a consensus that morality and criminal justice should not be combined, and a consequent "condoning" stance towards cannabis use and possession for personal use.

Commitment to this position strengthened in 1972 following a sharp rise in the use of heroin and heroin addiction. It was argued that criminalising cannabis use would lead to further involvement with heroin and other drugs and subcultures which were considered more dangerous (see Pudney 2010). The aim was for market separation, distinguishing between soft drugs,

such as herbal cannabis and cannabis resin, and hard drugs, such as heroin and cocaine, whose use involved unacceptable risk. Between 1972 and 1976, cannabis use subsequently declined among Dutch adolescents (MacCoun and Reuter 2001).

### 3.1.2 Decriminalisation

In 1976, the Dutch Narcotics Act (Opium Act of 1919; amended in 1928) officially decriminalised the possession of cannabis use and small scale selling (up to 30 grams). The drug was now characterized as a misdemeanour rather than an offence. This was intended as a temporary policy but, with no other countries following suit, it remained in place. As the decade progressed, house dealers replaced the underground market. Cannabis use declined (see Korf 2002), and the new legislation prompted little change in usage rates among young people (MacCoun and Reuter 2001).

### 3.1.3 Coffee shops and toleration

From 1980, although the sale of cannabis remained illegal, coffee shops became openly tolerated and routinely free from the attentions of the Dutch police. Besides market separation, the goals were to prevent cannabis users being criminalised and ostracised, and to guard against the possibility that users would develop addiction to hard drugs. Throughout the decade, the number of shops proliferated (see box below for estimates of numbers over the years), spreading throughout Amsterdam and into other parts of the country.

Although the approach attracted criticism internationally, approval within the Netherlands was generally widespread. As an illustration, Chatwin (2003) contrasted (liberal) Dutch policies towards drug control with the (repressive) approach adopted in Sweden. Characterising these approaches as, respectively, liberal and repressive. Permitting coffee shops to be set up, selling lower-risk drugs in a controlled environment, represents an example of the market separation strategy.

Chatwin went on to note that, around the end of the twentieth century, the number of young cannabis users in the Netherlands was reported to have reduced – although Sweden, with its very different ethos, pointed to a similar fall. Similarly, Bretteville-Jensen (2006) noted the EMCDDA finding (2003) that hard drug use in the Netherlands was no higher than in other countries in central Europe. This, she argued, cast doubt on the view that the use of cannabis was either an inexorable “stepping stone”, or a less inevitable gateway progression<sup>4</sup> to the use of other substances traditionally regarded as more harmful.

#### Coffee shop numbers

A number of commentators have offered estimates of the number of coffee shops in the Netherlands. Bieleman and Goeree (2001) reported around 1,500 in the mid-1990s. Abraham et al. (1999) put the 1997 figure at around 1,200 shops; confirming this, Reuter (2010) reported that the total peaked in this year, at 1,179 shops. Monshouwer et al. (2011) noted a sharp decrease between the 1997 figure and the total in 1999, when there were 846 shops. Van Laar et al. (2002) and Bieleman and Goeree (2001) report a further fall to around 800 by 2001.

By 2007, Monshouwer et al. reported that there were 702 shops, around half of which were in the four big cities. No municipality with fewer than 15,000 residents had a coffee shop (Wouters et al. 2010), and there were no coffee shops at all in over three-quarters of municipalities (Bieleman et al. 2008). Korf (2002) noted that, after legislative change in 1996, up to 500 local communities decided not to allow coffee shops in their locality. Supporting this, Wouters et al. (2010) noted that local variation in coffee shop numbers owed much to population size and demand, along with the proportion of local councillors of a progressive political hue.

The most recent figures available, for 2009, show 666 coffee shops nationally (Bieleman 2011) for that year, a year-on-year fall from 813 in 2000 (see Trimbos Institute 2011). Monshouwer et al. (2011) suggested that the introduction of licensing, and the tightening of regulations, lay behind the post-1997 decrease.

<sup>4</sup> For a discussion of both terms, see Kandel (2004).

In another cross-jurisdiction study, Reinerman et al. (2004) compared a sample of 216 experienced cannabis users<sup>5</sup> in Amsterdam with a similar sample of 266 users in San Francisco, where buying, selling and public use of marijuana were criminal offences. Despite the different approaches, the authors found no differences in age at onset of use, first regular use, or start of maximum use. There was no evidence that those in Amsterdam used cannabis for longer, or were less likely to stop using. In conclusion, Reinerman et al. disputed the contention that drug policies had a marked impact on cannabis use. Figures for 2005 (Rodenburg et al. 2007) supported Reinerman et al.'s assertion. These showed that less than a quarter (23%) of Dutch 15-to-64-year-olds had used cannabis at least once. Just over three per cent had used it in the previous month. The overall percentage using in the previous month remained relatively stable between 1997 and 2005; among those aged 15 to 24, use in the previous month had fallen, from seven per cent in 1997 to five per cent in 2005.

Other commentators during this period noted advantages of the coffee shop model and separation strategy. Farrell (1998) speculated that it reduce demand for hard drugs. He argued that less punitive enforcement might result in lower cannabis retail prices, as the risks involved in dealing were lower. The positive role of coffee shops in generating tax revenue was also highlighted. In 2000, Single et al. calculated that coffee shops paid over €300 million in tax annually, with turnover of over five times that amount. Suissa (2001) noted that coffee shops could insulate consumers from criminally involved drug trafficking, while facilitating the arrest of tourists treating the shops as supply centres. He argued that coffee shops created social ties and counteracted exclusion, rather than encouraging "the undesirable psychosocial effects associated with penal approaches".

By the late 1980s, however, some saw the increase in coffee shops as a sign of shifting business priorities. For Ossebaard and Van de Wijngaart (1998), the condoned sale of cannabis at coffee shops "became less ideological and more commercial", with the shops "chang[ing] into tax paying non-alcoholic cafes". MacCoun and Reuter (2001) suggested that falls in the use of hard drugs might be offset by increases in cannabis use. On this basis, they concluded, toleration of small amounts of home-grown cannabis, rather than availability through coffee shops, might be more likely to sever the gateway link between cannabis and harder drugs. They went on to speculate that business exploitation of the coffee shop market lay behind a rise in cannabis use by young Dutch people in this period. Others (for example, the Trimbos Institute 1997, reported in Van het Loo et al. 2003) have disputed this, on several grounds. First, the rise in use predated the rise in coffee shops. Second, coffee shops' share of the distribution of cannabis in the country amounted to only one third. Additionally, soft cannabis use had risen concurrently in other comparable developed countries where no coffee shop model operated. What seems clear is that the number of shops continued to increase, generally with little government intervention, until the mid-1990s.

### **3.1.4 Coffee shop restriction and reduction**

In 1994, there was a change of government in the Netherlands. For the first time in 80 years, the Christian Democrats were not in office. They were replaced by a so-called Purple Coalition, headed by Social and Liberal Democrats. Rather than leading to a continuation or relaxation of the existing legislation, however, the incoming administration took a tougher stance.

In 1995, a number of formal stipulations in relation to coffee shop sales of cannabis.<sup>6</sup> No advertising was allowed. Minors were not permitted to make purchases. Nuisance could not be caused to those living and working nearby. Wholesale trade quantities could not be sold, with sales limited to no more than five grams in a day.

In 1996: further regulations were introduced. Coffee shops could not house more than 500 grams of cannabis, import it, or grow it in large quantities. Despite lifetime prevalence of cannabis use rising consistently and steeply, MacCoun and Reuter (2001) pinpoint a twelve-year shift from depenalisation to de facto legalisation, in which those aged 16-to-18 could no longer be admitted to premises at all. Mayors' powers to close down coffee shops were bolstered. Sales of cannabis and alcohol were separated. Home cultivation of more than five cannabis plants was punishable.

This greater emphasis on enforcement was geared towards reducing public nuisance, preventing cannabis cultivation and other criminality associated with coffee shops, and stemming drug tourism. Korf (2002) found evidence that the higher age limit did lead to reduced coffee shop cannabis sales; however, informal supply of the drug to this group through friends rose concurrently (from 48 per cent in 1996 to 66 per cent in 1999). He concluded that regulating the cannabis market through law enforcement had minimal impact on consumption.

<sup>5</sup> Defined as those who had ingested cannabis 25 times or more during their lifetime.

<sup>6</sup> These are known as the AHJ-G criteria. See T.K.24077-3. Tweede Kamer der Staten-Generaal vergaderjaar 1994-1995, publicatienummer 24077, nr. 3 (1995), Drugbeleid; Nota 'Het Nederlandse drugsbeleid: continuïteit en verandering'. Den Haag. Sdu Uitgevers.

Abraham, too, found that coffee shops were far from the only source from which to buy cannabis in the Netherlands. His (1999) country-wide study was based on a nationally representative sample of almost 22,000 registered residents, exploring places of drug purchase. Of those aged 18 or over who had used cannabis in the previous 12 months, a greater proportion bought it from coffee shops than from relatives and friends or any other single source. Nevertheless, the proportion buying in coffee shops was, at 48 per cent, still under half. Those aged between 12 and 17, meanwhile, were most likely to obtain cannabis from relatives and friends (46%). Despite government directives prohibiting admission and sales to those under 18, a sizeable minority (40%) nevertheless stated that they had obtained cannabis at a coffee shop. Abraham concluded that coffee shops offered an official, regulated opportunity to purchase cannabis. However, the role of unregulated, non-official suppliers had not been entirely eliminated.

On the other hand, Abraham found little evidence that coffee shops were selling other substances. Of 945 coffee shop purchases made by all "last-year" users aged 12 or over, nearly all (910) were of cannabis, and only 11 were of "unacceptable risk" drugs. Other research published at the same time (Cohen 1999) examined the rate of cannabis and cocaine use in Amsterdam between 1987 and 1997. He found that cannabis, with coffee shops as the main distribution source, was as easy to obtain as tobacco and alcohol. Cocaine availability, however, was low, and not easy for the general population. Cohen noted that over three-quarters of those who had ever used cannabis "will never develop some experience with cocaine", and that rates of use were low and stable over the ten-year period. He concluded that legally regulating drug consumption was preferable to prevention through prohibition.

The reduction in coffee shops from the late 1990s onwards was among the evidence marshalled by some (for example, Rigter 2003) to suggest that Dutch drug policy was increasingly prioritising sanctions over legalisation. Garretsen (2010) located this decreased tolerance as part of wider developments, such as poorer economic prospects and greater insecurity following increased immigration. In earlier work (2003), he noted that officially prohibiting cannabis use, while simultaneously allowing and creating conditions which tolerate it, can (and has) been seen as weak by some members of the public. Uitermark, too, noted a trend towards conservatism. He reported (2004) that the Dutch Prime Minister and Minister of Justice both favoured banning coffee shops "as soon as possible". The main daily and national newspapers shared this view. Uitermark suggested that, coupled with reduced public enthusiasm for the "condoning" approach, support for progressive drug policies had begun to wane.<sup>7</sup>

Meanwhile, some had queried the legality of the coffee shop system (see Runciman 2000, for a discussion in relation to the supply mechanisms of the approach). Curtailment and prevention of coffee shop activity has been consistently advocated by the International Narcotics Control Board (INCB) on the grounds that it contravenes drug control treaties. Bewley-Taylor and Jelsma (2012) noted that, in 1997, the INCB's Annual Report described coffee shops 'an activity that might be described as indirect incitement'.

Intraval (1999) noted a fall in the number of coffee shops selling both cannabis and alcohol in this period, from 109 in 1996 to 86 in 1999.<sup>8</sup> Closure of shops due to rule violations or their proximity to schools, combined with a cessation in new permits would, it was predicted, result in still fewer shops (Uitermark 2004). Given stability in demand for cannabis, the remaining shops would have to increase turnover, Uitermark reasoned, thereby transgressing the 500-gram storage rule.

In January 2006, two very different solutions were proposed to this situation. In Maastricht, seeking to sever shops' ties with criminal suppliers, the mayor suggested they be allowed to grow their own cannabis plants. Countering this, members of the right-wing Christian Democrat Party (CDA) called for the closure of most coffee shops, and a bar on foreign tourists in those that remained. In the words of one MP, the existing system was "[a] liberal policy in isolation".<sup>9</sup> The seeds for the introduction of weed passes were sown.

<sup>7</sup> Despite this, there is evidence that the Dutch public continued to remain more accepting of illicit drug use than their counterparts elsewhere in Europe (see for example, Van der Sar et al. 2012, for a comparison of the attitudes of Dutch and Norwegian citizens).

<sup>8</sup> Nabben et al. (2010) noted that, subsequently, the proportion of Amsterdam coffee shop customers classed as risk drinkers fell, from 30 per cent in 2001, to five per cent in 2009.

<sup>9</sup> See <http://news.bbc.co.uk/1/hi/world/europe/4595018.stm>

### 3.1.5 Tightening the regulations: the move towards weed passes

*De facto decriminalisation is...an informal order that can easily be reversed after a change in government (IDPC 2012).*

In 2008, the largest coffee shop in the Netherlands, in Temeuzen, near the Belgian border, was closed after it was found to be housing nine times more cannabis than officially permitted. Daily customers totalled around 2,500. Only one in ten of these were Dutch. In consequence, the city's mayor believed that the condoning policy was redundant. Eighteen coffee shops closed in Rotterdam, as they breached the new requirements on minimum distance from schools. In October, all eight coffee shops in Roosendaal and Bergen op Zoom were closed by the mayors. In the same month, Maastricht's mayor relocated five coffee shops from the centre to the periphery of the city. Quelling drug tourism was the aim in all cases. Writing that in 2008, Garretsen (2010) noted the low proportion of Dutch 15-to-24-year-olds finding cannabis "(fairly) easy to access compared with the figure across Europe (28% in the Netherlands; 34% Europe-wide). He speculated that this might be because of the fall in the number of Dutch coffee shops between 1997 and 2005.

June 2009 saw 16 of Rotterdam's 61 remaining coffee shops close. In the same year, a review of the previous 15 years of Dutch drug policy and an evaluation of what changes, if any, needed to be implemented was commissioned (Van Laar and van Ooyen-Houben 2009). One conclusion of the review was that the separation of the markets was reasonably successful. The expert committee recommended that coffee shops should move towards being 'closed clubs' thus limiting drug tourism. The committee also highlighted that ideally there should be a national policy on how coffee shops are managed but this policy should allow municipalities the flexibility to respond to local demands. Ideally local responses should involve the mayor, Public Prosecution Service, the police and preferably include an input from the municipal health service. In conclusion the Committee stated that it: "would call for a more systematic approach, with further development of drugs policy in a more systematic and controlled manner than we have seen over the past few years ..... and with more guidance from central government..... National policy will have to be more actively shaped, and this will include the setting up and evaluation of experiments".

The government responded and issued a memo outlining their proposed new policy which was to make coffee shops quiet places for adult local residents, to restrict the number of coffee shops in any one area, and to increase efforts against organised criminals selling cannabis to coffee shops. The government also announced that it would concentrate its efforts on encouraging "small-scale coffee shops that focus on the local customer".

The following February, however, the Government resigned following a withdrawal of support by the Labour Party (PvdA). Following a general election, it was replaced by a new minority government led by the right-wing Liberal Party (VVD). This centre-right Regeerakkoord, involving coalition with the CDA and support from the right-wing Party for Freedom (PVV), was committed to recasting coffee shops as adult-only clubs restricted to Dutch citizens<sup>10</sup> possessing membership.

In January 2010, a membership card for buying cannabis in a coffee shop was introduced throughout Limburg, the most southern of the country's provinces. Holders were permitted to buy no more than three grams of the drug (a reduction from the previous limit of five), and could only purchase on one occasion each day. Again, the goal was to discourage drug tourism.

Meanwhile, Limburg's capital, Maastricht, was seeking to ban the sale of marijuana to foreigners. A crime rate three times greater than similar-sized Dutch cities further from the border was cited as the reason. A month previously, the European Court of Justice had moved this a step closer. It ruled that the sale of cannabis did not benefit from the freedom of movement guaranteed by European law.<sup>11</sup> In December 2010, the Court ruled that the Maastricht ordinance, originally established in 2005, was justified "by the objective of combating drug tourism and the accompanying public nuisance". Non-residents of the Netherlands could now be barred from Netherlands coffee shops.<sup>12</sup>

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<sup>10</sup> When the weed pass was first discussed the then government proposed that it should only be available to citizens, this was later revised to residents.

<sup>11</sup> See [http://www.upi.com/Top\\_News/World-News/2010/08/18/Town-wants-to-ban-pot-sales-to-foreigners/UPI-43571282137122/?rel=46591292526816](http://www.upi.com/Top_News/World-News/2010/08/18/Town-wants-to-ban-pot-sales-to-foreigners/UPI-43571282137122/?rel=46591292526816)

<sup>12</sup> See [http://www.upi.com/Top\\_News/World-News/2010/12/16/European-court-upholds-pot-cafe-rules/UPI-46591292526816/](http://www.upi.com/Top_News/World-News/2010/12/16/European-court-upholds-pot-cafe-rules/UPI-46591292526816/)

### 3.1.6 Weed pass legislation

Endorsing the Van de Donk committee's recommendations, the Dutch coalition Government announced in May 2011 that access to coffee shops would be through a membership pass (Government of the Netherlands 2011). Membership would be for a one-year minimum, and open only to Dutch adult citizens. Numbers of members for each shop would be restricted.<sup>13</sup> To reduce premises' visibility to students, the maximum distance between schools and coffee shops was limited to 350 metres. The Government also announced that the earlier restrictions placed on coffee shops would remain. In creating this legislation, the Government stated that it expected that

*foreign drugs tourists [would] no longer travel to the Netherlands to purchase and consume cannabis [as] many of them can use the illegal markets available in their immediate surroundings.*

The measures were part of a strategy aimed at a more robust response to substance use by young people, and to the growth and trade of large quantities of cannabis and other soft drugs. Timescales<sup>14</sup> were as follows:

- 1 January 2012: amendment of the toleration criteria in the Opium Act
- 1 May 2012: new membership rules (excepting those on maximum numbers) to become policy in Limburg, North Brabant, Zeeland and other municipalities wishing to adopt them
- 1 January 2013: all rules become policy throughout the country
- 1 January 2014: ban on coffee shops within 350 metres of secondary schools and secondary vocational institutions.

### 3.1.7 Subsequent reaction and ratification

The new proposals, although criticised<sup>15</sup> were upheld by the EU. The European Court of Justice ruled in 2011 that restricting sales to Dutch residents was "justified by the objective of combating drug tourism" and reducing public nuisance.

The tough approach continued in October 2011 when, following fears about its psychotic effects, strong cannabis was reclassified as a hard drug.<sup>16</sup> In March 2012 the VVD announced that it wished to ban coffee shop sales of hashish (Radio Netherlands Worldwide 2012a). It justified this on the grounds that this form of cannabis was illegally imported from Pakistan, Afghanistan and Morocco, thereby supporting international criminal organisations.<sup>17</sup> Again, this aroused opposition from shop owners and others, who feared the creation of a black market as a result. A further potential consequence of this was that cannabis purchased from street vendors contained more of the drug per joint than when perrolled at a coffee shop (as reported by Van Ours 2007).

On 27 April 2012, the ban on foreign tourists was upheld by a judge at The Hague district court.<sup>18</sup> Claiming the proposed measure was illegal, as it discriminated between EU citizens based on where they live, 19 cafe owners took the case to court.<sup>19</sup> Four days before this, however, the PVV, unwilling to accept budget cuts in line with EU rules, withdrew its support for the VVD. The Dutch government subsequently resigned. A new government was elected in September 2012.

Some parties were reported to favour the new legislation, others didn't. Supporting Uitermark's earlier (2004) analysis, Mascini and Houtman (2011), although not specifically examining coffee shops, found that the overall condoning approach to cannabis use has met with opposition from those with left-of-centre political inclinations, as well as those on the political right. In Amsterdam, some argued that a percentage of the money taken by coffee shops is used to support those supplying large quantities of a product which remains illegal, and who are therefore engaged in criminal activity.<sup>20</sup> However, the same article noted that Amsterdam's mayor opposed the change. Problems posed by drug tourism and cannabis consumption in border cities, he argued, were not comparable to those in his own city.

<sup>13</sup> The limit was later specified as 2,000 people.

<sup>14</sup> See <http://www.government.nl/issues/alcohol-and-drugs/drugs/soft-drug-policy>

<sup>15</sup> See [http://www.upi.com/Top\\_News/World-News/2010/10/09/Dutch-coffee-shops-irked-at-proposed-rules/UPI-73531286644443/](http://www.upi.com/Top_News/World-News/2010/10/09/Dutch-coffee-shops-irked-at-proposed-rules/UPI-73531286644443/)

<sup>16</sup> The change will affect varieties containing more than 15% THC, the chemical compound which is the drug's main active ingredient. Mean potency levels of cannabis sold at coffee shops rose between 2000 and 2007, although this rise was not linear (see Niesink et al., 2007).

<sup>17</sup> As a Dutch-grown product, weed (the dried flower at the top of the plant) would remain available in coffee shops under the proposal.

<sup>18</sup> See <http://www.bbc.co.uk/news/world-europe-17865151>

<sup>19</sup> See <http://www.bbc.co.uk/news/world-europe-17865663>

<sup>20</sup> *ibid.*

Many appeared to share this view. Radio Netherlands Worldwide (2012d) reported that thousands protested at Amsterdam's annual Cannabis Liberation Day in June, on the grounds that it had already led to market displacement and loss of coffee shop trade. In July, the city council was hoping to persuade the Dutch Justice Minister to exempt the capital from the regulations (Radio Netherlands Worldwide (2012e)). Concern about the weed pass legislation was not confined to the Netherlands. Anticipating an increase in cannabis cultivation in their country to meet demands from displaced coffee shop patrons, Belgian police increased controls on their Dutch border (Radio Netherlands Worldwide 2012b).

Korf et al. (2011) found little enthusiasm for the weed pass legislation either among a sample of 66 Amsterdam coffee shop owners, or in two surveys of cannabis users. A minority of owners believed the legislation would lead to increased customer loyalty. However, nine in ten expected that customers would be unwilling to compulsorily register, and believed the exclusion of tourists and other non-members was a discriminatory step. Echoing the beliefs of Nijmegen's mayor (reported in Pakes and Silverstone 2012), they also predicted that cannabis street dealing would increase, feared a rise in illegal supplying of cannabis in coffee shops to unregistered people, and were concerned that a black market for weed passes might develop.

Korf et al.'s surveys of 1,214 Amsterdam coffee shop customers, and 1,049 cannabis users nationwide, both bore out the proprietors' beliefs. Most (83% in Amsterdam; 74% nationally) opposed registration. Respondents were then asked what they would do if cannabis ID enabled them to buy from only one coffee shop. In both samples, just under a third (32% in Amsterdam; 31% nationally) said they would register. Smaller proportions (11% and 12% respectively) replying that they would not register and stop using cannabis completely. Most reported that they would not register, and instead obtain cannabis from other sources. The most commonly mentioned method (21% Amsterdam; 18% nationally) was to buy from a non-coffee shop dealer. Other declared ways of obtaining cannabis were to buy it from a grower, grow it themselves, delegate another to buy it for them, or have it delivered to their home. Overall, Korf et al. concluded that the surveys offered empirical evidence supporting concerns that introducing weed passes would "lead to a resurgence of the underground retail cannabis market and the accompanying crime and nuisance".

### **3.1.8 Post-introduction**

Initial reaction following introduction of the new coffee shop measures has appeared mixed. On 1 May 2012, the day on which the regulations became policy in the southern Netherlands, DutchNews.nl (2012a) reported that all 14 coffee shops in Maastricht closed in protest at the policy. One did open, but was subsequently given a written warning by officials as it had no membership list. Local news sources reported that the closures resulted not simply from dissatisfaction with the new measures. Rather, the coffee shops had received no customers, and no one had registered as a member, reportedly leading to almost 400 job losses. Elsewhere, a Tilburg coffee shop proprietor was given a police warning for failing to meet the new rules. Two of Venlo's five coffee shops closed permanently, while one of the remaining three reported six registered members.

However, the following week, the same source reported the mayor of Maastricht commenting that people living close to the cafes welcomed the changes (DutchNews.nl 2012b; Radio Netherlands Worldwide 2012c). It was unclear whether this stemmed from the earlier closure of the coffee shops. Indications were that an increase in street dealing, feared by opponents of the weed pass, had begun to occur. Twenty street dealers had been arrested in the week since the policy's introduction – higher than would normally be expected in Maastricht. In Venlo, local councillors' concern at a surge in street dealing had led to the establishment of a hotline, on which locals could report associated problems. In Nijmegen, a city in the eastern Netherlands where the measures had not been introduced (in May 2012) drug tourism had reportedly increased, with one coffee shop owner reported sales rises of up to 30 per cent.

In the same month, it was also reported that, since the introduction of weed passes, police in Limburg had arrested 386 people for soft drugs offences (DutchNews.nl 2012c). Comparison figures for the same period the previous year were unfortunately not noted.

Only one university-based study appeared to have been carried out at the time this report was being prepared. It found street sales of cannabis to have risen steeply since the weed pass had been introduced (Maalsté and Hebben 2012). Those aged 18-to-24, and non-Dutch nationals, appeared especially likely to have deserted coffee shops in favour of on-street suppliers. As well as offering cannabis which is at least 25 per cent cheaper, Maalsté and Hebben reported that many of these dealers trade in other substances. The risk that buyers will be exposed to potentially more harmful substances has therefore increased.

In spite of the new policy, commentators have continued to find evidence in support of the coffee shop approach. Monshouwer et al. (2011) found no evidence that cannabis use had risen due to the coffee shop system, and concluded that the shops appeared successful in supporting the separation strategy. Similarly, Reinerman (2009) found the policy's impact on separation had been "substantial". Adjustments have been proposed to cannabis policies in other jurisdictions which share the harm reduction impetus of coffee shops in the Netherlands. For example, in a discussion of the 2008 reclassification of marijuana in the UK, Macleod and Hickman (2009) argued that cannabis use should be prevented primarily for two reasons. First, to minimise the harmful effects of people simultaneously using tobacco. Second, to prevent people from becoming dependent on cannabis. Macleod and Hickman concluded that cannabis use should be recast from a criminal justice issue to a public health matter. Also in 2009, a UK charitable thinktank suggested the coffee shop approach as one of five models for regulating drug availability (see Rolles et al. 2012).

On the other hand, after the announcement of the introduction of the weed pass, evidence emerged that recent, self-reported cannabis use throughout the Netherlands was at or above average. In a comparison of individual level adolescent cannabis use, Bjarnason et al. (2010) examined data from 31 European countries on 84,711 students, of whom 2,095 were from the Netherlands. Data were drawn from the 2003 European School Project on Alcohol and Other Drugs (ESPAD).

Dutch 15-to-16-year-olds reported the eighth highest 30-day usage in the study, of 13 per cent. Weighted by country size, the Netherlands was slightly above average. However, the effects of perceived availability of cannabis, and risk associated with use, were neither especially strong nor weak in the Netherlands compared with other countries. Bjarnason et al. found that reducing both supply and demand for cannabis could decrease the prevalence of adolescent substance use – a goal which the Dutch government hopes to achieve through mandatory club membership for coffee shop customers.

Meanwhile, writing in 2010, Monshouwer et al. (2011) found the Netherlands to occupy a middle position in Europe in terms of adult cannabis use in the adult population. The percentage of daily users was moderate to low. Prevalence rates among adolescents fell from 1996; however, they remained higher than the European average, while age of first use was relatively low. Addiction rates have also increased. Figures from the Netherlands National Drugs Monitor became available in July 2012 (Trimbos Institute 2012). These show that, between 2000 and 2010, there was a threefold rise (from 3,534 to 10,971) in the number of Dutch people treated for cannabis addiction. Of these, 40% were under 25 years old.

### **3.1.9 Abolition or retention?**

As this review was being prepared, the future of the weed pass remained as unclear as its impact. Despite implementation in the southern provinces few other municipalities appear to have followed suit. The Dutch government, of September 2012, decided not to introduce the weed pass, instead suggesting that visitors should present their identity card proving that they are residents of the Netherlands. The implementation of this rule has, however, been left at the discretion of individual municipalities, some of which have decided to continue to allow non-Dutch residents to purchase cannabis. In January 2013, reports of increased street dealing and disorder emerged and previous supporters of the policy, such as the mayor of Maastricht, began to doubt its efficacy (Amsterdam Herald 2012). The September 2012 election returned the VVD, the centre-right liberal party, as the senior party within the new government who formed a coalition with the Labour Party (See appendix A for a review of each political party's stance on cannabis policy). At the time of writing, the weed pass had been modified by the new coalition. Initial modifications included:

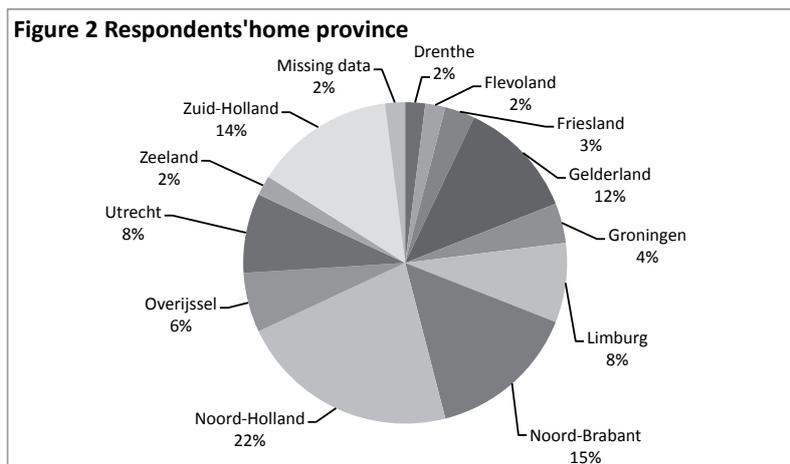
- Abolishing the requirement that coffee shop users register with their local council
- Retaining the intention to limit access to individuals with Dutch residency.

## **3.2 The web-based survey**

As part of this case study we asked the Dutch respondents from the web-based survey to answer an additional 17 questions. The web-based survey was carried out in early 2012 and therefore reflects the views of respondents prior to the weed pass being abandoned. The additional questions asked respondents about the changes they were aware of in their local areas; whether their buying habits had changed during 2012 and their thoughts on Dutch drug policy.

In total 871 people answered the additional questions posed on the WBS, of these 70% were male, the remainder (30%) female. Residents from all 12 provinces were represented in the survey.

Figure 2 illustrates the proportion of respondents from each of the 12 provinces.

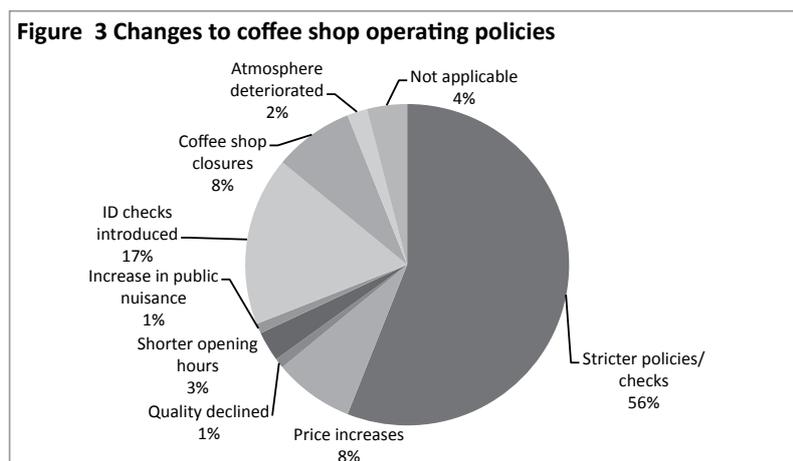


Thirty-eight per cent of respondents who indicated which province they lived in resided in the south of the country, the area that by mid-2012, had introduced some of the new regulations. Just over two-thirds of the sample (70%) lived in urban areas, just under a third (29%) stated that they resided in more rural settings; the remainder (1%) declined to answer the question.

As part of the survey, we asked respondents how many coffee shops were operating in their local area, the most frequent answer was 'more than five' (n=257 - 30%), however, 19% of the population stated that there were no coffee shops in their immediate vicinity. Respondents were also asked if they had noticed any discernible changes to the number of coffee shops or any apparent differences in how they were being run. Over three-quarters of the sample (83%) stated that they were unaware of any new coffee shops or any closures. In the south of the country one in five of the Zuid-Holland respondents thought there were fewer coffee shops in early 2012 than there were in 2011, a similar number to those from Noord-Brabant (21%). Of the 73 Limburg residents an overwhelming majority (64) stated that there had been no changes in the previous year. In the province of Noord-Holland, which Amsterdam is part of, the results were remarkably similar. Eighty-five per cent of respondents stated that there had been no change, two per cent thought there were more coffee shops operating and 14% thought there were fewer.

In addition to the number of shops operating in local areas we asked respondents if they had noticed any discernible changes to the running of coffee shops. An overwhelming 80% of respondents stated that they hadn't. This perception was similar whether respondents were from the north or the south of the country. As part of the survey respondents were asked what changes they had noticed. In total 155 respondents expanded on their answer which elicited 198 responses. Of the changes noted, 115 (56%) responses highlighted that they were aware of stricter operating policies and an adoption of new rules and checks. Just over a fifth of responses (21%) mentioned that identification checks were now taking place.

Figure 3 highlights the perceived changes to the running of coffee shops noted by our respondents.



Interestingly few (2%) respondents used the coffee shops they purchased their cannabis in to then smoke/ingest their purchase. Most (68%) preferred to buy their cannabis and leave.

Over three-quarters of the sample (77%), when asked if their attendance at coffee shops had changed in the previous 12 months, stated that it hadn't, almost a quarter (22%) stated that it had. Of those who had changed their attendance patterns, 11% stated that they visited shops less frequently; five per cent stated that they visited shops with greater regularity; three respondents reported that they had no coffee shops left in their municipality so had ceased frequenting them altogether and four respondents asked others to buy for them rather than buying for themselves. Other responses included: I grow my own cannabis, I've stopped using cannabis, I'm now pregnant, I order my cannabis by phone and have it delivered.

Finally we asked a series of questions about the (then) proposed weed pass. Questions related to respondents' awareness of its impending implementation and the expected changes to a respondent's buying habits. Almost three-quarters (70%) of our respondents were aware of the then up and coming weed pass, 20% were unaware of its existence and 10% said they were unsure. In the southern provinces of Noord-Brabant and Limburg respondents were slightly more aware of the impending changes; in both areas almost 80% said they were aware.

Respondents were split on whether they would change their buying habits after the introduction of the weed pass. Across the sample just under half (48%) said they had little inclination to change, just over a quarter said their purchasing habits would change and just under a quarter (24%) were unsure. The picture was similar in the south of the country.

Finally we asked respondents for their views on current (March 2012) Dutch drug policy. The question was open-ended, enabling respondents to express as many thoughts and opinions in their answer as they wished. Of the 871 respondents, 782 (90%) provided their opinions on Dutch drug policy. Of the 782 respondents, just under half (44%) of the comments made about Dutch drug policy pre-September 2012 (the election of a new government) were negative. Of these, just under a quarter (22%) believed that the government's stance was hypocritical and nonsensical. A number of respondents were in favour of the market being regulated (allowing coffee shops) as they believed this approach was pragmatic, has the ability to drive a wedge between the user and criminal entrepreneurs, has the potential to regulate quality whilst also protecting users from harm. Just over a fifth (22%) of respondents believed that by introducing the weed pass the government was potentially opening up the cannabis market to a more diverse group of criminals and creating an environment where an underground, unregulated illicit cannabis market could develop. Below are some typical responses from respondents who were critical of the current Dutch drug policy:

*"Cannabis should be regulated by the government and should be coupled with prevention and information/education. The introduction of the weed pass will primarily cause criminality around cannabis use to rise."*

*"[the current policies are] stupid and completely useless, but understandable considering drug policy in the rest of Europe. Condoning is a very vague policy, but basically all drugs should be legal."*

*"[the policies are] very hypocritical. Only one part of the chain is regulated. To be effective, the whole drugs chain should regulated, including alcohol. Good regulation and education and not just controls for the end user - which has*

*the effect that the end user does not have access to education/information and will come in contact with the criminal market for other drugs."*

*"Cannabis pass should not be introduced. Criminality will rise and demand for cannabis on the street will rise."*

*"It is all going wrong. For years we have been at the forefront with a drug policy based on common sense and facts. Nowadays the current politicians are under the illusion that drugs can only be bad and should be banned from society."*

*"If they would look at the facts, they would treat this topic as a health issue and they would put more emphasis on dissemination of factual information and teach people to deal with drugs in a healthy and sensible way. People (and politicians) should be aware that it is about medicine with an enormous therapeutic, medicinal and life enriching potential, that is only detrimental when used foolishly and used with the wrong intentions".*

From the 782 respondents a third (33%) expressed positive opinions regarding Dutch drug policy. The majority of respondents provided very brief responses such as: 'perfect', 'ok as it is', 'keeps cannabis use controllable', 'better than in other countries'. The remainder (n=96) provided slightly fuller answers. Of these 51 believed that the rules regulating the coffee shops should remain as they are, 11 respondents thought that the policy of allowing coffee shops to sell to users was a good example to other European countries. A small number of respondents (9) thought that the introduction of the weed pass was a pragmatic solution to the problems posed by drug tourism and a further 10 respondents believed that the current Dutch policies were an improvement on the policies being adopted in other European countries. Typical responses regarding respondents' thoughts on Dutch drug policy are provided below:

*"I think the condoning policy must remain as it is. For years it was successful and it helps the Dutch economy (drug tourists")*

*"I think the cannabis pass is a good idea. Less French people in Maastricht."*

*"Condoning policy for soft drugs is fine. The cannabis pass is a bad idea because friends in the surrounding communities without coffee shops cannot buy cannabis or hashish. The underground market of the smaller communities will grow. As your ID shows you are Dutch a special pass is unnecessary."*

*"At the moment I think the drug policy in the Netherlands is OK, I don't agree with the new propositions from parliament. One of the reasons tourists come to the Netherlands is our drug policy. The drug pass is not OK, especially because each shop will have to have a limited number of members. I don't think it is necessary to leave my personal data at a coffee shop. Where I live there is still no cannabis pass and that is fine for me. Please can the government debate other questions, the tolerance towards cannabis is what makes the Netherlands so special."*

*"Concerning the implementation of the weed pass I think it is a good obstacle to drug tourism and public nuisance. However, I fear there will be a growth in illegal ways to sell drugs. I am not particularly positive or negative concerning this implementation. The drug field is difficult and each regulation has its pros and cons. Regulation could be an option, but what happens with the public nuisance of drug tourists? I think it is a good idea that coffee shops are not in the neighbourhood of a school, this could be even more than 350 meters. By placing it farther away it becomes maybe less attractive."*

*"I'm mostly positive, but I am negative about the direction the government is taking. I mean the closing of the coffee shops, the cannabis pass and the negative image of soft drugs. I think we should legalise, regulate and educate soft and hard drugs. I am positive about the way the police handle small quantities these days (i.e. take away, not arresting in general)."*

*"We Dutch deal with drugs more sensibly thanks to the condoning policy. With the stricter policy, the government gives criminality a chance to increase. I do not like the new plans."*

*"I applaud the condoning policy, because it is now evident that the Netherlands does not have more problems than the other countries. On the other hand the back door policy operating in coffee shops is ridiculous. The government cannot check what is offered for sale in the coffee shops. With illegal buying, you attract criminality. The suppliers of coffee shops are doing criminal acts and risking a fine or prison sentence. This does not seem right to me. But the pressure from the surrounding countries is too high."*

*"I think recreational cannabis in the Netherlands should be legalized and all production should be based in the Netherlands (incl. resin). All other drugs should remain illegal but condoned. Hard drugs are too dangerous to legalize."*

### 3.3 Dutch cannabis policy: experts' views

The final part of the case study involved interviewing a small number (n=4) of Dutch drug policy experts. The aim of this element of the research was to elicit expert opinion on the implications of the introduction of the weed pass and the impact of the pass on drug users and the cannabis market. Themes explored during the interview included:

- Views on the correlation between drug policy and cannabis use
- Whether coffee shops insulate consumers from criminally involved drug traffickers
- The links between coffee shops and/or street vendors and organised crime
- The extent and nature of drug tourism
- The possible unintended consequences of tightening the regulations governing coffee shops
- The possible impact of the weed pass on neighbouring countries
- The impact of tightening the regulations on tax revenue
- The impact of a new government (Sept 2012) on the implementation of the weed pass.

The views of the four experts on whether a correlation between drug policy and cannabis use exists differed slightly. One of our experts stated that if a drug policy is repressive there will be less use, another thought that there was a greater correlation between social class and drug use and the remaining two believed there was no correlation between drug use and drug policies. One of our commentators stated that:

*"Trends in use seem to go across countries, completely disregarding policy, place and time."*

In direct contrast another interviewee stated:

*"If a policy is repressive there will be less use...the more a substance is available, the more users, the more users the more heavy users there will be".*

When asked whether coffee shops insulate consumers from criminally involved drug traffickers, three of the four respondents stated that they believed coffee shops did just that. The fourth respondent thought the statement was 'questionable', stating that whilst coffee shops may not have traffickers frequenting them, it is likely that they will be outside waiting to pick up passing trade. *"Coffee shops may play a role in establishing contacts, although of course it's not the owners who are involved"*. Following on from this question we asked about the links (or not) between coffee shops, street vendors and organised crime groups (OCGs). In essence we were interested in exploring whether the Dutch government's concern regarding the links between OCGs and coffee shops was one shared by our experts. One of our experts believed that the research evidence highlighted the existence of such links, stating that coffee shops buy their cannabis via the back door, which is unregulated and is one of the main problems with Dutch cannabis policy. This particular interviewee commented:

*"Organised crime has always been heavily involved in coffee shops and drugs. The supply to coffee shops was never regulated and has remained illegal. Coffee shop owners claim that they don't buy from businesses with links to organised crime and use only trusted sources. There is research showing that coffee shops employ brokers who buy drugs from all sorts of suppliers, this usually includes crime groups which traffic and grow drugs on a large scale. There's always been a connection, that's something that you need to realise. The supply not being regulated has always been a big problem, because cannabis is not legal in the Netherlands".*

The other interviewees were more sceptical about the links or believed the links were over-exaggerated. One of the interviewees thought that:

*"It would be naïve to think that in some cases there weren't larger or medium scale growers involved [in coffee shop supply]. Where does the line get drawn, what's organised crime? There must be a link between the tolerated market and the black market. To make links with coffee shops and organised crime, however, is overstating the case. There are stronger links between organised crime and the street dealers."*

Another expert believed that in a few cases where had been proved links between OCGs and coffee shops. Regardless of the links, this particular expert believed that the small scale suppliers that have traditionally supplied to coffee shops are feeling a certain degree of pressure to stop growing and supplying to the shops due to increased enforcement.

A concern expressed by successive Dutch governments over the last couple of years, respondents of our WBS and outlined in a number of academic and research papers is the negative consequences for communities of drug tourism. We asked our experts for their views on this issue. One of our experts was baffled by the idea that the weed pass would eliminate drug tourism, stating that a weed pass, if introduced, would damage the economy of the Netherlands and undermine the particularly successful market separation policy that successive governments had continued to promote. This particular interviewee accepted that the South of the country had experienced problems with drug tourists from Belgium and Germany but did not think a weed pass would solve these problems. Another interviewee believed that since the weed pass had been implemented in the South of the Netherlands, the neighbouring countries of Belgium and Germany had simply changed their method of purchasing; instead of driving across the border they had their drugs delivered. The same expert also believed that the illegal markets in Belgium and Germany would be likely to flourish. Expressing a similar view, another interviewee commented:

*"The introduction of the weed pass was definitely related to drug tourism. It was largely based on the situation, or perception of the situation, in a very limited number of cities along the southern border. Two communities have already decided to close down all the coffee shops. There are two kinds of nuisance: One is too many tourists come, there are cars parked, they hang around at the coffee shops and the surrounding area. The other nuisance is that coffee shops attract pushers who supposedly aggressively approach tourists, largely to sell drugs other than cannabis."*

Towards the end of the interview we asked our experts what impact they thought the then proposed weed pass would have on the tax revenue of the Netherlands. One of the experts believed the impact would affect different areas in different ways. This particular expert commented:

*"It will depend on the local level, for a city like Maastricht definitely. There are some areas where cannabis users only go to buy cannabis and that it is – they won't go to restaurants etc because they are not very attractive places, but a city like Maastricht, people go for the coffee shops but might also stay in a hotel, buy clothes, go to a restaurant, it's a more attractive city. It will have a tremendously negative effect on some local communities and their public income like parking, but also private shops/restaurants."*

Another interviewee was adamant that tightening of the regulations would have a negative impact on the ability of the Netherlands to generate a sizeable tax revenue from coffee shops. As illustrated by the quote below:

*"Yes it [the weed pass] is having a detrimental impact, and will continue to have a detrimental impact, no doubt. A third of Dutch drug tourism is said to be drug related. Tourists will turn to the black market or just not come, in which case they won't be spending money in the Netherlands at all. They might use hotels if they come, but money will still go into black market, and the Dutch will be using the black market as well."*

Finally, we asked our experts for their views on the future of the weed pass post the September 2012 election. The comments below illustrate three of our experts' thoughts on what the potential impact might be:

*"Public attitude is less tolerant. Maybe there's less cross party support than we think. The new government will be a coalition, there's always wheeling and dealing between parties with different policies. The left wing party is negotiating to join the government; they may adjust the idea of the weed pass. Maybe it will stay just in the south not the rest of the country, maybe they will stop Dutch nationals having to register. The ban on foreign*

*nationals will probably go through because that obviously has a positive effect on the nuisance caused by drug tourists coming to the south of the Netherlands."*

*"I think the policy could get a bit more liberal now."*

Our final expert was interviewed after the September election and commented:

*"You know what, it could go in both directions. One is that the current government, the social democrats, is very peculiar. They have never had a clear stance on coffee shops, they were always 'as long as the market can regulate itself, let's do it'. Now, of course safety and repression are key words. So if they still stick to the plans that tourists are not allowed- it will be quite messy in cities like Amsterdam and Rotterdam. Alternatively, possibly the social democrats - as well some other parties - put the somewhat older idea of regulating supply back on the agenda, in terms of experiments with state controlled marijuana cultivation sites, taxing and so on".*

### 3.4 Discussion

Although the specific aims of the case study changed during the course of the research, the views and opinions of the WBS respondents and our expert interviewees raised a number of interesting issues. Initially we thought we would be able to chart the introduction and impact of the weed pass, however, whilst we were only able to describe its introduction in the South of the country, what we were able to capture was our respondents' far-reaching thoughts on Dutch cannabis policy in general and more specifically what the new government should perhaps tackle.

In essence, three concerns emerged from the information gathered in the literature review, the WBS and the expert interviews: the supply to coffee shops, the importance of maintaining market separation and the problems associated with drug tourism. These will be addressed in turn.

#### 3.4.1 Supply to coffee shops

Our findings showed that, despite the fact that the sale of cannabis to consumers is regulated; the supply to coffee shops remains largely unregulated. The tolerance afforded to cannabis users is not afforded to those that supply coffee shops. The owners of coffee shops have to rely on their supply coming from the illicit underground market. Although many coffee shops purchase from small scale growers, who are unlikely to be involved in other crimes, enforcement against coffee shop suppliers appears to be intensifying. With the threat of arrest looming this particular supply route seems to be slowly eroding. If the risk adverse small scale suppliers leave the market, this gap will undoubtedly be filled by the risk takers – the organised criminal groups. One of the unfortunate issues, that seems to be facing the new government, is how to regulate the supply of cannabis to coffee shops without displacing trade onto the street and into the hands of unregulated suppliers that may or may not have links with organised crime groups.

#### 3.4.2 Market separation

One of the cornerstones of Dutch drug policy has been the successful separation of the cannabis market from other more harmful drug markets. A concern raised by interviewees was the possible knock-on effect that coffee shop closures will have on the current market separation. Closures will result in many customers switching their coffee shop supplier to a street seller. The unfortunate (unintended) consequence is that some cannabis users will undoubtedly become exposed to other more harmful substances – which they may then decide to buy. It is likely that this scenario will also be played out in areas where there is a requirement to register oneself with a coffee shop. For those that wish to remain anonymous the illicit street market is likely to look like an attractive – if somewhat constrained – choice.

### 3.4.3 Drug tourism

One of the arguments which orchestrated the implementation of the weed pass was the need to reduce drug tourism and its associated harms, including street nuisance, excessive traffic and illicit street dealers. Although the areas that implemented the weed pass have indeed reduced drug tourism, this has coincided with an increase in reports of street dealers. It is likely, given its reputation, that the Netherlands will remain a supplier of cannabis to its neighbours, either through sales to tourists on the streets or couriers crossing the borders. It would seem prudent therefore, to monitor whether those areas that implement the weed pass experience an increase in the number of street sellers, the range of drugs available, criminal activity and its associated nuisance and a decrease in local residents' perceptions of safety and tax revenue.

### 3.4.4 In conclusion

The countrywide enforcement of the weed licence, proposed by a previous government, encountered considerable opposition in a number of cities. The current government has arrived at a compromise by leaving policies relating to the regulation of coffee shops to the discretion of local councils. This appears pragmatic, given the range of challenges posed by the very different provinces. The more pressing, although less visible, challenge to Dutch drug policy, however, is how to control the illicit (street) drug market, which is likely to flourish if coffee shops close, if customers have to register and if drug tourists are unable to buy from coffee shops. Another, equally pressing issue, is how to regulate the supply of cannabis to coffee shops – an issue that appears to have been left in the “too hot to handle basket” by successive Dutch governments. This particular issue, however, may now become far more pressing if the small scale suppliers desist from supplying and the (organised) criminal gangs take over.

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# Annex 1: Table Weed pass policies of main political parties

**Table:** Weed pass policies of main political parties in the 2012 election

Party	Inclination	2010 seats	Weed Pass Policy
VVD	Right Liberal	31	Retention. (Stricter punishment for soft drugs offences)
PvdA	Left	30	Abolition. Coffee shops to be hospitality industry
PVV	Right	24*	Retention, but no coffee shops within a 1 km radius of schools
CDA	Right	21	Retention. Move towards closing all shops
SP (Socialist Party)	Left	15	Pass "unnecessary". (Regulate soft drug trade)
D66	Left Liberal	10	Abolition. (Legalise and tax soft drugs)
GroenLinks	Left/Green	10	None stated. (Abolish cannabis; legalise soft drugs)
ChristenUnie	Left	5	Abolition. End to policy on soft drugs
SGP	Right	2	None stated.
PvdD	Animal Rights	2	Abolition. (Legalise and tax soft drugs)

**Source:** *DutchNews.nl (2012d)*.

\* Three of these quit on 3 July 2012 following disagreements with the party leader.



## Report 3

# Exploring trends in the illicit drugs market and drug policy responses in the EU

Franz Trautmann

With contributions of Martine Themmen to the analysis of the drug policy trends

## Abstract

Besides having knowledge about the effects and effectiveness of drug policy measures taken and an understanding of relevant developments of the drug problem, drug policy making also needs to anticipate what is coming, how the drug problem might develop in the coming years. In order to get an idea of future developments, we explored expert views on how key trends of the illicit drugs market and policy responses in the EU might develop in the near future. We chose an adapted version of the Delphi method, using a four stage expert consultation through a mix of web-based and e-mail questionnaires. Point of departure was a list of key trends we had identified in our earlier study of the global illicit drugs markets (Reuter and Trautmann 2009). The selected market trends concentrated on different aspects of increasing drugs supply (increase of scale, growing globalisation and diversification), while the selected policy trends focused around convergence of drug policy in the EU (decriminalisation of use, a tougher approach to illicit drugs supply, wider acceptance of harm reduction and regulation instead of prohibition in drug control policies). The responses we received show that there are three more issues which are expected to play an important role in the coming years: the impact of the economic crisis on the drugs market and on drug policy, the increase of poly substance use and an increasing importance of internet as means of drugs distribution. Based on these findings we have formulated a number of recommendations for a more pro-active drug policy response.

## 1 Introduction

Sound drug policy making requires solid knowledge of the effects and effectiveness of measures taken and understanding of relevant developments of the drug problem. However, the demands made on drug policy making go beyond this. Drug policy is expected to look ahead and try to anticipate what is coming, how the drug problem might develop in the coming years. Drug policy is expected to be proactive. We therefore explored expert views on future key trends of the illicit drugs market and policy responses in the EU.

It is of course impossible to predict developments in the field of demand and supply and to foretell the directions the policy response to these developments will take. Foresight studies generally do not succeed to correctly 'predict' the development of drug problems and policy. We therefore would like to emphasise that this study does not pretend in any way to predict future developments of the selected trends. It is an analysis of the expectations from key experts in the drug field. We, as well as the consulted experts, are well aware of the fact that the basis of our analysis is nothing more and nothing less than the informed guess of experts with different backgrounds, who have been involved in analysing and studying the drugs problem for many years.

## 2 Approach and methodology

As drug policy modelling is not an appropriate method to produce credible results for the likely future of the illicit drugs market and drug policy in the EU, we decided to rely on an approach based on the Delphi method, to make the best use of the only available source of information we had, namely the expertise of those most involved with drug problems and drug

policy. We used a variant of the Delphi method, which has been applied in various fields to forecast future developments of certain phenomena (Linstone and Turoff 2002; Turoff 2002). We presented a series of propositions and questions about future developments of drug use and drug problems in the EU to a selected group of international drug experts. Our primary interest was in the experts' views on a number of elements of the illicit drugs market in the EU.

We chose an approach consisting of the following consecutive steps:

1. Consulting a selected group of EU drug experts about key trends of the illicit drugs market and policy responses in the EU and about their future development
2. Formulating a draft paper summarizing the EU experts' expectations about the development of these key trends
3. Consulting experts from the seven sample Member States on the conclusions in this draft paper
4. Consulting international experts to discuss the findings and conclusions from this consultation and writing the report.

## 2.1 Consulting EU experts about key trends

To prepare this exercise we put together an international group of experts from different EU Member States, the EMCDDA and the European Commission. We also included some experts from outside the EU with a long and well-regarded record of service in analysing the drugs market and drug policy in the EU. To take into account the diversity of viewpoints on drug policy and drugs market trends we focused on experts representing different relevant viewpoints on both demand and supply issues. We selected researchers, policy makers and staff working in the field with an outstanding track record in analysing trends and developments of the illicit drugs market and drug policy in the EU.

We selected 65 experts, assuming that probably around half of them would be prepared to participate. The selection included:

- Researchers/drug policy analysts (42)
- Policy makers (9)
- Representatives from demand reduction services (6)
- Police/justice (4)
- User/'hands-on' expert (2)
- Journalists (2).

The list of experts participating in the three rounds of our consultation of EU drug experts has been included as annex 1.

As the focus of our study was on the analysis of key trends the biggest share of our sample were researchers and analysts studying the drugs market and drug policy in the EU. Their disproportionately high representation in our sample might have resulted in a 'critical' bias towards current drug policy. A critical reflection of drug policy is intrinsic to drug policy research.

The consultation of EU drugs experts consisted of three consecutive rounds of questions about key trends of the illicit drugs market and policy responses and about their future development:

1. The **first round** focused on identifying key trends and phenomena which – according to the consulted experts – could potentially develop into a significant trend. With 'phenomenon' we meant an event or change in the drugs market or drug policy which had been observed recently and which might have the potential to become a trend.
2. In the **second round** we aimed to assess the experts' views on the development of the selected trends and phenomena in the next five years. We also asked them to briefly formulate suggestions for appropriate policy responses to the trends identified.
3. In the **third round** we originally intended to provide a short anonymous summary of the experts' views we had received in the second round and to sum up the arguments they had provided for their judgments and their suggestions for appropriate policy responses. The idea was to ask the experts to consider their earlier answers in light of this summary. Based on the extensive information we received in the first two rounds we decided to limit the third round to the new issues introduced in round 2, i.e. the impact of the economic crisis on the drugs market and on drug policy and the increase of poly substance use. We also added one question on recent divergence tendencies in the EU, e.g. the position of some Member States regarding harm reduction.

### 2.1.1 Round 1

For round 1 we drew up a web-based questionnaire, using LimeSurvey software. The questionnaire consisted of a set of statements and a number of closed and open questions to assess the general view of the experts on the development of trends and phenomena/tendencies in the next five years. For practical reasons we decided to limit the elaborateness of the answers by asking to name the three most important arguments and to formulate the answers in a limited number of words.

We prepared a questionnaire consisting of two parts. In part 1 we presented a preliminary list of drugs market and drug policy trends we had identified in the earlier drugs market study we conducted for the European Commission (Reuter and Trautmann 2009). The questions focused on the experts' view on the significance of these trends and – for the drugs market trends – on their policy relevance. We wanted to know if these trends are expected to play a prominent role in the next five years and pose significant challenges to present and future drug policy making in the EU.

From the global illicit drugs market study (Reuter and Trautmann 2009) we derived the following drugs market trends:

- A relative growth of the market share of illicit 'synthetic' drugs (amphetamine type stimulants, etc.) compared to the market share of 'natural' drugs (heroin, cocaine and cannabis)
- A trend towards bigger scale (for example industrial) production of illicit drugs replacing small scale production
- A growing globalisation of the supply of illicit drugs, i.e. cross-border organisation of production and trafficking in the EU
- A growing diversification of illicit drugs/markets in the EU
- A shift from 'addiction'/disruptive forms of illicit drug use to more integrated forms of use (including regular recreational).

Regarding drug policy trends the same study showed that convergence of drug policy is one overarching trend which can be observed in the EU (and other parts of the world) since the nineties (Reuter and Trautmann 2009). Within this general trend we identified four particular trends which can be seen as examples of the convergence or harmonisation of drug policy in the EU:

- The first is the trend towards **decriminalisation of use of illicit drugs** (and of possession of small quantities for personal use), viewing drug use not as a crime but as an illness. All EU Member States – as well as many other countries – showed a trend towards a more lenient, health-oriented approach to the use of illicit drugs in the past two decades.
- At the same time – as the other side of the medal – one could see another trend: **a tougher, more punitive approach to the production and trafficking of illicit drugs**.
- The third trend, **a wider acceptance and implementation of harm reduction strategies** targeting users of illicit drugs, can be seen in all EU Member States in the past twenty years.
- The fourth trend was a growing interest in **exploring the feasibility of regulation instead of prohibition** in drug control policies. This trend towards a more regulatory approach can be observed in the field of cannabis policy. Examples are the Dutch cannabis policy, but also recent developments in Spain and other EU Member States.

In part 2 of the questionnaire we explored whether according to the consulted experts there were:

- Other relevant trends of the illicit drugs market and policy responses which should be taken into account in our analysis.
- Phenomena which had the potential to develop into a significant trend of the illicit drugs market.

The invitation to participate in the first round of the consultation was sent out to the selected 65 experts by e-mail on 26 February 2012. The deadline for completing the questionnaire was 16 March. Five experts opted out. Thirty-nine filled out the questionnaire. We excluded three of these 39 questionnaires because of their 'rudimentary' state of completion. We included 36 questionnaires in our analysis.

### 2.1.2 Round 2

We used the analysis of the responses from the first round to draw up the questionnaire for the second round. For round 2 we also used a web-based tool using LimeSurvey software. Based on the comments we had received in the first round we modified the formulation of some key trends. The aim of this second round was to assess in more detail the experts' views on the development of the trends selected for the first round. Per trend we presented a summary of the findings and comments from the first round, taking into account the modifications considered important by the respondents. The idea was to give the experts the opportunity to consider their earlier answers in light of this summary. We also asked them to briefly reflect on appropriate policy responses to the selected trends.

Based on responses to the question which drugs market and drug policy trends the experts expected to play an important role in future drug policy making in the EU in the next five years we added two issues to the questionnaire:

- The impact of the economic crisis on the drugs market and on drug policy
- The increase of poly substance use.

As in the questionnaire for round 1 we used a format to limit the extent of detail in the answers to the open questions, e.g. by asking to state only the three most important arguments and to formulate the answers in a limited number of words.

For the second round we invited the 36 experts whose responses to the first round had been included in our analysis. This selection included:

- Policy makers (5)
- Researchers/drug policy analysts (20)
- Representatives from demand reduction services (4)
- Police/justice (4)
- User/'hands-on' expert (2)
- Journalists (1).

The invitations for the second round were sent out on 10 April 2012. The deadline for filling in the questionnaire was 6 May. Twenty-eight experts filled out the second round questionnaire; six of which were not fully completed.<sup>1</sup>

### **2.1.3 Round 3**

The third round was built on the analysis of the responses received in the second round. We originally intended to provide a short anonymous summary of the experts' views we had received in the second round and ask the experts to consider their earlier answers in light of this summary. However, we took from the round 2 responses that this would be asking too much. Round 2 had proved to be a demanding and time consuming exercise for the experts. Moreover, in the round 2 questionnaire we had already presented short summaries of the answers we received in round 1, explicitly asking respondents to take these summaries/shadings into consideration. Therefore we decided to limit the questionnaire for the third round to the new issues introduced in round 2, i.e. the impact of the economic crisis on the drugs market and on drug policy and the increase of poly substance use. We also added one question on recent divergence tendencies in the EU, e.g. the position of some Member States regarding harm reduction.

For the third round we invited the 36 experts whose responses to the first round had been included in our analysis. The invitations for the third round were sent out on 16 May 2012. The deadline for filling out the questionnaire was 8 June. The third round questionnaire was completed by 31 experts.<sup>2</sup>

## **2.2 Draft paper on the expert's expectations**

After this third round we analysed and compiled the responses from the three rounds and put together the findings and conclusions in a draft paper.

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<sup>1</sup> 4 policy makers, 14 researchers/drug policy analysts, 4 representatives from demand reduction services, 4 representatives from police/justice, 2 user/'hands-on' expert.

<sup>2</sup> 4 policy makers, 19 researchers/drug policy analysts, 2 representatives from demand reduction services, 4 representatives from police/justice, 1 user/'hands-on' expert, 1 journalist.

## 2.3 Consultation of experts from the seven sample Member States about draft paper

The conclusions from this draft paper were the basis for consulting experts from the seven sample Member States. In consultation with our project partners from these Member States we selected 5-6 experts from each Member State. We looked for national experts with the same profile as the EU/international experts, i.e. having thorough generalist knowledge on developments and trends in drug use and drug problems, to do justice to the diversity of trends selected. They should be able to cover – in general terms – both the angle of demand and supply and to reflect on current and alternative policy responses. For reasons of 'doability' and because the selected experts had to be familiar with the drug situation in other EU Member States we decided to select only English speaking experts.

The focus of this consultation was whether and to what extent the selected national experts believed that the conclusions regarding the trends presented in the draft paper applied to the situation in their respective Member State. In this round we also asked for arguments underpinning the respondent's opinion. Finally, we asked to briefly formulate suggestions for appropriate policy responses to the trends identified.

For the consultation of experts from the seven sample Member States we sent the draft paper summarising the experts' views from the European rounds and a questionnaire to the selected experts (5 from Bulgaria, 5 from Czech Republic, 6 from Italy, 6 from the Netherlands, 5 from Portugal, 5 from Sweden and 5 from UK). We sent out the documents on different dates in July, requesting a reply before 1 September. We received 5 replies from Bulgaria, 4 from Czech Republic, 5 from Italy, 4 from the Netherlands, 5 from Portugal, 4 from Sweden and 4 from the UK.

## 2.4 Discussion on findings and conclusions in international expert panels

The findings and conclusions from the EU-wide and national expert consultation was used as input for a final consultation of a small group of international experts, consisting of representatives from the core research team and experts from the seven sample Member States. This exercise aimed at:

- *A clarification of different viewpoints in the sample Member States*  
A reflection of the differences between the seven sample Member States was meant to help us better understand and appreciate the findings from the different Member States.
- *Formulating conclusions for a more general picture of trends and developments*  
We expected that reflecting on the findings from the first three Delphi rounds and on the experts' view from the seven sample Member States would allow us to draw cautious conclusions on expected overall trends of the illicit drugs market and policy responses.
- *Formulating recommendations for future policy making*  
This prospective experts' view on the development of trends of the illicit drugs market and policy responses was expected to help us to formulate recommendations anonymously.

## 3 Findings

### 3.1 The growth of the market share of illicit 'synthetic' drugs

**Statement 1: In the next five years the trend of a relative growth of the market share of illicit 'synthetic' drugs compared to the market share of 'natural' illicit drugs will continue in the EU.**

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
6	14	7	7	0	1	0	1

N = 36

The majority of experts agrees (27 of 36); some (7) are not sure.

Based on the comments we received we made some modifications in the second round. Without doubt the market share of natural illicit drugs (cannabis, heroin and cocaine) in the EU is still bigger than the market share of synthetic illicit drugs (amphetamines, ecstasy, etc.). Cannabis is by far the most prevalent illicit drug in the EU. In some countries the market share of natural drugs is still increasing. According to some respondents there are major differences between countries.

However, the majority of experts agrees that – overall – the relative market share of illicit synthetic drugs is on the rise – compared to the market share of 'natural' illicit drugs – and that this trend will continue. Important factors that are mentioned here are that many illicit synthetic drugs are easy and quick to produce (no time-consuming crop growing) and that the production is not geographically bound (as for instance the production of opium and coca is) and easy to relocate. Strict(er) drug control measures are mentioned to be supporting the relocation of production of illicit drugs, closer to the user, to shorten the trafficking lines and thereby reducing the risk of interdiction and seizures. This also makes that the differentiation of countries into illicit drugs "producing" and "consuming" countries becomes more and more irrelevant.

Though the focus of this Delphi exercise is explicitly on illicit drugs, we take from the comments that the development of the markets in new psychoactive substances (many of which are synthetic) and the use of diverted pharmaceuticals need to be taken into account here. The use of diverted pharmaceuticals can in a way be seen as a form of 'illicit' use. The production of new psychoactive substances can be seen as a response to the control/prohibition policy which seems to lead, among others, in some countries to a shortage and/or bad quality of natural drugs. 'Spice', a mixture of herbal products and synthetic cannabinoids is seen as one example of this. It seems to be in particular popular in countries where natural marijuana or hash is not easily available or of poor quality. Finally, these so-called 'legal highs', i.e. the – unregulated or 'uncontrolled' – new psychoactive substances might be the new illicit drugs of the near future.

In the second round we checked again if respondents agreed that – taking into account the added modifications in the formulation – the trend of a relative growth of the market share of illicit 'synthetic' drugs compared to the market share of 'natural' illicit drugs would play a significant role in the next five years (Statement 1). The response was as follows:

Yes	No	Don't know	No answer
21	0	4	3

N =28

One respondent states a change of mind from 'no' to 'yes'.

Again a few experts highlight that according to them one could speak here of an absolute growth, because new synthetics simply seem to substitute illicit synthetic drugs. They are not sure if the market for illicit synthetic drugs would grow enormously, and faster than that of illicit natural substances. They rather expect that the total market for illicit drugs produced within the EU might increase, e.g. hydroponically cultivated cannabis, amphetamines, ecstasy, and new psychoactive substances that are made illegal like mephedrone.

### ***Factors supporting trend***

The most frequently named factors supporting the growth of the market share of illicit synthetic drugs were the following:

- They are relatively easy to produce. They can be produced indoor which is less visible than agricultural outdoor production. The knowledge of chemistry and pharmacology is increasing and easily accessible.
- They are cheap to produce, yielding relatively high profits. The relatively low production costs are partly explained by the relatively low risk of detection. According to one expert the latter also has to do with the fact that supply reduction measures seem to focus more on traditional (natural) illicit drugs.
- The production is easy to relocate, which is an advantage if you want to avoid seizures. The production of synthetics can be sited in many locations. Unlike natural drug cultivation and refinement, synthetics are not tied to geographic regions by agricultural factors (climate). Synthetics production can be much more responsive to market demands all year round, and is defter at avoiding enforcement action.
- The distribution is also seen as relatively easy as can be taken from references to easy availability through internet. Synthetic drugs – also illicit ones according to some respondents – are readily available from internet sites and their purchase does not require traditional 'drug dealers'. Selling/buying through internet is seen as involving fewer risks than through a traditional dealer.
- Synthetic drugs are generally cheap to buy, cheaper than 'natural' drugs; an argument which is seen as important, taking into account the economic situation.
- They are popular among young people in recreational settings. They are seen as fitting well to the life-style and fashion of young people, to their culture (music, dance, party, etc.)

### ***Possible changes***

Several experts refer to the rapidly changing fashions of (synthetic) drugs use. This makes it difficult to predict how trends and how the market will develop. Fashions depend on a multitude of unpredictable factors. These processes are seen as not linear but chaotic.

In this context respondents also refer to a further differentiation of products (new drugs are synthesised and traditional ones modified) and a growing interest in and curiosity for experimenting with new substances. The latter is also associated with a weakening of traditional authority, which is seen as making room for experimentation. The growing diversification of products is understood by many respondents as response to prohibition/drug control measures, reducing the risk for the producer/seller as well as for the buyer (till a new substance is placed under control).

One interesting remark made here is that this development blurs the lines between different markets of (legal) new psychoactive substances, psycho-pharmaceutical/medical drugs and illicit synthetic drugs.

### ***Policy response***

A few respondents plead for improved and more effective law enforcement measures, e.g. precursor controls, interdiction measures and targeting illicit production laboratories. However, the majority of respondents argues in favour of regulatory measures replacing the current prohibitive drug policy. Some plead for a general change of the current drug policy; some see a regulation policy as alternative for the new psychoactive substances.

Several experts propose to develop a regulation regime for the new psychoactive substances, similar to that for medicinal products. This would require new legislation, possibly based on the consumer protection law and aimed at regulating the supply of such substances. Point of departure could be a review of existing regulations governing the production, distribution and trade of pharmaceuticals and of uncontrolled drug precursor chemicals. Better management, storage and reporting protocols for the supply of medicines (human and veterinary) using existing legislative instruments may assist in identifying illicit transactions and allowing a more effective response.

According to respondents an innovative drug policy should include the following elements:

- More effective control of the production, and distribution and trade of pharmaceutical/chemical active components
- Quality control of licit and illicit substances
- Regular monitoring of the market and market trends and analyses of health consequences and risks of new licit and illicit substances to have a comprehensive picture of what is being sold and used on the illicit market
- Early warning system, providing quickly objective information on effects and risks to consumers and possible consumers
- Development of appropriate information, prevention, harm reduction and treatment responses. Involvement of young people/users organisations is seen as important to collect and disseminate information.

Some of these elements are already – at least partly – applied in some of the sample Members States, e.g. monitoring of the (illicit) drugs market, implementing an early warning system and of course information, prevention, harm reduction and treatment. Several respondents emphasise that under the current drug policy adequate safety standards for a black market are required; otherwise

*“there are no guarantees as to the content and strength of any illicit drug traded. To reach an objective view of precisely what is being sold to users, it is necessary to invest in a comprehensive and coordinated forensic analysis of all synthetic drugs seized or otherwise obtained from the illicit market. This will provide the information on which to base accurate safety warnings, and target scarce enforcement resources to most effect.”*

There are no new suggestions regarding the improvement of information, prevention, harm reduction and treatment programmes. Regarding prevention the emphasis is on realistic and factual drug education (also covering legal substances and diverted pharmaceuticals) and targeting/involving parents. Some respondents also underline the connection between information, prevention and harm reduction.

Harm reduction should not only target drug users (experimenting, recreational and problem users), but should also include general drug education/information about risks related to drug use. Monitoring and testing of (synthetic) drugs should also become standard, among others in the party scene and at known high-consumption events. One respondent underlines the importance of influencing/developing social norms to give guidance to people to be aware of the risks of taking unknown and untested drugs in unknown quantities and how to deal with these drugs.

Regarding treatment it is emphasised that the focus should not just be on addiction, but also on problem use of stimulants and synthetic drugs.

### **Findings from consultation of experts from the seven sample Member States**

The consultation of national experts confirms the picture we got from the consultation of EU drug experts. Twenty-two (of 30) national experts agree that the trend of a relative growth of the market share of illicit synthetic drugs compared to the market share of natural illicit drugs will play a significant role in their country (5 disagree and 3 don't know).

The arguments brought forward by the respondents are the same as those in the EU round: synthetic drugs are cheap and easy to produce and transport; production is easier to hide from interception; internet is supporting this trend; experimenting with/using synthetic drugs is popular among young people in recreational settings, etc.

Some experts (from Bulgaria, the Netherlands, Portugal and Sweden) also emphasise that the market of natural drugs is still substantial and even growing. Experts from Czech Republic and from Sweden underline that the increase of the market share of synthetic substances in their country has to be seen in the light of a traditional popularity of (illicit) synthetic drugs in these two countries. Some respondents also stress that it is not only or even not so much the illicit synthetic drugs that contribute to this trend, but also licit, 'not yet controlled' psychoactive substances and diverted pharmaceuticals.

## **3.2 The increasing scale of illicit drugs production**

**Statement 2: In the next five years the trend towards bigger scale (for example industrial) production of illicit drugs replacing small scale production will continue.**

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
1	9	11	12	1	1	0	1

N = 36

Again, the majority agrees (21 of 36), although one third (12) is not sure.

Experts point at the analogy of the illicit drugs market with any other (expanding) market: growth, scaling up is seen as a general economic law.

Different experts point out that there might be major discrepancies between different drugs and different EU Member States/regions. Some also indicate that (besides scaling up, industrial production) in some Member States/regions increases can be seen in small scale production for the local market of among others cannabis but also ATS in 'kitchen' laboratories.

Other experts put forward that bigger scale production covers besides industrial production also joint small scale production, i.e. different small scale facilities (at different locations) in one hand. Smaller production facilities are more difficult to detect than big ones. Belgium is mentioned as one example of this trend: professional growers seem to want to spread the risk (and impact) of detection by downsizing their plantations.

In the second round we checked again if respondents agreed that the trend towards bigger scale (for example industrial) production of illicit drugs replacing small scale production will continue to play a significant role in the next five years (Statement 2). The response was as follows:

Yes	No	Don't know	No answer
10	4	11	3

N =28

One respondent states a change of mind from 'yes' to 'no'.

Some experts again point out that small scale production of for instance cannabis might still play a substantial role. One respondent emphasises that there are in fact no accurate data on the share of the market of "hobbyists" and "small scale growers" compared to professional or large scale growers, but it seems the market share of small scale growers is usually underestimated. In different EU Member States home growing of cannabis is still quite popular. This is reported for among others Belgium, the Czech Republic, Germany, the Netherlands and the UK. Most empirical studies focus on professional or large scale cannabis growers. They often use police data to study the phenomenon. This may very well lead to a serious underestimation of small scale production, both in terms of numbers of growers and in terms of total cannabis production.

The same argument may be valid for estimating the size of production of other drugs, such as cocaine and heroin (often not produced in Europe, but in 'traditional producing nations').

*"The larger the production facility, the higher the risk of detection, and the higher chances of being incorporated in official statistics on supply indicators."*

Other experts point once more at the option of small scale production (home growing and kitchen labs) organised as a network in hands of a larger scale criminal organisation to spread the risk of being caught. This might be especially true for cannabis growing in Europe, because of the increased focus of police forces on cannabis production. This works as a driving force behind professionalization, leading to bigger organisations which have their production spread over several locations. The same might be true for ATS production. One expert states that this trend might not apply to all illicit drugs, by this referring to the production of cocaine and heroin. However, reference is made by others to examples of several production sites (coca or opium farms) under control of one organisation.

One respondent states that both large scale production and small scale production might increase, serving different parts of the market.

*"Depending on law enforcement interdiction, the market may restructure itself. Small scale, 'amateur' and independent cultivation and production may be targeted more intensively and be dismantled. The illicit market may respond with an organised diversified strategy: Smaller scale sites for the cultivation of cannabis or production of ATS but in higher numbers in countries where enforcement is intensive, while larger cultivation or production sites may emerge in more remote areas."*

### **Factors supporting trend**

Several experts state that the general laws of the market and therefore the interests of the producers and traders make that the trend towards bigger scale (for example industrial) production will continue. This includes the phenomenon of different small scale production sites in hands of one 'firm'. The current supply reduction measures are mentioned as encouraging this development. Criminal organisations act as legal multinational organisations having an interest in the expansion of the market, in globalisation. Bigger scale production, distribution and trade help to reduce costs and prices. The latter helps to improve the competitive position.

Other factors brought forward were the following:

- The economic crisis reducing the spending power of the users. Bulk production tends to be cheaper than small scale production.
- For natural drugs improved agricultural technology plays a role. It requires higher starting capital ('seed money') – which only bigger scale producers can afford – resulting in higher yields and – in the end – lower prices.
- Due to a growing demand the market is increasing. A bigger market size requires bigger production capacities. Also population growth is mentioned as factor here. According to a few experts the increased demand is corresponding with the economic crisis and – on the other hand – with the consume oriented lifestyle in current times.

### **Possible changes**

Several respondents expect that production will be taken over step by step by syndicates. For the most popular drugs smaller producers will be bought up or wiped out. But there may be some room for niche producers for certain, not so popular, drugs.

Different respondents point here at some unintended consequences:

- Larger producers will use some of their profits to reduce risks, leading to an increase of corruption.
- Larger scale, industrialised production requires specific know-how. The latter might be worth good money, e.g. the know-how how to produce synthetic drugs.

### **Policy responses**

A few experts propose legal changes allowing for more effective enforcement measures against corruption and fighting international organised crime, prioritising industrial production (e.g. law enforcement measures against money-laundering) and improving the control on hardware chemicals and basic materials. However, the majority emphasises the need for reconsidering prohibition. Decriminalisation, regulation through among others regulatory agencies and a well controlled licensing system and taxation are frequently mentioned priorities.

While quite a number of respondents see small scale production as the favourable option for the future, one respondent points out that in case one chooses for decriminalisation/regulation of production it is easier to regulate a small number of big producers than a big number of small producers.

### **Findings from the consultation of experts from the seven sample Member States**

For this trend the statements provided by the national experts differ substantially from the views of the EU drug experts. Seventeen (of 31) respondents do not expect that the trend towards bigger scale (for example industrial) production of illicit drugs replacing small scale production will play a significant role in their country in the next five years. Nine respondents state that they don't know, while only five see this trend as important in their country.

The fact that two of the latter five are from the Netherlands seems to reflect the fact that big scale drug production (cannabis growing and XTC production) has been reported for the Netherlands. For the three Member States with only negative (and one or two neutral) responses (Bulgaria, Portugal and Sweden) only small scale production of cannabis and synthetic drugs has been reported. Experts from the Czech Republic, the Netherlands and the UK emphasise that small scale production carries less risk of detection than large scale production.

## **3.3 The growing globalisation of illicit drugs supply**

**Statement 3: In the next five years the trend of growing globalisation of the supply of illicit drugs, i.e. cross-border organisation of production and trafficking in the EU will continue**

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
6	18	7	3	1	0	0	1

N = 36

The majority (31) agrees; a few (3) are not sure.

With this trend experts point again at the analogy of the illicit drugs market with legal markets. Globalisation is a phenomenon observed both in licit and illicit markets. Reference is made to the rule of free movement of people, goods and services within the EU and the Schengen Convention from 1990 (which initiated the abolition of border controls between Member States joining the Schengen area) fuelling this evolution, both on licit and illicit markets.

Some respondents also mention that the phenomenon of cross border organisation and trafficking of illicit drugs is nothing new but can be observed in the EU for the last four decades. It is seen as an intrinsic feature of the illicit drugs market. In this cross-border business also historic trade links – serving as virtual infrastructure – play a role in shaping the organisation and infrastructure of the drugs market. The transshipment of cocaine from Latin America through former Portuguese colonies in West-Africa to Portugal or through the Dutch Caribbean islands to the Netherlands can be taken as examples for this.

Furthermore, one expert underlines that the trend of globalisation might be more correctly described as global spread of production, trafficking and use of illicit drugs over more countries/regions. This includes local/regional production for local/regional markets and at the same time cross-border trafficking. One example for the latter is the growing of cannabis in Belgium by Dutch growers for the Dutch market, due to stricter supply reduction measures in the Netherlands. As already mentioned under statement 1 (see 3.1) strict(er) drug supply reduction measures are also seen as supporting the relocation of production of illicit drugs, closer to the user, to shorten the trafficking lines and thereby reducing the risk of seizures. The abolition of internal borders in the Schengen area is seen as facilitating cross-border drugs-business as is shown by the Belgium-Dutch example. This development also supports the earlier mentioned trend of blurring the differentiation between illicit drugs 'producing' and 'consuming' countries.

For certain drugs (heroin and cocaine) the changes regarding production are seen as rather small, whereas the changes regarding trafficking are significant and underline the importance of the globalisation trend, e.g. changes in the cocaine route to the EU (among others shifting from Northern Europe to Southern Europe via West Africa).

Some experts also mention the growing importance of internet in the global, cross-border drugs business facilitating cross-border distribution.

In the second round we checked again if respondents agreed that the trend of growing globalisation of the supply of illicit drugs, i.e. cross-border organisation of production and trafficking in the EU would play a significant role in the next five years (Statement 3). The response was as follows:

Yes	No	Don't know	No answer
21	0	2	5

N =28.

One respondent states a change of mind from 'no' to 'yes'.

### **Factors supporting trend**

Globalisation and increase in scale are two closely linked trends of the illicit drugs market as can be taken from the expert responses we received. Both are seen as general features of economy, as market regularities (economic patterns). Expansion is seen as a driving force of both the legal and the illegal market. Respondents state that the integration of the EU, international trade treaties imposed by industrial countries, the influence of multinational companies, the liberalisation and deregulation of markets contribute to globalisation in general and therefore also in the drugs field. Open borders, free movement of goods and people are again mentioned as important supporting factors, creating economic dynamism. An effective, watertight control of international transport into and – in particular – of cross-border transport inside the EU is impossible:

*"It's easy for criminal organisations but also for one-shot mules to move drugs around countries."*

The responses show that globalisation and increase in scale have more supporting factors in common, among others:

- Industrialisation of the production.
- High profit potential against relatively small investment. Again this applies in particular to the production of synthetic drugs which can be produced almost everywhere.
- Growing competition, involving the need to reduce the costs (to maximise profits). "This means financing, getting raw materials, manufacturing and transporting at the best price." This supports relocation of production and trafficking to places with fewer risks and therefore less costs. Transnational organised crime groups can swiftly adapt to law enforcement measures.

- One respondent underlines the role of weak countries (in and outside the EU) with corruption and organised crime “mixed in local oligarchic economic system”. In this context respondents also point at the importance of shortening trafficking routes by (re)locating the production of mainly synthetic drugs and cannabis closer to the user.
- The increase of demand, the fact that drug use is fashionable and fitting in youth culture. Respondents also refer to growing markets for illicit drugs in emerging economies, opening new markets.

Some respondents highlight the importance of the improvement of transport infrastructure, information technology and professionalization for the globalisation of the illicit drugs market. It

*“will facilitate the trade in illicit drugs as it will any other trade in commodities. Ironically as roads are built or improved in certain countries with international aid to allow for the expansion of legitimate trade and alternative crops, the transport of illicit crops will be assisted. The revolution in communications technology has augmented the global trading in licit and illicit goods alike.”*

One respondent provides a statement describing what key elements of the complex globalisation are according to him:

*“The structure of the major organised crime groups involved in the illicit drugs trade had developed into ‘modular’ organisations. Cells or modules specialised in aspects of the business such as transport, money laundering, security, etc. Many of these cells are semi-independent operating with several suppliers at a time. The improvement in communications and transport allows for a crime group to be spread across several countries to their best advantage. Heads of crime organisations were often located in ‘benign’ environments (friendly governments, failed states etc.). The move to trading on the internet may well see the demise of some of these specialists, and indeed mid-level dealers, as the electronic route from supply to user is much shorter and more efficient. The internet will allow producers in far off locations to sell direct to Western Markets.”*

### **Possible changes**

Most of the changes envisaged by the consulted experts are in fact a – sometimes intensified – continuation of the developments already described. Respondents expect:

- A growing scale of supplier organisations
- A further global spread of production
- More corruption as big suppliers will take measures to reduce risks
- Production moving to lower risk/lower cost areas and where possible closer to the demand.

### **Policy responses**

The proposed policy responses are similar to the ones suggested for tackling the growing scale of production of illicit drugs. A small number of experts suggest improved drug supply reduction measures, among others well-targeted measures against money laundering and investments in legal economy, improved international cooperation and intelligence sharing (in and beyond the EU) and developing more information technology based responses.

One respondent provides a rather detailed proposal:

*“1. Consider a fundamental review of current anti-drug strategy. Success should be measured in terms of a reduction in the user population and a reduction in the profitability of the illicit market. Simple enforcement measures alone (arrests, seizures, etc.) are not sufficient to impact on the problem. Better collection, coordination and sharing of information about the criminal trade and its impact on citizens needs to be managed at EC level. Alternative interventions need to be developed that are more effective and efficient with public resources. The financial aspect to the criminal trade should be given greater attention. The identification of key suppliers and greater collaboration with countries blighted with key components of the drugs trade. The involvement of the private sector in areas where the criminal trade rely on business infrastructure needs to be encouraged.*

*2. Political dialogue between countries with a shared problem, and international trade discussions should reflect concerns about the global drugs trade and foster a shared responsibility to make legitimate trade facilities out of reach of coercion, corruption and subterfuge by criminal groups.*

*3. Consider how a strategy to reduce drugs trafficking can be applied to the increasing trade on the internet. Issues to be considered include jurisdiction of offences committed, criminal anonymity, electronic and digital money laundering, and the balance between the confidentiality of honest citizens communications and the need for the authorities to investigate or prevent criminal acts committed online.”*

Again, the proposals of the majority of respondents point in the direction of decriminalisation and regulation (regulatory agencies, licensing system, taxation, etc.), monitoring and research of the drugs market and improved demand reduction measures (prevention, harm reduction and treatment).

### ***Findings from the consultation of experts from the seven sample Member States***

The majority of national experts expect that the trend of a growing globalisation of the supply of illicit drugs, i.e. cross-border organisation of production and trafficking will play a significant role in the coming years. Twenty-six of them think this will be the case in their country, while four don't know and one disagrees.

Again, the arguments are the same as mentioned in the consultation of EU drug experts. Experts understand globalisation as a general feature of our economy; they point at the open borders in the EU, etc. Experts from Bulgaria, Italy, the Netherlands and Portugal underline the role of their country for transshipment of drugs. Experts from Sweden refer to drugs import into their country and experts from Italy draw attention to the importance of organised crime (Mafia, Camorra and 'Ndrangheta) in their country regarding the cross-border organisation of drug trafficking.

## **3.4 The growing diversification of the illicit drugs market**

**Statement 4: In the next five years the trend of growing diversification of illicit drugs/markets in the EU will continue**

The response in the first Delphi round to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
5	13	10	8	0	0	0	0

N = 36

The majority (28) agrees; some (8) are not sure.

Respondents emphasise that many countries already face a rather diversified drugs market. They stress that diversification does not mean an explosive trend nor a growing extent of drug use. New substances seem to replace others. Diversification covers a wide spectrum of phenomena from variations of traditional drugs (cannabis, ATS) to fast changes and relatively short hypes of new synthetic substances which are named as the most important factor shaping this trend.

Experts point out that drug policies based on prohibition fuel the search for 'new' drugs. Both producers and consumers will always show some interest in discovering 'new' drugs that fall outside the scope of the drug law in order to avoid the risk of prosecution. As already mentioned, the – not yet banned – new psychoactive substances might be illicit drugs in the near future (see 3.1). Also the user dissatisfaction with the poor quality of 'traditional' illicit drugs together with the visibility and accessibility online to alternative 'highs' are mentioned as factors driving the market to a more diverse and responsive operating model.

Some experts refer to trends in other areas of society. Diversification seems to be part of a broader socio-cultural trend as can be seen in youth culture, fashion, music and lifestyle.

In the second round we checked again if respondents agreed that the trend of growing diversification of illicit drugs/markets in the EU will play a significant role in the next five years (Statement 4). The response was as follows:

Yes	No	Don't know	No answer
18	0	5	5

N =28

### ***Factors supporting trend***

The growing diversification of the illicit drugs markets in the EU is also linked with increase in scale and globalisation. The factors supporting these trends are therefore for an important part the same:

- Like globalisation and increase in scale, diversification is seen as a general feature of economy, a characteristic of the legal as well as the illegal market.
- Advanced pharmacological and technological knowledge.
- Economic factors like the open EU market, the interest of producers and traffickers to expand their markets towards new groups of possible users and to find cheaper options. This is also seen as a consequence of the economic downturn, which makes users look for cheaper (substitute) substances, e.g. replacing the 'prestigious' and expensive cocaine by cheaper amphetamine.
- Besides economic motives, changes in life-style and culture are also drivers for producing new drugs. Culture is seen nowadays as more dynamic and prone to changes. Again globalisation plays a role here, introducing cultural influences from all over the world. People look for new drugs, for new experiences. Certain substances might be seen as old-fashioned like for instance heroin. Respondents point out that substance use plays an increasingly important role in lifestyle, with blurring borders between licit and illicit substances, including pharmaceuticals and performance enhancers. Internet is seen by some respondents as important ingredient in this development. The 'digital generation' has gained access to an immense online choice to a wide variety of consumer goods. Buying licit and – as stated by a few respondents – illicit drugs online is merely one element of this culture.

Quite a few respondents point at the role supply reduction measures play in the diversification of the drugs markets. Legal pressure on the traditional drugs market by intensified control efforts are seen as inducing the search for less risky alternatives, both by producers and users. Besides enforcement efforts also limited availability of certain drugs – which in some cases might be explained as a consequence of enforcement measures – is seen as contributing to the search for substitute drugs. The heroin 'drought' in some EU Member States in recent years is an example often mentioned.

### **Changes**

The responses we received here show a very diverse picture. Several experts refer to trends already discussed, like the shift from natural to synthetic products. Others point at shifts between types of drugs, e.g. a shift from depressant substances to stimulants or hallucinogens.

### **Policy responses**

The policy responses proposed by the experts are again similar to the responses mentioned for globalisation and increase of scale of production. Experts plead among others for regulation instead of prohibition, for monitoring and research and improved, more effective demand reduction programmes:

*"Once more: Drug policy has commonly little impact on the drugs market and drug use. A sensible option would be to make substances legally available - to get organised crime and big industrial interests out of the market - to have prices that make illicit production pointless, to guarantee good quality, to inform about risks objectively and not horror based and to guarantee that there is no marketing for the substances at all."*

*"In the next five years, a genuine debate about half a century of illicit drug policy should be organised, based on scientific evidence and taking a holistic and global perspective. The current situation regarding illicit drug control is increasingly non-sustainable, on the one hand because of unacceptable 'collateral damage' of the policy, and on the other the non-sustainability of the impacts of a large drug economy on the stability and rule of law in developing countries, e.g. in Latin America."*

### **Findings from the consultation of experts from the seven sample Member States**

According to most of the consulted experts the trend of a growing diversification of illicit drugs / markets in the EU is expected to play a significant role in the seven countries. Twenty (of 29) anticipate that this will be the case, while only two disagree. Seven state that they don't know.

And with this trend also the national experts bring forward the same explanations as the EU experts: diversification is seen as a general feature of economy; the search for new licit alternatives for illicit drugs and the internet as drugs market place are expected to give a boost to diversification; lifestyle makes young people look for new experiences; poly substance use is related to this; etc. The search for licit replacements shows again that diversification is not limited to illicit drugs. Some experts emphasise that diversification does not necessarily mean an increase of drug use. However, there is also mention that some drug users are rather conservative regarding their preferences and habits.

## **3.5 The shift from disruptive forms of use of illicit drugs to more integrated forms of use**

**Statement 5: In the next five years the shift from 'addiction'/disruptive forms of use of illicit drugs to more integrated forms of use (including regular recreational) will continue. Do you agree with this statement?**

In the first round we received the following response to the question 'Do you agree with this statement?':

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
5	11	6	8	2	2	0	2

N = 36

The majority of respondents (22) agrees; some (8) are not sure, 4 disagree and 2 state that they were not familiar with this trend.

However, taking into account the comments made by the experts, the support for this statement is clearly less convincing than that for the first four statements. The most important point made by various respondents – surprisingly enough also by respondents who agreed with the statement in the first question – is that they do not see a change toward less disruptive/ more integrated forms of drug use. According to some experts disruptive forms of use might be simply less visible or less perceived than for, instance, the open street scenes of heroin users in the eighties and nineties. Others point at an increase of more disruptive forms of drug use, in particular of poly substance use including the combination of illegal and legal substances, mainly alcohol.

Taking into account the high level of disagreement emerging from the comments we concluded that the reality is much more complex than can be presented in one clear general trend. We therefore decided to drop the trend presented in statement 5 in the following rounds.

## **3.6 The trend towards decriminalisation of use of illicit drugs**

**Statement 6: In the next five years the trend towards decriminalisation of use of illicit drugs (and possession of small quantities for personal use) will continue in the EU**

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
5	6	9	10	4	1	0	1

N = 36

The majority (20) agrees, nearly one third (10) is not sure, 5 disagree.

The majority of the experts think that this trend will continue in the EU, though there are some countries where the trend seems to be in reverse. The trend might be encouraged by the economic crisis, as decriminalisation could be a means to reduce costs. Criminal justice responses to possession and use are rather costly. However, according to some respondents policy makers might also oppose decriminalisation, because this could lead to an increase of treatment costs. After all, decriminalisation of drug users often goes hand in hand with replacing punitive sanctions by treatment. Changing the paradigm of drug use from crime to illness seems to create an obligation. Finally, several experts expect that the rising conservatism in European social policy will work against this trend.

There are diverging opinions whether the trend is an effective policy response.

In the second round we checked again if respondents agreed that the trend towards decriminalisation of use of illicit drugs (and possession of small quantities for personal use) will play a significant role in the next five years (Statement 6). The response was as follows:

Yes	No	Don't know	No answer
10	3	10	5

N= 28.

One respondent states a change of mind from 'no' to 'yes'.

A few respondents have their doubts if this trend applies to all illicit drugs. One respondent explicitly states that it will probably only apply to cannabis. Main reasons for this are the widespread use of cannabis and the decreasing public support for tough sanctions on the use of 'soft' drugs.

Respondents name as key problems addressed by decriminalisation of use and possession of small quantities of illicit drugs:

- The inconsistency of the policies towards licit and illicit drugs
- The unreasonableness of criminal proceedings as response to the use of illicit drugs
- A possibility for rehabilitation of 'problem' drug users
- A reduction of costs especially for the legal system and
- The possibility to increase resources for demand reduction (prevention and treatment).

### **Factors supporting/opposing trend**

Several respondents point at the evidence in favour of decriminalisation based on prevalence and incidence of drug use in the young population. Decriminalisation did not result in higher prevalence and incidence rates.

According to respondents there is more and more doubt about the usefulness and effectiveness of a policy based on prohibition and law enforcement. A few experts point at the growing recognition that many illicit substances are not exceptionally harmful (and in any case clearly less harmful than the widely used licit substances alcohol and tobacco). Still, harmfulness is used as argument for prohibiting certain drugs. Experts also underline that the prohibitionist policy has not proven effective (measured against its objectives) in controlling the market and reducing supply. Several experts think that it will be impossible to effectively 'control' the drugs market, taking into account its growing extent and diversification.

In particular law enforcement measures targeting drug users are seen as ineffective and useless. Experts also point out that the economic crisis might support the trend towards decriminalisation. Mention is made that with reduced budgets the police has other priorities than focusing on drug users. Several respondents state that the costs of prohibition are excessive and refer to a growing unwillingness to spend money on this. Besides economic costs experts also underline that a prohibitive policy involves high social costs (among others caused by marginalisation, etc.). These are seen as unintended negative consequences or collateral damage of prohibition.

However, as mentioned above, the economic crisis might also work against decriminalisation as it could lead to higher treatment demand and thus higher treatment costs.

### **Adaptations**

The answers to the question which adaptations or suggestions could make the policy more appropriate/effective were very diverse. Several experts state the need of a consistent policy in the EU allowing for local adaptations. One expert also points out that some alternatives for criminalisation are "*strange, expensive, ineffective, too*". One example are the diversion

schemes, offering treatment instead of imprisonment. *"In some case this overshoots the mark: treatment should only be offered to users who need and ask for it."*

Other experts point out that decriminalising drug use without regulating or tolerating the supply side (production and retail) is neither logical nor advisable. The illicit drugs supply and its disruptive effects remain unchanged. Cannabis clubs or similar structures could be an answer to this. Decriminalisation should be accompanied by an increased investment in prevention, treatment, and harm reduction and reintegration measures.

### **Findings from the consultation of experts from the seven sample Member States**

A majority of the consulted experts (nineteen of thirty) does not expect that decriminalisation of use of illicit drugs (and possession of small quantities for personal use) will play a significant role in their country in the next five years. Six agree and five state that they don't know.

However, there are different reasons for this expectation. In Bulgaria, Italy and Sweden decriminalisation is seen as not fitting in the political context or 'mood'. One Bulgarian and one Italian expert state however that there is growing support for decriminalisation in their country. This support is bottom-up rather than on political and policy making level. Economic motives (decriminalisation is seen as reducing supply reduction costs) are also seen as important here. These two points are also mentioned by the UK experts, though their opinions are rather divergent. Two argue that there is *"little political appetite and there is no political benefit to be gained at the moment"*. One refers to increasing support from the media and to feelings of frustration that current drug policies do not work. The other one sees both arguments, but is not sure which direction things will take. The majority of the consulted experts from Czech Republic, the Netherlands and Portugal expect that there will be not much change in the coming years as decriminalisation is put into practice in all three countries.

## **3.7 The trend of a tougher approach to the supply of illicit drugs**

**Statement 7: In the next five years the trend of a tougher, more punitive approach to the production and trafficking of illicit drugs will continue in the EU.**

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
4	9	9	11	1	1	0	1

N = 36

The majority (22) agrees; some (11) are not sure.

There is rather broad agreement that a tougher, more punitive approach to the production and trafficking of illicit drugs is a key element of current drug policy in the EU. One expert states that there seems to be a clear consensus on this among law enforcement officials and governments, in particular emphasising the focus on organised crime.

According to some experts, a tougher approach on producers and sellers fits both the general conservative mood and a more tolerant attitude towards users. Other experts emphasise that getting tough is very expensive which might help to turn this trend supported by the economic crisis. Some respondents think this approach is counterproductive in combination with the decriminalisation of drug use and possession of small quantities for personal use.

In the second round we checked again if respondents agreed that the trend towards a tougher, more punitive approach of drug supply will play a significant role in the next five years (Statement 7). The response was as follows:

Yes	No	Don't know	No answer
8	6	9	5

N = 28

One respondent states a change of mind from 'yes' to 'no'.

While for the drugs market trends and the first drug policy trend (growing decriminalisation) the responses to the opening question in round 1 and round 2 were more or less consistent, for the trend towards a tougher, more punitive approach of drug supply the response in round 2 is clearly less positive than in round 1. Whereas in the first round only two out of 36 respondents disagreed (see above), in the second round 6 out of 28 disagree. Interestingly enough only one states a change of opinion when explicitly asked if he/she has changed his/her mind since the first round. One explanation might be the different phrasing: In the first questionnaire we asked "In the next five years, the trend of ... will continue in the EU. Do you agree with this statement?" In the second round we asked more explicitly: "Do you agree that this trend will play a significant role in the next five years?" Overall, the agreement with this trend is clearly lower than with other trends.

According to respondents a tougher approach of drugs supply has to be seen as an attempt to get control of the market, though the majority doubts the effectiveness of this approach. Drug policy is more and more perceived as having the task to assure public safety.

### **Factors supporting/opposing trend**

One respondent saw the tougher approach as necessary to deal more effectively with the cocaine trafficking invasion into Europe and the international criminal syndicate structures. According to this respondent prohibition has been successful, taking into consideration *"that only 3% of the world population is taking illicit drugs"*.

Most respondents who agree that this trend is becoming more prominent, state that there are mainly political factors supporting this. The trend seems to match with the current political agenda. It is seen as a political quick win for many politicians to be humane for users, which are presented as victims and tough on those involved in production and trafficking, that are seen as evil. The general public calls for tougher measures.

Getting tougher on producers and dealers also corresponds well with the growing political conservatism and the general trend of more punitive approaches to all kinds of socially undesirable behaviour, which can be seen in many EU Member States. Respondents also point to a stronger emphasis on security by national governments and at EU level. Finally, also economic factors are seen as important. One respondent expects that there will be fewer funds available for crime prevention and social development.

Most respondents doubt the effectiveness of a tougher approach towards drug supply. They consider the war on drugs to be a failure – measured against its objectives. A tougher approach might be counterproductive, as it fuels illicit economies and a higher level of organisation of criminal organisations, thus encouraging violence and making any control on potency and quality of substances impossible. Additionally, the emergence of a variety of new substances may be a consequence of this trend. *"The punitive approach is difficult to combine with the decriminalisation approach, in particular if some points of sale and small scale production/cultivation are not regulated."*

The economic crisis is also mentioned as an opposing factor. A tougher approach requires additional resources, which might be difficult to find in the current economic crisis.

### **Adaptations**

Various suggestions were made among others to consider proportionality in all criminal justice responses and to better evaluate the (cost-) effectiveness law enforcement measures:

*"Rather than just trying harder and being more punitive in the hope that production and trafficking will reduce it may be more appropriate to target types of activity that are seen as particularly harmful. For example, having harsher punishments for people producing/trafficking high THC cannabis and less for low strength. Targeting people using children in their activities."*

### **Findings from the consultation of experts from the seven sample Member States**

Regarding the trend of a tougher, more punitive approach to the production and trafficking of illicit drugs the views of the national experts are mixed. Nearly half of the respondents, (14 of 30) endorse the view that this trend will play a significant role in their country in the next five years. 10 do not and 6 don't know.

It is interesting that quite a number of experts (ten of thirty) who agreed that in their country a trend towards a tougher approach to drug supply can be observed, state at the same time that decriminalisation of use of illicit drugs will not play a significant role. Four experts mention the opposite.

Again, the background underlying the expectations differs. Bulgarian experts refer to a growing drug supply problem and to adhering to EU regulations and guidelines. The majority of experts from the Netherlands, Portugal and the UK point at the growing conservatism in their country. The four Swedish experts underline that Swedish policy targeting drug supply has always been very tough. Two state that it can hardly get tougher and one reports a trend towards a less harsh approach. The views of the Czech and Italian experts are very diverse and do not alter the general picture.

### 3.8 The trend of a wider acceptance of harm reduction

**Statement 8: In the next five years the trend of a wider acceptance and implementation of harm reduction strategies in the EU targeting users of illicit drugs will continue**

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
4	11	9	9	1	1	0	1

N = 36

The majority (24) agrees; some (9) are not sure.

Many respondents state that harm reduction has been generally accepted (in particular for heroin users) as it is understood to be successful and relatively cost-effective. The trend, however, seems to have had its peak and might get less important due to the economic crisis and rising conservative social policy. Factors contributing to this are according to some experts the decreasing number of (injecting) heroin users in many countries and the declining importance of the AIDS challenge in the drug policy debate. The heroin and AIDS epidemic were prominent facilitators for the broad acceptance of harm reduction. Most harm reduction measures targeted heroin users. Nowadays other drugs and other forms of use play a more important role for which the usefulness and importance of harm reduction is less evident and less accepted. Harm reduction strategies addressing health risks related to other drugs than heroine, such as drug testing, are still much disputed.

Again, the economic crisis and the growing conservatism are seen as barriers for an ongoing investment in harm reduction programmes.

In the second round we checked again if respondents agreed that the trend of a wider acceptance and implementation of harm reduction strategies in the EU targeting users of illicit drugs will play a significant role in the next 5 years (Statement 1). The response was as follows:

Yes	No	Don't know	No answer
13	2	6	7

N = 28

Respondents expect that the trend of a wider acceptance and implementation of harm reduction will continue. According to respondents harm reduction helps to:

- Prevent the most severe health and social consequences of drug use (infectious diseases like HIV and Hepatitis, overdose, social exclusion)
- Protect public health
- Increase the reach of demand reduction programmes, reaching active users, who are not seeking treatment and remain 'hidden' for most of other health and social services
- Reduce drug-related crime
- Increase public security.

#### ***Factors supporting/opposing trend***

Experts emphasise that harm reduction has become clearly less controversial. They see the general acceptance of harm reduction and wide implementation as a solid basis for further implementation. Harm reduction has become politically accepted (at national level, but also by international organisations). Other supporting factors mentioned are proven efficacy

(“power of evidence”), cost-effectiveness, but also the fact that “there are simply no effective alternatives”. Prohibition is seen as very expensive, not effective (measured against its objectives) and causing substantial collateral damage (unintended consequences). One expert holds the view that the fact that illicit drug policy is no longer so high on the national and international political agenda helps to choose for a more pragmatic and evidence based approach.

Harm reduction measures are seen as not only effective in reducing health problems of drug users but also in ‘decriminalising drug users’ and reducing public order problems.

Despite the broad support of harm reduction in the EU, some respondents still think that things could easily change: *“I see no problem for populist politicians to convince the population majority that a strict abstinence oriented approach is superior. I don't hope so but politics is commonly not rational and/or humane.”* Another respondent points at the UK, where there is some criticism of harm reduction, in particular of OST as being defeatist, and a reevaluation of recovery as the way to deal with problem use/addiction. The earlier mentioned political conservatism and again budget cuts due to the economic crisis are expected to contribute to this criticism. However, a small number of respondents expect that in the end harm reduction and recovery/drug-free treatment will be taken as two options in one demand reduction approach.

### **Adaptations**

Respondents came up with various suggestions for adaptations, too diverse to draw any commonly shared conclusions. Some present ideas for specific interventions, among others specialised programmes targeting young drug users and women, interventions geared to problems linked to new substances, e.g. pill testing and ‘overdose prevention’ in the field of the growing synthetics use. Others propose broader adaptations, modifying the general approach or the framework in which harm reduction is implemented.

### **Findings from the consultation of experts from the seven sample Member States**

Half of the national experts (fifteen of thirty) expect that the trend of a wider acceptance and implementation of harm reduction strategies in the EU targeting users of illicit drugs will play a significant role in their country in the next five years. Twelve don't think so and three don't know. Yet again the reasons for choosing one of these options differ.

Just as in the EU round the main arguments that harm reduction might not play an important role in the next years are lack of or decrease in political interest, austerity budgets due to the economic crisis and doubts about the effectiveness or usefulness of harm reduction. Another argument is that harm reduction has been already widely implemented. Some Czech and Dutch experts state that therefore a wider implementation will not be policy priority for the next years. Three of the four Swedish experts expect that harm reduction will gradually get a more important place in drug policy in their country, in particular in the medical field (opiate substitution treatment and needle exchange).

### 3.9 The trend of exploring regulation instead of prohibition in drug control policies

**Statement 9:** In the next five years the trend of exploring the feasibility of regulation instead of prohibition in drug control policies will continue in the EU

In the first round of our Delphi exercise the response to the question 'Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
5	7	6	10	3	3	0	2

N = 36

The majority (24) agrees; some (9) are not sure.

Half of respondents (18) agrees; some (10) are not sure; 6 disagree.

This is clearly the most debated drug policy trend. Eighteen respondents agree with the statement and 6 disagree. Those who agree state among others that prohibition is losing ground and regulation is gaining strength. The emergence of new substances might also be an opportunity to explore the feasibility of regulations:

*"This process could be driven by new substances where, at least in the early stages of use, there is often little or no evidence of harm. Since traditional methods of drug control (e.g. UN treaties) require some form of risk assessment before a substance is scheduled, then other options must be explored. I notice that many EU countries are now exploring regulatory forms of control, many of which do not criminalise users."*

It is pointed out that regulation also includes regulatory forms of control like decriminalising use and possession of small quantities for personal use.

Experts expressing doubts if this trend will materialise state that there is quite a momentum, that quite some steps have been taken in various areas, but regulation is not discussed seriously at high level and there is too strong ideological opposition.

Respondents who do not agree assume that the rising conservatism in European social policy might work against the trend. 'Lack of political will' is a frequently mentioned barrier for the continuation of this trend. According to some experts this 'lack of political will' has to be explained by the economic crisis, the rising conservatism in EU social-policy and a change of focus. One expert also mentions that the usefulness of this strategy is hard to explain to the public and therefore difficult to maintain.

In the second round we checked again if respondents agreed that the trend of exploring the feasibility of regulation instead of prohibition in drug control policies will play a significant role in the next five years (Statement 1). The response was as follows:

Yes	No	Don't know	No answer
9	3	10	6

N = 28.

One respondent states a change of mind from 'no' to 'yes'.

The second round confirms the picture from the first round: The opinions of the experts about the development of this trend are quite divided. Ten don't know, nine agree, while three disagree.

#### **Factors supporting/opposing trend**

Experts see as major supporting factors the ineffectiveness and high economic and social costs of prohibition policies. Their ineffectiveness is shown by the inability of law enforcement to effectively control the drugs market. The growing and diversified synthetic drugs market and the increasingly important role of internet shows according to respondents the failure of the existing law enforcement approach even more clearly. Internet evades the existing control efforts and makes them useless, resulting in a situation where a free market develops fast and without any regulation and control of among others the quality of the products sold. This makes people aware of the shortcomings of prohibition and makes them think about

alternatives to prohibition. The costliness of prohibition policies and their unintended consequences are seen as supporting the search for more cost-effective and targeted alternatives. The economic crisis makes cost-effectiveness of supply reduction more urgent. This is also taken as argument in the plea for a more thorough evaluation of effectiveness, costs and effects of supply reduction measures. Unintended consequences – such as corruption, organised crime and violence – should be included in such an evaluation.

A few experts also points at reports on the positive effects of decriminalisation in a number of countries and at promising experiences with regulation in among others New Zealand.

### ***Adaptations***

Regulation policies are still rather rare. The Dutch coffee shop policy is frequently mentioned as an example. The most widely applied regulation strategy is of course decriminalisation of use and possession of small quantities for personal use.

### ***Findings from consultation of experts from the seven sample Member States***

The experts' opinions diverge about the question whether exploring the feasibility of regulation instead of prohibition in drug control policies will play a significant role the seven countries in the next five years. Ten experts (of thirty) think that this will be the case; twelve don't and eight don't know.

The arguments for the affirmative and the negative responses are in line with the views provided by the EU drug experts. Respondents expecting that this trend will continue refer to the rational arguments and evidence for this approach and to its expected cost-effectiveness, which is important in times of economic crisis. Some expect that in particular the debate how to deal with new psychoactive substances might serve as a window of opportunity.

Respondents stating that this trend will not play a role in their country refer to political conservatism fostering the dominant role of prohibition. Regulation policies are seen as politically unpopular and unacceptable. Some experts stress that regulation policies are unacceptable because they are not in line with the UN conventions on narcotic drugs.

## **3.10 New trends/other relevant issues**

In the first round we received very diverse answers to the question 'which trends in the illicit drugs market and drug policy do you expect to be relevant for/in future drug policy making in the EU in the next five years'. Some answers were in fact elaborations on the trends we had presented in the questionnaire. Several experts for instance point at the rise of the synthetic drugs market (e.g. synthetic replacement of natural drugs like opiates and cannabis), the link between the pharmaceutical and (illicit) drugs market (increase in development and use of mood and cognitive enhancers, misuse of medicines), the production of precursors and new synthetic substances in among others Asia and the importation in the EU of non controlled (pre)precursors. The global spread of drug production and use of illicit drugs is another prominent theme. This includes both natural drugs – in particular cannabis – and licit and illicit synthetic drugs. Mention is also made of the 'adulteration' of natural drugs with synthetic (pharmaceutical) substances.

There are three issues which are seen as particularly important by a significant number (one third) of respondents:

- The increasing importance of internet as means of distribution for licit and illicit substances
- The impact of the economic crisis on the drugs market and on drug policy
- The increase of poly substance use.

Nine experts point at the increasingly important role of internet. Twelve experts mention the impact of the economic crisis, thirteen the increase of poly substance use. Taking into account that we did not mention these issues in our questionnaire one third can be taken as a substantial number.

### ***3.10.1 The increasing importance of internet as means of drugs distribution***

A substantial number of experts (9) point at the increasingly important role of internet in the distribution of uncontrolled precursors and drugs, in particular legal "smart drugs" and other pharmaceutical products from web pharmacies which are said to be widely ab/used in the EU already. However, a few experts (5) state that also illicit drugs are sold online. Selling

drugs online is seen as having advantages in terms of dealer anonymity, reduced supply chains, and 'consumer' reach:

*"Trading illicit drugs online mitigates risks inherent in the criminal business. Risks connected with transport are transferred to unwitting freight forwarding businesses and Postal Authorities. The risks associated with the movement of bulky cash are reduced through the use of established electronic cash transfers."*

*"Dealing on the internet has opened up the illicit market to a much bigger and more diverse customer base. It provides a physically safer environment for users to buy illicit drugs (including so called 'legal highs'). Internet trading also reduces the risks for dealers, providing a greater degree of anonymity, and through the use of electronic transfer/payment systems and 'digital money' (e.g. bitcoins) the risks of handling cash proceeds are mitigated. This cyber-environment lends itself to the demographic most likely to use synthetic drugs."*

The growing importance of internet in the retail of (illicit) drugs is perceived as an unintended consequence of the current – prohibitive – drug policy.

The responses we received in the Delphi rounds left us with an ambiguous picture. Apart from a few rather detailed statements we did not have much more than some guesswork regarding the importance of internet for the illicit drugs market, the focus of our study. Therefore we decided not to include this issue in the following consultation rounds. However, in the following stages of the study experts repeatedly referred to an increasingly important role of internet in linking supply and demand, including illicit drugs. Further informal consultation of experts and rough searches on the importance of internet for selling and buying drugs brought us to the conclusion that the role of internet deserves serious attention. The information we found on the website 'Silk Road', its use and appreciation has convinced us that there is much to explore, that there are many questions yet to answer and challenges to be dealt with in the future (see 4).

### 3.10.2 The impact of the economic crisis on the drugs market

In the first round several experts point out that the economic crisis might lead to an increase of (problematic forms of) drug use, in particular among young people. Growing unemployment, social exclusion and marginalisation among the young are seen as decisive factors in this. The views diverge on the question to which drugs young people will turn. A few experts mention heroin pointing among others at potential cuts in demand reduction services, which may have an adverse effect on the demand for illicit drugs, resulting in increased use of e.g. opioids. Mention is made that austerity measures might lead to less abstinence oriented treatment and to less service quality.

However, the majority expects that licit and illicit synthetic drugs will be the drugs most frequently used. Arguments for the latter are increasing availability of (new) synthetic substances and their relatively low price.

Experts mention various interesting aspects of this trend:

- Unemployed and marginalised people might not only be willing to engage in drug use but also in drug trafficking (as a means to make a living).
- Health consequences due to increasing levels of drug use will pose a problem the authorities will have to address.
- Drug use due to unemployment and social exclusion can also be seen as a form of self-medication.

In the second round of our Delphi exercise the response to the question 'The economic crisis will have substantial impact on the drugs market in the EU. Do you agree with this statement?' was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
3	5	8	4	0	1	0	0

N = 21

Sixteen respondents agree; four are not sure; one disagrees. The respondent who disagrees states that drug users still have sufficient money to buy drugs. Moreover the demand for drugs is high. *"Food, liquor and drugs are the first demands in life"*.

### **Effects of the economic crisis on the drugs market**

The responses to the question what the most important effects of the economic crisis on the drugs market will be in the next five years, can be grouped under the following headings:

- Decrease of use
- Increase of use
- Search for cheaper drugs
- Falling retail price
- Growing involvement in illicit drug business
- Other effects.

The responses in the third round confirm the picture which arises from the second round. Again it is pointed out that effects can take various directions as summarised by one respondent:

*"There might be very different impacts: less users or users with less resources might reduce the size of the market and/or bring changes to its content (players, products, prices), more unemployed people might translate into more people willing to work in the drugs market, less resources for drug law enforcement might reduce the costs of selling drugs, etc. It is both difficult to assess precisely what these impacts might be and what their combined impact will be."*

#### **- Decrease of use**

A few experts expect that drug use might decrease. One states that *"in an economic crisis people tend to behave more adjusted, not to risk dropping out of school and job. This could lead to a conservative - anti-substance use main stream and less demand for drugs."* It is mentioned that *"users cannot afford to purchase, as they used to do before the crisis"*. There is also the argument that as people have less money they might spend less on things they do not really need. This could lead to a decrease in demand for drugs or, as several respondents state, there might be less use of (illicit) substances in particular among recreational users.

#### **- Increase of use**

The majority of respondents expects that the economic crisis will lead to increased levels of drug use. Some refer to what has been seen in earlier economic crises: people tend to indulge more extensively in behaviour such as drinking, gambling and substance (drugs) use. Different respondents refer to an increase of drug use as possibility to escape from the problems people are facing. Others expect that deprivation and social exclusion will result in an increase of psychological problems (i.e. depression), which in turn could facilitate a wider spread and increased levels of problem use of licit and illicit substances. Poly substance use is expected to rise. Respondents anticipate that especially problem or dependent users and marginalised groups might be affected. One important factor contributing to social exclusion/marginalisation is unemployment. The fact that more people, especially young people, will lose their job is expected to contribute to a growing number of problem users.

Several respondents point out that this increase of drug demand will most probably result in an increase of drug supply.

One respondent elaborates on this complex interrelation of factors as follows:

*"... drug abuse is often shaped by - among many other drug, set and setting factors - economic conditions (cfr. the work of Loic Wacquant, Philippe Bourgeois, and many others). I would expect that as the economic difficulties in European countries increase, alcohol and drug related problems will too. If more people lose their job, and live below poverty standards, chances are higher that some of them will use substances for escapist reasons. This might be more the case with the cheaper drugs (the more expensive drugs might be used to a lesser extent, as less people can afford them). Economic problems also affect migration patterns, and this in turn may pose new challenges for the drug field: more immigrants that end up in deprived economic conditions at the borders of the EU, and or in EU member states. At the same time some of these immigrants may get involved in ethnic networks that are involved in drug trafficking."*

One respondent holds the view that there will be a balance between increase and decrease of use:

*"The crisis is hitting the productive, financial legal sectors. Illegal economies are not affected. On the one hand, consumers have less disposable income; on the other hand, there are the psychological and social conditions in place to stimulate increased 'consolatory' or 'self-treatment' consumption of substances (opiates, alcohol, benzodiazepines, cannabis, etc.)."*

### - Search for cheaper drugs

Respondents assume that a substantial number of users might switch to cheaper (synthetic) drugs instead of (poor quality) "classic" drugs. Especially problem or dependent users are expected to look for cheaper alternatives.

One respondent thinks that this might result in an overall reduction of the volume of cocaine market:

*"Cocaine is one of the most lucrative drugs and yet problem cocaine users are just a small proportion of all users. The economic downturn is likely to contribute to a shift of the recreational users to cheaper substitutes like ATS and new synthetic drugs."*

A few respondents state that there might be a shift to cheaper licit alternatives including alcohol or to mix of illicit drugs and alcohol. These shifts might imply health consequences among others due to poor quality of cheap substances and an increase of risk behaviour.

*"It is, however, probable that a search for cheaper 'highs' will trigger a change in the variety of substances available (in terms of purity and therefore cost) and an increase in poly drug use in order to produce the desired effect. Poly drug use may also include an increase in the use of cheap alcohol (both beer and spirits). Additionally, there may be a shift to novel psychoactive substances if they are deemed to offer better value for money."*

Finally, one respondent points at the possibility that more people might start to grow their own cannabis.

### - Falling retail price

Respondents mention different factors causing the retail price to fall. One is the pressure of users on the street price of drugs when users have less money at their disposal. *"The dealers response will be to reduce quality and quantity, and possibly offer cheaper alternatives (prescription drugs and other pharmaceutical products, including veterinary medicines)."* An important issue here might be a drop in purity by adding larger quantities of different cutting agents *"some of which might be detrimental to health having a knock on impact on the health services"*. The other option is that the illicit trade will become more efficient in order to reduce costs. *"Internet trading will shorten supply lines making it cheaper to get the product from production to market."*

### - Growing involvement in illicit drug business

Another issue mentioned by several respondents is that some users might engage in drug production, trafficking or dealing or other criminal activities as a welcome (additional) source of income, among others to finance their drug use. Regarding production, several experts see in particular cannabis growing as tempting option for making 'easy money'. Unemployment, social deprivation and marginalisation are expected to contribute to this:

*"Economic problems and lack of resources may shift people into different forms of illegal activities including drug trafficking whilst organised crime groups may take advantage of this situation by spreading their illegal activities and recruiting new members."*

*"On the other hand, more people might be attracted to the easy profit-making in the drugs market. Criminological theories often hypothesise that if people have no legitimate means to attain the socially defined goals and standards, they might look for illegal means to attain those goals. Drug dealing, involvement in trafficking ('boletas', street dealing, corruption) are easy ways to earn extra money, and to 'survive'. The same holds for traditional drug producing countries: economic deprivation is a strong driver for many drug producers (especially the farming communities), and will continue to fuel drug production."*

A growing involvement in illicit drug business is also named as factor that could contribute to an increase of drugs supply.

### - Other effects

Different respondents state that the reduction in public spending will have rather uncoordinated effects on drug demand and drug supply reduction efforts, which in turn will affect the market. For most respondents it is evident that there will be fewer resources for treatment services and law enforcement activities. This – according to one expert – basically means that the risk to users will increase, while the risk to traffickers will decrease. Another expert states that:

*"the reduction in investment by enforcement agencies in expensive but 'invisible' intelligence work as a result of cuts in funding will lead to reductions in arrests of higher level dealers and/or an increase in activity against lower level easy targets."*

There is also a statement that the anticipated expansion of the market might lead to turf wars, with increasing violence between rivaling parties. It also is expected to lead to greater profits for those who are successful, which in turn may lead to more corruption.

One respondent points at further consequences of the economic crisis for drug users:

*"Furthermore, as the drug phenomenon is influenced by many factors other than drug policy, an overall economic downturn may also result in cuts in government spending for social security benefits, programmes and support services. Some of these may affect problem or dependent drug users."*

### **Suggestions/recommendations**

In the third round respondents brought forward various suggestions and recommendations for appropriate policy responses to the impact of the economic crisis on the drugs market in the EU. Some provide rather elaborate, specific suggestions. Others do not have clear ideas or have their doubts about the availability of appropriate policy measures.

*"I do not believe there are effective policy responses to these change".*

Some respondents underline the importance of a well-coordinated national and international (European) justice and police approach to organised crime with a focus on money laundering, on investment of capital built up through illegal business in the legal economy, on confiscation of income and capital of criminal organisations, on the fight of corruption, etc.

One expert suggests to *"focus repressive actions on violent criminal organisations to reduce the damages"*. Another pleads for adapting national strategies focussing on strict law enforcement for drug traffickers. Two respondents emphasise the need for a radical review of enforcement policy and adaptations of the laws to allow for an effective approach of drug dealing over the internet. One expert states that *"even in periods of limited resources, suppressing the supply side should remain crucial"*.

According to one respondent

*"drug supply issues are more complicated but the system/s need to sort out differentiation between social supply and less commercially motivated supply to prevent disproportional punishments in the economy of sentencing"*.

Another respondent states that:

*"law enforcement strategies can explicitly attempt to shape the illicit market by creating the conditions where small scale and private 'friendship network' types of supply can thrive, but cracking down on larger scale operations that involve violence or inconvenience to the general public. The priority must be the reduction of the violence and the power of big criminal organisations."*

Tolerating of small scale home-growing and producing within the framework of clear rules could also help to reduce the supply by criminal organisations:

*"It's also a way to produce a small amount of money for poor but green fingered user"*.

Several respondents propose decriminalisation policies as reasonable alternative for the current prohibitive drug policy approach. There are a number of arguments for this point of view. Decriminalisation is seen as saving money and resulting in better health and social outcomes for communities among others by quality control of substances. Regulating the market may also reduce the power of organised crime, undermine drug trafficking organisations and improve the security of the citizens.

Decriminalisation of the use of illegal drugs would also help to prevent people experiencing the effects of the economic crisis and at the same time having to face the consequences of law enforcement approaches. According to one expert, decriminalisation should be applied to production, sale and possession. Such a regulation of a drugs market would be an option for some drugs, in particular for cannabis.

*"Giving the level of uncertainty, this is clearly a case first and foremost for increased research and monitoring"* according to one expert. Different priorities are mentioned here.

*"A thorough review of the effects of 'legal highs' and illegal synthetic drugs."*

*"A comprehensive system of collecting information, in real time, regarding the drugs in circulation in the EU."*

Another priority is a thorough monitoring of the drugs market, providing a picture of purity and added adulterants, which can be used for an early warning system drawing information from law enforcement agencies and service providers.

The information collected should be used for correct and realistic information and education regarding risks involved in the use of these substances. Experts emphasise the importance of community education, outreach, harm reduction and therapeutic treatment interventions, *"giving priority to evidence-based prevention strategies and treatment modalities, as should be the case for harm reduction strategies"*. Access to treatment, advice and information has to be improved.

Several respondents state that policy strategies need to address the underlying social and economic problems of drug abuse: unemployment, social exclusion, poverty, etc. One expert emphasises that community education, outreach, harm reduction and therapeutic treatment interventions are important and appropriate short-term policy responses. However, over the longer-term, regeneration programmes are required focusing on alleviating poverty and social exclusion in impacted communities. The responses are not necessarily drug policy responses, but general social and economic policies that ensure a stable income for affected groups and the continued provision of treatment and support for problem and dependent drug users:

*"Support for volunteering schemes to enable recovering drug users to obtain experience in the job market and build confidence in themselves and with employers should be considered. Similarly attention to employment and other opportunities for young people so that they do not become 'a lost generation' is essential."*

### ***Findings from the consultation of experts from the seven sample Member States***

Two third of the national experts (nineteen of thirty) expect that the economic crisis will have substantial impact on the drugs market in their country in the next five years; seven don't think so and four don't know. In the UK, Sweden and the Netherlands only one expert in each country expects a substantial impact of the crisis on the drugs market, while in Bulgaria, the Czech Republic, Italy and Portugal four experts do so. This might have to do with the fact that these four Member States are more seriously affected by the crisis than the other three. Several experts explicitly refer to this point.

The impact expected by the national experts accords with the opinions of the EU drug experts. The main problems expected are an increase of (problem and poly) drug use due to unemployment and marginalisation and a growing involvement of young people in illegal drugs business (to finance their own supply).

### ***3.10.3 The impact of the economic crisis on drug policy***

Responses in the first round showed that several experts expect that the economic crisis will result in budget cuts affecting drug policy making and implementation, in particular drug treatment and harm reduction. Regarding drug policy making there is broad agreement that drug policy might slip down the policy agenda, as the economic crisis is an issue of broader concern and higher priority. There are diverging views on the consequences of the expected budget cuts. There is for instance the expectation that austerity might be a boost for regulation policies as they are less costly than prohibition policies.

With regards to drug treatment and harm reduction experts agree that the economic crisis may affect the availability, access and coverage of services, as already can be seen in some Member States (Greece, Romania and the Baltic States). However, there is difference of opinion when it comes to harm reduction. The broad acceptance of harm reduction is seen as a fact by most experts, though it is unclear if this will lead to wider implementation. Some experts think that the economic crisis could encourage wider implementation, as a means to reduce costs. Others expect that the economic downturn and the rising conservatism in European social policy will put harm reduction policies under pressure.

In the second round of our Delphi exercise the response to the question ‘The economic crisis will have substantial impact on the drug policy in the EU. Do you agree with this statement?’ was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
2	5	4	7	2	1	0	0

N = 21

Eleven respondents agree; 7 are not sure; 3 disagree.

Arguments for disagreeing with the statement are that governments might “have other things on their mind than drugs policy”. There might be less funding for implementing drug policy measures but the policy will stay more or less unchanged. Another argument is that EU policies “are not sensitive to big economical factors at short - medium term”.

### ***Effects of the economic crisis on drug policy***

The responses in the second and third round show that the most important factor here are budget cuts and their impacts. There is general agreement that governments will certainly reduce the drug policy budgets. They will review the cost and usefulness of the different policy approaches. Proven effectiveness might not be a decisive argument for actual decisions taken. The political/ideological agenda of a government is expected to play a more important role. Experts therefore disagree which budgets will be affected. This also might differ from country to country. In some Member States this may result in a shift away from costly law enforcement. According to some respondents financial cuts might be reason to reduce, modify or even ‘abandon’ prohibition. The costs involved in enforcing prohibition are after all high. In other Member States cuts in demand reduction services might be the consequence.

One respondent expects a growing importance of evidence based approaches and more emphasis on project evaluation. The reduction in available public resources might also drive the search for more cost-effective policies.

#### **- Lower rank on the political agenda**

Respondents expect that drug policy will be downgraded on the political agenda. In most of the EU Member States governments have more pressing problems to address – like budget consolidation, reducing levels of unemployment, etc. Drug policy – as other fields of social and health policy – will be seen as less important.

#### **- Effects on demand reduction**

The general budget cuts in the health field (e.g. in public health) are expected to impact on demand reduction policies, on drug prevention, treatment and harm reduction, resulting in a more limited quality, reach and impact of demand reduction services for drug users. The funding for drug demand reduction might be reduced substantially in countries with an already weak infrastructure in this field, in particular in Central and Eastern Europe. Economic arguments might be used to justify certain changes. For example, the cost of methadone programmes is used in some Member States to argue for/invest in abstinence-based treatments. One respondent states that:

*“such a policy shift may result in the cutting of spending for maintenance treatment but without additional spending on other drug treatment options. In practice, this may lead that fewer problem or dependent users will receive any form of treatment. Where such drug users receive less treatment and/or support, they may revert to economic-compulsive crimes, which may then result in a greater number of drug-related offences”.*

The majority of respondents holds the opinion that the growing conservatism in politics will make that budget cuts will particularly affect health policy and therefore drug demand reduction – and then again especially harm reduction – rather than supply reduction. Several experts refer to examples of this effect, which have already been observed:

*“When budgets are tight people may question spending money on services for what may be seen as an undeserving group, so provision of treatment and harm reduction services may be reduced.”*

On the other hand scrutinising costs and cost-effectiveness of treatment and care is also seen as opportunity to look for cheaper, more efficient and effective measures.

### **- Effects on supply reduction**

Several experts expect funding for supply reduction to decrease in the next few years, resulting in less investment in law enforcement, affecting capacities and capabilities. There might still be a more punitive approach and at the same time a reduction in actual law enforcement capacity, which might result in a reduced risk of arrest for key criminals and an increase of arrests and sentences for small scale drug-trafficking offences as those are 'easier' to realise. Another option is – as pointed out by one respondent – that as law enforcement agencies will have fewer resources to target drug offenders. *“existing drug laws will lack enforcement and become discredited”*.

According to a few respondents, the urge to save money could be an opportunity to explore *“less ideological and more evidence based supply reduction programmes”*. Reduced budgets also might give support to *“questioning the economic burden of prohibition”* and to the argument for decriminalisation.

### **Suggestions/recommendations**

In the third round respondents came up with a wide variety of suggestions, emphasising very diverse aspects of drug policy. Some come up with detailed, specific proposals, while others are rather pessimistic that there is not much to be done about it. One expert stresses the impact of *“a more conservative approach and less willingness to consider liberal reforms”* and concludes as follows: *“While I believe both responses will hurt society, I cannot see that there are effective strategies for countering these broad changes in social attitudes.”*

As with the suggestions for tackling the impact of the economic crisis on the drugs market several respondents state that policy measures need to address the underlying social and economic problems of drug abuse unemployment, social exclusion, poverty, etc.

Emphasis in the suggestions made is on evidence-based approaches, cost-effectiveness and efficiency. Investments in drug policy should be guided by sound evidence. Priority should be given to evidence-based prevention strategies and treatment modalities, as should be the case for harm reduction strategies. Some respondents have their doubts about the (cost-) effectiveness of law enforcement (in particular prison sentences) while they underline that harm reduction (including substitution treatment) is proven (cost-)effective. Efficiency and cost-effectiveness are seen as vital in times of an economic crisis.

Respondents offer different suggestions how to reduce costs, e.g. using less costly services like social networks for prevention and information on drugs. One expert states that *“there may be a greater role for voluntary programmes such as AA and NA”* in case funded services have to be cut. Another respondent refers to the possibility to reduce costs of opiate substitution treatment by using less expensive substances than methadone and buprenorphine e.g. *“opium tincture like in Iran, morphine like in Austria or heroine like in the Netherlands”*.

Different suggestions were made regarding policy measures targeting the drugs market. One expert states that *“decriminalisation and regulation could be considered as a possible choice for governments in order to save money and get revenues from taxation”*. Others point at price (and profit) reducing effects of regulatory measures. The social club model – as developed in Spain and considered in the Netherlands and Belgium – is mentioned as one option to create a non-profit economic model for the cannabis market. A less commercially motivated supply is also seen as preventing *“disproportional punishments in the economy of sentencing”*.

### **Findings from the consultation of experts from the seven sample Member States**

Fourteen (of twenty-nine) national experts anticipate that the economic crisis will have substantial impact on drug policy in their country in the next five years; five don't think so and ten don't know. Again, only three experts from the UK, Sweden and the Netherlands (one from each country) endorse the view that the economic crisis will considerably influence drug policy, while this number is clearly higher for Bulgaria (3), the Czech Republic (3), Italy (2) and Portugal (3). The explanation for this might lie again in the different impact of the economic crisis on these Member States, as can be taken from some experts' statements.

It does not come as a surprise that the national experts on the whole foresee the same effects as the EU drug experts. Budget cuts are the most important problem brought forward. Experts think that these cuts will particularly affect drug demand reduction programmes (including harm reduction). Drug policy will lose importance.

### 3.10.4 The increase of poly substance use

As we can take from the first round of this Delphi exercise, poly substance use is clearly seen as a major issue. It is not so much a new trend – it has been an issue in drug policy discussions for quite some years – but a substantial number of the respondents see it as a growing problem. More users seem to use a mix of substances, which is seen as problematic, as it complicates demand reduction responses. The concept of ‘drug of first choice’ seems to become more and more obsolete. People seem to use substances that are around, not necessarily the ones they used traditionally. This is said to be true for natural and synthetic drugs, licit and illicit drugs. As one expert puts it: the increase of poly substance use has to be partly understood as an “on-going substitution of different substances depending on availability, quality and price”.

Alcohol is mentioned most frequently as ingredient of the popular ‘drug cocktails’ people are using. Binge use of combinations including alcohol is seen as involving serious short and long term health impact. Other ingredients are different legal and illegal natural and synthetic drugs, including so-called ‘legal highs’, pharmaceutical (prescription) drugs and cocaine. In this context experts also point to the wider misuse of medicinal products like cognitive enhancers and lifestyle drugs (anabolic steroids and related substances) both in sport and in everyday situations. Respondents underline that poly substance use is wide-spread, not only among ‘street-level users’ but also in the main stream population.

In the second round of our Delphi exercise the response to the question ‘Poly substance use is an increasing problem in the EU. Do you agree with this statement?’ was as follows:

I fully agree	I strongly agree	I slightly agree	I am not sure	I slightly disagree	I strongly disagree	I fully disagree	I am not familiar with this trend
3	10	4	4	0	0	0	0

N = 21

Seventeen respondents agree; 4 are not sure.

#### **Factors supporting trend**

Respondents suggest various factors, which according to them contribute to an increased poly substance use in the coming years. For some respondents the increase of poly substance use is simply a continuation of a trend which can be observed in EU Member States for ten, twenty years. A number of factors – most of them already mentioned in the first round – are seen as important here:

- Economic crisis
- Diversification of the available substances
- Low price
- Availability
- Lifestyle/consumption patterns
- Poor quality of available drugs.

#### **- Economic crisis**

Different respondents think that one important factor supporting poly substance use is the economic crisis (see 3.10.2 under ‘Increase of use’ and ‘Search for cheaper drugs’).

#### **- Diversification of the available substances**

Several respondents point at the diversification of the drugs market. The rapidly growing supply of new psychoactive substances, in particular of synthetic drugs and their use – in some cases as substitutes for other substances – are seen as an important factor here.

#### **- Low price**

The relatively modest price of licit and illicit (synthetic) substances is seen as another important facilitator. As result of the economic crisis users are said to look for cheaper substitutes for the drugs they normally use. In particular marginalised groups with lesser income are expected to tend towards using “all kind of substances” in different combinations.

#### **- Availability**

Regular and increased availability of a variety of substances in EU Member States is another important element according

to several respondents. The globalisation and diversification of the market has contributed to the availability of a wider variety of substances on the market. Fluctuations in availability of substances on the street (for whatever reason) are seen as encouraging substitution of drugs and using them interchangeably. The increased availability of a variety of synthetic drugs is seen as triggering experimentation with different substances.

#### **- Lifestyle/consumption patterns**

Several experts also underline the fact that poly substance use reflects contemporary consumption patterns. One respondent describes this as follows: *“choosing a certain drug which suits a particular purpose at one time and choosing another drug which suits a different purpose at another time”*. Also changes of fashions and lifestyle play a role. One expert draws attention to *“the greater exposure of young people to the patterns of use in other countries leading to the development of a European youth culture in which poly-substance use features quite strongly”*. Reference is also made to a normalisation of the use of (illicit) drugs. Drug use is not a taboo anymore for many people.

Finally, it is pointed out that *“the economic crisis, unemployment and the wish to ease life”* supports using legal and illegal substances.

#### **- Poor quality of available drugs**

Fluctuations in quality also contribute to substitution of drugs, changing between and mixing drugs, but also to increase the effects through alcohol and other substances. Reference is made to the widespread substantial adulteration of cocaine, which *“has unwittingly introduced users to a cocktail of substances including mixes of cocaine, benzocaine, lignocaine, phenacitin and levamisol”*.

#### **Popular combinations of substances**

The second round confirms the picture we got from the first round: alcohol is mentioned by the majority of respondents as ingredient of the different drug combinations used. Fourteen out of the fifteen experts answering the question ‘What will be the most frequently used combinations of substances?’ mention alcohol as ingredient in at least one of the (maximum three) combinations they name. Synthetic drugs/ATS (9), Cannabis (7), Cocaine (7) and Pharmaceuticals (7) are the other frequently named substances. The responses underline again that the lines between legal, illegal and medically controlled substances are faint (see 3.1).

- Most important problems related with poly substance use
- The problems mentioned by the respondents can be grouped as follows:
- Increase of consumption
- Increased health problems
- Public order issues and accidents.

#### **- Increase of consumption**

Different respondents expect that poly substance use will result in an increase of drug consumption, resulting in increasing prevalence of problem use. One factor contributing to this is the combined use of ‘uppers’ and ‘downers’, in an attempt to neutralise the effect of one by the other, which may result in more excessive consumption patterns and thus increase the risk of severe health damage. Mention is also made of episodic binge use of high dosages of upper and downer combinations and other drug mixes.

#### **- Increased health problems**

Several experts predict an increase of physical and psychological harm related to poly substance use. Knowledge is lacking on interactions between different substances. The fact that they are difficult to predict increases the risks of acute health problems like overdoses. However, also the long-term effects (of high levels) of poly substance use are not yet fully understood. Respondents expect that this will have serious consequences in the long run, regarding physical and psychological health including the psycho-social functioning.

This might have a massive impact on treatment services, not only because of the growing treatment demand, but also because appropriate prevention and treatment programmes targeting this specific problem are lacking. *“We do not know what should be the treatment.”*

#### **- Public order issues and accidents**

Respondents refer to an increase in drug use related violations of public order (nuisance) and violence. Alcohol abuse is frequently seen as a factor contributing to public order problems. The additional misuse of other illicit substances may exacerbate the problem. Another issue mentioned here is an increase of – industrial and traffic – accidents.

#### ***Appropriate/effective policy responses to poly substance use***

Respondents make a number of suggestions for appropriate and/or effective policy responses to poly substance use, regarding research, prevention and treatment, and policy measures.

#### **- Research**

Several respondents underline the importance of a better understanding of the problem in order to be able to develop appropriate and effective prevention and treatment responses. One priority is research into the effects of the various licit and illicit psychoactive substances, in particular of frequently used combinations and focussing on the most prevalent substances. Research is also necessary to have better knowledge and understanding of the practices of poly substance use to be able to avoid and reduce health risks. This research should also make use of the experience and expertise of users.

Another priority is (improved) research and monitoring of the market, collecting detailed information about what is being bought consumed by users in order to provide a robust knowledgebase for treatment and education responses and for enforcement and/or regulation action. Exchanging the information collected by research and monitoring between EU Member States is vital to ensure efficiency and cost-effectiveness.

Finally, there is the proposal to review current policies on alcohol abuse, among others to determine whether (heavy) alcohol use is one precursor for poly substance use. This research will help to adapt health messages relating to alcohol use. It is also seen as important to review the regulatory regimes controlling pharmaceutical production and supply to be able to develop more appropriate rules and more effective interventions.

#### **- Prevention and treatment**

Among others based on the outcomes of this research appropriate and effective information and advice, prevention and treatment can be developed. Respondents emphasise the need for realistic information on the risks and possible effects of combining different drugs. Respondents also plead for developing early interventions (at the onset of the problem use), easy access to treatment centres and harm reduction services. Allocating resources for the development and implementation of these interventions are seen as priority.

#### **- Policy measures**

Some respondents also underline the importance of policy measures. The focus is on a more strict regulation of the market, e.g. age limit for buying certain substances, limitations of the amounts which can be bought each time, defining the number of sales outlets and their hours of business. The importance of stricter rules on the sale of alcohol is also emphasised.

#### ***Findings from the consultation of experts from the seven sample Member States***

Twenty-two (of twenty-nine) national experts anticipate an increase of poly substance use, including licit drugs like alcohol and pharmaceuticals, in their country in the next five years; two don't think so and five don't know.

When it comes to the main issues the opinions of the national experts and of the EU drug experts are basically the same. There is wide agreement that poly substance use is a wide spread phenomenon yet. Alcohol is frequently mentioned as prominent component of drug mixes. Other frequently mentioned ingredients are – legal and illegal – synthetic drugs, pharmaceuticals but also cannabis. Like the EU drug experts the national experts also refer to economic crisis, increased diversity and availability of substances and lifestyle/consumption patterns as supporting factors.

### **3.11 Divergence tendencies in EU drug policy**

In this Delphi exercise we primarily focused on convergence of drug policy in the EU. However, in the first two Delphi rounds different respondents also point at recent divergence tendencies in EU drug policy. In the third round we explored the opinion of respondents on this issue. This provided us with a number of somewhat diverse but very interesting reflections.

A substantial number of respondents who answered this question (13 of 28) are of the opinion that there is a growing tendency of divergence in EU drug policy. Three of them think that this divergence will be a temporary phenomenon, just a phase in the process of EU policy making. Eight of the thirteen point in particular to signs that harm reduction is losing ground in the EU. Four respondents expect that some Member States will develop a more harsh, supply reduction oriented drug policy.

Some Member States with a tradition of well-developed harm reduction programmes seem to reconsider their policies and put more emphasis on abstinence oriented programmes. Other countries that never clearly adopted harm reduction as a pillar of their drug policy or even formally rejected harm reduction in political statements seem to do away with harm reduction. Several experts see the austerity budgets due to the economic crisis, the growing influence of conservatism and populist politics in EU countries as important factors supporting this tendency:

*"If the topic is made a populist political issue in some countries, I am afraid that harm reduction and moderate dealing with mere consumers may be swiped away in short time." "Economic crisis usually plays into the hands of populist with quick fix policies, a focus on emotions (anger, envy, plain enmity) and no regards for rational approaches of substance use."*

*"Harm reduction is clearly the core point of focus in relation to any process of divergence. While Sweden was for many years an island of punitive prohibition within the EU, it is no longer alone with other states becoming less supportive of the approach. Some, like Italy, have flip-flopped in many areas of drug policy for some time, but others, such as the UK for example, present a more significant shift away from the harm reduction approach to dealing with IDUs. In many states this seems to be linked to a move to the right in terms of the politics of national administrations. That said, other states, such as the Czech Republic, are increasingly engaged with more tolerant approaches to drug use including both harm reduction and decriminalisation. It will be interesting to see how the new EU drug strategy copes with such divergence and if in the face of differing views harm reduction retains a prominent place within the document and accompanying action plan. As such, while the policy of the EU is always fiendishly difficult to summarise and map, it is arguably becoming more of a mosaic with both the austerity environment and shifts in the political landscape having an effect upon national and hence EU policy approaches."*

*"The recent so-called 'Stockholm Document'<sup>3</sup> is a clear example of the tendency of certain governments (e.g. Sweden, UK, USA, Russia, Italy) to disregard the importance and urgency of a common EU policy, proceeding instead with individual or sub group agreements. Even if there seems to be some opening with regard to harm reduction, this behaviour demonstrates a tendency towards a more marginal role for the European Commission and the HDG."*

*"There is considerable divergence related to harm reduction policies, and this divergence will continue to exist, due to many factors (ideological, political, economical, cultural, etc.). The same holds for several other areas (law enforcement policies, legal systems, prevention strategies, treatment models, etc.). I do not believe a unified and uniform EU drug policy will ever exist, and I think the need for more independence of the member states will be felt more strongly over the years."*

*"The divide over harm reduction has probably diminished to some extent due to the change of government in certain Member States. However, a renewed debate may emerge on the question whether drug treatment should be abstinence based or not. Member States such as Sweden, Italy and the UK will advocate for the concept of 'recovery' as key element in drug demand reduction, which provides a more narrow 'outcome' of treatment than 'rehabilitation and reintegration', which is current EU policy and which does not require a 'drug free' outcome per se. Other discussions may concern the aspect of fundamental rights, pre-trial diversion schemes and alternatives to imprisonment. Furthermore, there may be some divergence on which approach to take towards tackling new psychoactive substances as measures in various Member States vary from moderate 'scheduling' of substances to the introduction of blanket ban legislations."*

*"A number of key players (countries) supporting and promoting the inclusion of harm reduction in drug policies have become much less noisy than they were in the past or have given up their role of advocacy within Europe. This allows other players to voice more loudly their opinions against it. So, yes there is a slow change in balance which, with diminishing drug problems, is likely to go on. Another main change is the re-emergence of supply reduction/law enforcement as an independent drug policy in Europe, alongside the "balanced" approach of which it is meant to be a part of."*

*"Divergence in EU drug policies will for example arise in the local experiments with supply regulation. I believe in some member states local actors and authorities will experiment with alternative models of e.g. cannabis regulation (closed*

<sup>3</sup> <http://www.drugnews.nu/article.asp?id=7300>. Last accessed 11 February 2013.

*circuits, social clubs, etc.). Other member states will react firmly to these experiments, while at the same time they will be interested to see how these experiments develop, and which (un)intended effects these experiments will have."*

A couple of experts (6 of 28) hold the opinion that there is no clear trend towards more divergence in the EU, but a somewhat diffuse development of different political processes, reflecting among others the current socio-economic situation. While there might be some diverging moves, most respondents expect that we will see more convergence of drug policy in the future:

*"I don't expect more divergence than the existing one, it is always up and down depending on current elections and governments (see Czech Republic, Hungary and France). A Drug Strategy on European level could be helpful to balance drug policies better."*

*"I wonder if the concept of convergence/divergence is the correct one – it might more be a question of cycles or fashions with those people who had a problem (or recognised it) earlier taking a path that others followed a bit later (creating an appearance of convergence) but then that first group experiencing a reaction which sends them backwards (appearing to diverge), a pattern that will be seen in others later."*

*"There is a lot of debate regarding drug policy but there is little evidence that it is actually changing policy to any great extent. The discussions seem to be polarised between legalisation and prohibition. Some member states are set firmly into the prohibition camp, influenced by culture and social attitudes. Other member states appear to be inclined towards a more liberal approach. The outcome at present appears to be a stalemate, both extreme positions cancelling each other out and stifling informed debate. The moral debate can quickly become a political minefield. The economic argument may offer a better path to a sensible review of policy."*

*"Nations such as Germany, Sweden and the Netherlands, not much affected by the recession, will shift slightly right in their approaches to drug policy. The nations that are suffering most will slash programs of services sharply and may find nativist political parties shifting sharply right on drug policy."*

*"Divergence and convergence do not indicate trajectory. Convergence can be towards conservative or liberal measures. The balance of this overall may be impacted more than previously by the impact of the economic context. If the economic crisis was not in place we might see continued convergence around liberalisation. Now over a period we might see divergence as politics intervenes and then there may be convergence and renewed trajectory towards harsher perceptions and punishments as a conservative attitude seeks to control and punish drug use and what it supposedly stands for."*

### **Findings from the consultation of experts from the seven sample Member States**

The question whether there are tendencies in the seven sample Member States to diverge from the drug policy consensus reached in the EU in the past years, resulted in a wide range of opinions regarding drug policy development in these particular countries and in the EU. The most widely shared point of view is that there is a tendency away from a policy which is characterised by the respondents as 'liberal', 'health driven' and 'harm reduction oriented' towards a more 'restrictive', 'repressive' or 'punitive' approach. This is true for Bulgaria (two of two experts), Italy (two of four experts), the Netherlands (three of four experts) and the UK (three of three experts). There are also two Italian (of four) and two Swedish (of three) experts stating that not a lot has changed in the drug policy field in their country, describing it as rather repressive or restrictive. One Swedish expert emphasises that Swedish drug policy is in line with UN Conventions whereas drug policy in other countries (the Czech Republic and the Netherlands) is not. One of the two Czech experts responding to this question states that the restrictive position of Italy and Sweden might be the end of the consensus reached by the EU Member States in 2005.

## 4 Discussion and conclusions

Notwithstanding some comments we received in the first round of the consultation of EU drug experts (see chapter 3 Findings) and some suggestions for reformulating the wording of two trends, the majority of respondents agrees that the trends we presented will play an important role in the EU in the years to come. The only exception is the shift from 'addiction'/disruptive forms of use of illicit drugs to more integrated forms of use (including regular recreational) will continue. Though, still a clear majority of respondents (22 of 36) agrees with the statement that this trend will continue in the next five years, the comments made in the answers to the subsequent questions show that a substantial number of experts (15) have their doubts if this can indeed be seen as a general trend in the EU. Experts point among others at substantial differences between Member States and substances used. Some also refer to the increase in drug use, in particular (problem) poly substance use as a consequence of the economic crisis. We therefore decided to exclude this trend from our analysis. We took the experts' opinion as simply too divergent to be able to talk about an important general trend in the EU.

Overall, it can be said that the selected drugs market trends received slightly more support than the drug policy trends. In the first round the consent with the drugs market trends was respectively 27, 21, 31 and 28, while for the drug policy trends it was 20, 22, 24 and 18 (N = 36). For the market trend the answers to the first question (if respondents recognised a trend) in the first and second round were almost consistently positive. The same number of experts agreed with the statements in both rounds. For the policy trends the answers in the second round were a little less positive. This might have to be explained by the different phrasing: In the first questionnaire we asked 'In the next five years, the trend of a ... will continue in the EU. Do you agree with this statement?' In the second round we asked more explicitly: 'Do you agree that this trend will play a significant role in the next five years?'

One explanation for the lower level of consent with the policy trends might be that experts rather agree on the problems we presented under the drugs market trends, than on the solutions we presented under the drug policy trends. The latter seems to be due to different opinions on practicality and feasibility of certain policy measures rather than to a fundamental disagreement on what would be appropriate policy approaches but. Quite some experts for instance support regulation policy as possible alternative for prohibition and plead for experiments with regulatory approaches but doubt that politicians will make this choice.

In this chapter we will highlight some aspects from the findings we think are worth a discussion for future drug policy making in the EU. We have grouped these issues under three headings:

1. Drugs market trends (including the impact of the economic crisis on the illicit drugs market and the increase of poly substance use)
2. Drug policy trends (including the impact of the economic crisis on drug policy and divergence tendencies in EU drug policy)
3. Unintended consequences of the current drug control policy.

### 4.1 Drugs market trends

#### 4.1.1 General market features

The responses we received show that general characteristics of markets or 'economic laws' are seen as important in shaping the illicit drugs market. Several experts underline the analogy of the illicit drugs market with other (licit) markets. They point out that the development described in three trends (increasing scale of the production, growing globalisation of drugs supply and an increasing diversification of the illicit drugs market) are general characteristics of markets. They are closely linked with each other; all are features of economic growth or expansion, a driving force of both the legal and the illegal market. Both are seen as driven by the same mechanisms, ruled by the same general economic laws (see 3.2, 3.3 and 3.4). Respondents refer here among others to industrialisation of production, to the interest in high profits compared with relatively small investment and to growing competition, supporting the urge to reduce costs.

Respondents also refer to other factors contributing to these three trends of the EU drugs market. One is the process of integration of EU Member States, in which the development of an open European market – which in fact is one element of the market globalisation – is a crucial element. The Schengen Agreement resulting in open borders between 26 European

States (in 2012, p. 25 EU Member States and Switzerland) providing for free movement of goods and people is not only seen as boost for the market of legal goods, but also for the expansion of the illicit drugs market (see 3.4).

Diversification of the illicit drugs market is understood by several respondents as element of broader socio-cultural developments driven by trends in youth culture: fashion, music trends and lifestyle, which influence or even shape drug trends. Reference is also made to a globalisation of these trends. The fact that the use of certain drugs is fashionable, fitting in with youth culture is also seen as explanation for growing illicit drugs markets in emerging economies. These trends are seen as helping to open new markets.

As mentioned above (see 3.4), advanced pharmacological and technological knowledge and the search for new, cheaper substances (partly driven by the economic downturn) are not only supporting the growing diversification of the illicit drugs market in the EU but also the increase in scale and the globalisation of production. This search for and production of new cheaper substances is also one of the drives behind the relative growth of the market share of illicit 'synthetic' drugs compared to the market share of 'natural' illicit drugs. As summed up under 3.2 synthetic drugs are relatively easy and cheap to produce. They are generally also cheap to buy – they tend to be less expensive than 'natural' drugs – which is important in the current economic crisis. Finally, they are popular among young people in recreational settings.

But, maybe even more important, drug prohibition seems to be a crucial contributing factor for the growth of the market share of synthetic drugs. Their indoor production is less visible than the outdoor growing of coca and poppy. The production of synthetic drugs can be done everywhere; it is not geographically bound like the cultivation of natural drugs. The production is thus easy to relocate, which helps to avoid seizures. Relocation might be chosen to keep production out of sight, but also to move the production closer to the user. Shorter trafficking lines reduce the risk of seizures (see 3.1).

The current drug prohibition policy is also mentioned as contributing factor to the other three drug market trends we included in our analysis. Globalisation can, at least partly, be explained by this relocation, moving production to 'safer' places in other countries, involving fewer risks and therefore less costs (higher profits). In particular countries with a weak state structure (in and outside the EU) are seen as breeding ground for corruption and organised crime, frequently closely linked with the governmental structures, which are perfect conditions for making illicit drugs business thrive. This globalization has also been described as balloon effect, contributing to a more internationally organised and wider spread drug crime. Enlarging the scale of production, in particular joint small-scale, downsized production spread over different locations (in different countries) to reduce the risk of detection can also be seen as supported by prohibition. Diversification of drugs produced is at least partly understood as response to prohibition/drug control measures: new substances are placed on the market to get around the prohibitive rules.

Overall, taking together the opinions of the consulted experts, the picture of an increasingly professionalised and well-organised illicit drugs market emerges, which seems to be closely intertwined with the legal drugs market, basically ruled by the same economic laws as licit markets.

Overall the views of the national experts on the development of three of these drugs market trends in their countries, growth of the market share of illicit synthetic drugs, growing globalisation of the illicit drugs supply and growing diversification of illicit drugs markets, converge with the views of the EU experts regarding the EU wide development. National experts also give the same arguments for their expectation. However, this is different for the trend towards bigger scale production of illicit drugs. Only five of the 31 respondents think that this will be important in their country. Interestingly enough two of this five are from the Netherlands where big scale drug production (cannabis growing and XTC production) has been reported. In the three Member States with only negative (and one or two neutral) responses (Bulgaria, Portugal and Sweden) only small scale production of cannabis and synthetic drugs has been reported.

#### **4.1.2 Impact of the economic crisis on the illicit drugs market**

Besides these general market features current economic developments influence the illicit drugs market. The majority of consulted experts expects that the economic crisis will have substantial impact on the illicit drugs market. Though there is some difference of opinion the majority anticipates an increase of use of licit and illicit substances. In combination with a decreased spending power of users experts foresee a search for cheaper drugs and, as a response to this, falling retail prices accompanied by a drop of purity and worsening quality through adulteration with larger quantities of different cutting agents. As buyers

frequently are not aware of the composition of the substance they buy – in particular when sorting out/experimenting with alternatives and regularly buying different substances – this is expected to involve increased health risks.

Several experts also point at a possible boosting effect of the economic crisis on illicit drugs supply, not only because of the expected increased demand but also because of an increase of available 'human resources'. One expert explicitly refers to criminological studies which show that in situations where people lack legal means to make the money required meeting their needs they tend to turn to illegal means (see 3.10.2). Selling (illicit) drugs might be one way to make 'easy money'. Also producing drugs, in particular growing cannabis is mentioned as an option here. A growing availability of 'cheap labour' for drug supply (particularly for smuggling and (street) dealing) might also bring about more competition and by that contribute to lower prices. However, this again could be compensated by higher percentages of adulteration.

The consultation of national experts resulted in an interesting picture. The majority – two third – expect that the economic crisis will have substantial impact on the drugs market in their country. However, there is a clear difference between the countries which are more seriously affected by the crisis (Bulgaria, the Czech Republic, Italy and Portugal) and the countries less seriously affected (the UK, Sweden and the Netherlands). In the latter only one expert per country expects a substantial impact of the crisis.

#### **4.1.3 Increase of poly substance use**

According to the majority of respondents both from the EU and the national expert consultation poly substance use takes a prominent place in the expected increase of drug use as a result of the economic crisis. This includes a variety of mixes of licit and illicit substances, in which alcohol is seen as playing the central role. The availability of a growing number of substances and the search for cheaper options is seen as trigger for experimenting with (combinations of) different substances. Experts anticipate that this might bring about serious health risks due to the fact that users are not aware of the actual ingredients of the substances they buy nor of the effects of combinations of substances (3.10.4). Respondents also point at a general lack of available information regarding the interactions between different substances and possible short and long term health effects.

#### **4.1.4 Internet as drugs market place**

The responses we received from the experts in the Delphi rounds left us with some diverging opinions and expectations regarding the importance of internet for the drugs market. Nine respondents provided us with their views, some of them gave rather detailed statements (see 3.10.1), but the views were too divers to come to certain conclusions. Therefore we decided to – briefly – consult some additional experts and do some rough searches on internet. The additional information we found made it clear that the role and importance of internet in linking drug supply and demand deserves serious attention.

As can be taken from all these different sources, internet serves as a facilitator rather than just a simple communication tool. References to a website like Silk Road illustrate this. "Silk Road, a digital black market that sits just below most internet users' purview, does resemble something from a cyberpunk novel. Through a combination of anonymity technology and a sophisticated user-feedback system, Silk Road makes buying and selling illegal drugs as easy as buying used electronics—and seemingly as safe. It's Amazon—if Amazon sold mind-altering chemicals."<sup>4</sup> In fact, Silk Road is functioning as a broker getting the buyer in contact with the seller. The important point here is of course that selling and buying illicit drugs through internet seems to be quite safe. It is at least perceived as safer (and more convenient and reliable) than the traditional face-to-face retail. "One happy customer wrote on his profile: 'Excellent quality. Packing, and communication. Arrived exactly as described.' They gave the transaction five points out of five."<sup>5</sup>

A first, methodologically sound research in the potential of Silk Road confirms this rather positive judgment regarding the functioning and potential of Silk Road for its purposes (Cristin 2012). It serves valuable information on the functioning of this internet market place. Therefore we decided to present some of its findings and conclusions in a bit more detail. Though Silk Road offers a wide range of items "from digital goods to pornographic materials, to various kinds of narcotics or prescription medicine" – there are more than 200 distinct categories –, Cristin's research shows "that Silk Road is overwhelmingly used as

<sup>4</sup> <http://gawker.com/5805928/the-underground-website-where-you-can-buy-any-drug-imaginable>. Last accessed: 21 September 2012.

<sup>5</sup> Idem.

a market for controlled substances and narcotics". (idem p. 1, 7/8) In the top 20 of the categories available – representing two third of all items available on Silk Road at the time of the research – illicit drugs play the most prominent role.

In Table 1, we take a closer look at the top 20 categories per number of item offered. "Weed" (i.e. marijuana) is the most popular item on Silk Road, followed by "Drugs," which encompass any sort of narcotics or prescription medicine the seller did not want to further classify. Prescription drugs, and "Benzos," colloquial term for benzodiazepines, which include prescription medicines like Valium and other drugs used for insomnia and anxiety treatment, are also highly popular. The four most popular categories are all linked to drugs; nine of the top ten and sixteen out of the top twenty are drug-related. In other words, Silk Road is mostly a drug store, even though it also caters some other products. Finally, among narcotics, even though such a classification is somewhat arbitrary, Silk Road appears to have more inventory in "soft drugs" (e.g., weed, cannabis, hash, seeds) than "hard drugs" (e.g., opiates); this presumably simply reflects market demand." (Cristin 2012, p. 8).

**Table 1: Top 20 categories in terms of items available (Cristin 2012, p. 9)**

Category	#. Items	Pct.
Weed	3,338	13.7%
Drugs	2,207	9.0%
Prescription	1,784	7.3%
Benzos	1,193	4.9%
Books	955	3.9%
Cannabis	880	3.6%
Hash	821	3.4%
Cocaine	633	2.6%
Pills	473	1.9%
Blotter	441	1.8%
Money	406	1.7%
MDMA (ecstasy)	393	1.6%
Erotica	385	1.6%
Steroids, PEDs	376	1.5%
Seeds	375	1.5%
Heroin	370	1.5%
Opioids	344	1.4%
DMT	343	1.4%
Stimulants	292	1.2%
Digital goods	261	1.1%

Interesting is also the overview of origins and destinations of shipping found by Cristin. The majority of items are shipped worldwide.

**Table 2: Top 12 most frequent shipping origins (left), and acceptable shipping destinations (right) (Cristin 2012, p. 12)**

Origin		Acceptable destinations	
Country	Pct.	Country/Region	Pct.
U.S.A.	43.86%	Worldwide	49.70%
Undeclared	16.28%	U.S.A.	35.13%
U.K.	10.14%	European Union	6.19%
Netherlands	6.51%	Canada	6.04%
Canada	5.91%	U.K.	3.65%
Germany	4.50%	Australia	2.87%
Australia	3.19%	World except. U.S.A.	1.39%
India	1.22%	Germany	1.03%
Italy	1.02%	Norway	0.70%
China	0.97%	Switzerland	0.61%
Spain	0.93%	New Zealand	0.57%
France	0.82%	Undeclared	0.26%

**Note:** Certain sellers ship to multiple destinations, hence the rightmost column totals more than 100%.

The revenue made by all sellers on this 'online marketplace' is estimated in that study as USD 1.9 million per month, resulting in USD 143,000 per month commissions for the Silk Road operators. This means that the market share of Silk Road, to our knowledge one of the rather well-known websites where one can buy licit and illicit drugs, is still a very tiny, not even one per cent of the estimated EU illicit drugs market.

We came across some more limitations which are worth to be taken into account. The most important one seems to us the actual anonymity of the system. How secure can sellers or buyers feel, how safe are they or how safe is the system? Silk Road is using the TOR network<sup>6</sup> which is seen as a rather safe way to conceal one's identity when visiting a website (without leaving one's IP address) and therefore to defend the user against network surveillance like the so-called 'traffic analysis'. But there are also some doubts if TOR is a fully effective protection against identification.<sup>7</sup>

Yet, the most risky elements in using Silk Road for selling or buying illicit drugs might be the payment system and the actual delivery. Silk Road is using the 'virtual money' Bitcoins, a so-called peer-to-peer digital currency.<sup>8</sup> Attacking this financial infrastructure might be in fact an effective disruption strategy (Cristin 2012, p. 20). The Bitcoin payment system has proven not to be fully safe as hackers have been able to steal money from one of the Bitcoin banks (Cristin 2012, p. 20). One expert involved in the development of the Bitcoin system also points out "that because all Bitcoin transactions are recorded in a public log, though the identities of all the parties are anonymous, law enforcement could use sophisticated network analysis techniques to parse the transaction flow and track down individual Bitcoin users."<sup>9</sup> An additional weak point of the Bitcoins system is that it is based on trust (there is no system for solving disputes) and that the value of the currency fluctuates and can vary between the Bitcoin networks.

Finally, it is of course the transport and the actual delivery which is far from safe, despite the fact that buyers and sellers seem to be not much worried about it. As the delivery appears to be primarily done through the traditional post services involving customs controls of transnational shipments the risks can be substantial. The general advice to have the substances delivered at a different address than your own does not really solve this problem. Cristin sees attacks of the delivery model through intensified controls at post offices and customs as one potential intervention strategies (Cristin 2012, pp. 20-21).

Despite the reported high level of buyer satisfaction – Cristin reports 97.8% positive feedback (4 or 5 on a scale of 1 to 5) – the position of the buyer is still quite weak. There is no way to reclaim stolen Bitcoins and there is no effective way of controlling the quality of the bought substances. Overall it can be expected that in countries where the risks involved in using

<sup>6</sup> See <https://www.torproject.org/>. Last accessed 5 October 2012.

<sup>7</sup> [http://en.wikipedia.org/wiki/Tor\\_\(anonymity\\_network\)](http://en.wikipedia.org/wiki/Tor_(anonymity_network)). Last accessed 5 October 2012.

<sup>8</sup> <http://bitcoin.org/>; <http://en.wikipedia.org/wiki/Bitcoin>. Last accessed 5 October 2012.

<sup>9</sup> <http://gawker.com/5805928/the-underground-website-where-you-can-buy-any-drug-imaginable>. Last accessed 21 September 2012.

the traditional 'face to face' market are high – both sellers and buyers – might after weighing up the risks of the traditional market against the risks of an internet market choose for the latter.

Another limitation is that using websites like Silk Road is still far from simple. It requires technical knowledge (being familiar with using TOR). One has to register on Silk Road. The next step is to create your own Bitcoin wallet at one of the various 'e-wallets' available. It is difficult to decide which one to choose, which one to trust. This means that for someone who uses drugs irregularly, who is generally buys small quantities or who is experimenting with different substances Silk Road might not be an interesting option, even when choosing for courier delivery.

To conclude, as mentioned before (see 3.10.1), the importance of internet as market place for licit and illicit drugs and its share in the (retail) market are unclear. Experts differ in opinion here. Some emphasise its importance in particular for licit drugs, others stress that internet is also more commonly used as digital market place for illicit drugs. Still, as already mentioned the market share of the illicit drugs trade through internet seems at the moment to be very small. However, besides websites like Silk Road there are other options like for instance chat rooms through which one can buy illicit drugs.

There is general agreement among the experts who mention internet as drugs market place that the importance of internet is growing, not only at the retail level, but also in the global, cross-border distribution. Internet clearly has the potential to contribute to globalisation and scaling up of drug supply. It eases the link between the supply and the demand side by facilitating accessibility for both sides and increasing availability of a wide range of substances through one portal.

There are two more important issues regarding the growing importance of internet: through its anonymity it might have the potential to undermine the current drug control system. It not only helps to shorten the supply chains, but also to effectively circumvent the traditional, 'real life' drug control measures implemented by police, customs, etc. Finally, drug trade through internet might also serve as a way for digital money laundering.

## 4.2 Drug policy trends

### 4.2.1 *Convergence - common feature of analysed drug policy trends*

As with the drug market trends the selected drug policy trends (decriminalisation of use, a tougher approach to drug supply, a wider acceptance of harm reduction and exploring the feasibility of regulation as alternative for prohibition) are not strictly separate phenomena. We mentioned already at the beginning (see 2.1.1) that these trends are all examples of the global convergence of drug policy we found in our earlier study (Reuter and Trautmann 2009). Decriminalisation of the use of illicit drugs (and the possession of small quantities for personal use) can be seen as one form of regulation. One argument in favour of this decriminalisation is that it can help to reduce health harms related to the use of illicit drugs. Measures like syringe exchange and injecting rooms targeting in particular injecting heroin users were illegal in many countries as they facilitated the use of illicit drugs which at that point of time was still was a criminal act.

All four trends have in common that they are a response to dissatisfaction with certain features and results of current drug policy measures. Several respondents refer to the disappointing results of current drug policy (measured against its objectives). They also point at the unintended consequences of drug prohibition like health harm and the contribution to illicit economies and organised crime, at the inconsistency of the policies towards licit and illicit drugs and at the unreasonableness of criminal proceedings as response to the use of illicit drugs (see below in this section). While three trends are examples of a search for alternatives to current policies, one trend – the tougher approach to drug supply – can be seen as 'more of the same'.

The views of national experts on the convergence of drug policy clearly show the political and ideological differences between countries. A majority of the consulted experts does for instance not expect that decriminalisation of use of illicit drugs (and possession of small quantities for personal use) will play a significant role in their country in the coming years. There have, however, different reasons. In Bulgaria, Italy and Sweden decriminalisation is seen as not fitting in the political context or 'mood'. The majority of the consulted experts from Czech Republic, the Netherlands and Portugal expect that there will be not much change in the coming years as decriminalisation is put into practice in all three countries.

Another interesting divide can be found regarding a wider acceptance and implementation of harm reduction strategies. Half

of the respondents anticipate that this trend will play a significant role in their country in the next five years, while close to the other half does not think so. Arguments for the latter viewpoint are, on the one hand, lacking or decreasing political interest, budget cuts and doubts about the effectiveness or usefulness of harm reduction and, on the other hand as stated by some Czech and Dutch experts, that harm reduction is already widely implemented.

As with the EU drug experts the national experts' opinions diverge about the question whether exploring the feasibility of regulation instead of prohibition in drug control policies will play a significant role the seven countries in the next five years. Also the arguments provided are similar.

#### **4.2.2 Impact of the economic crisis on drug policy**

From the responses we received we take that the economic crisis is expected to be a major factor influencing EU drug policy in the next years. Obviously most of the experts see budget cuts as the inevitable consequence of this crisis. There is also broad agreement that drug policy might fall on the policy priority list, as concerns about economic growth and employment are of more importance. However, there is difference in opinion regarding the targets of the anticipated budget cuts.

There are respondents who expect that above all harm reduction will be affected. However, also drug prevention and drug treatment programmes are seen as likely targets for budget savings. Social policy generally proves to be substantially affected in times of expenditure cuts. Others think that reduced budgets for drug policy might serve as opportunity to trim down spending on supply reduction measures, which in general are very costly and take the biggest share of the drug policy budget (Trautmann et al. 2009). Budget cuts might give rise to prioritising cost-effectiveness of supply reduction measures, underlining the need for a more thorough evaluation of their costs and effects. Getting tougher on producers and sellers of illicit drugs is very expensive. The economic crisis might work as a facilitator to turn this trend. Austerity might also support the exploration (and implementation) of regulation policies, as they are expected to be less costly than prohibition policies, though, at the same time, there might be no money available for drug policy innovation. The same can be said regarding decriminalisation. The trend to decriminalise drug use might be encouraged by the economic crisis, as decriminalisation could be a means to reduce costs involved in the criminal justice system. However, as already mentioned, the economic crisis might also work against decriminalisation as decriminalisation is expected to lead to higher treatment costs (see 3.10.3).

Anyway, the direction the impact of the economic crisis on drug policy will take depends on a number of factors. According to several respondents the rising conservatism in European social policy will be an important factor.

Regarding the impact of the economic crisis on drug policy we found an interesting divide between the opinions of the EU and the national drug experts. Half of the national experts expected that this trend will have substantial impact on drug policy in their country and the other half does not. Again this difference of opinion seems to be linked to the actual situation in the involved countries. Only one expert from the UK, Sweden and the Netherlands endorses the view, while this number is clearly higher for the other countries that are faced with a more serious impact of the economic crisis. There is no difference between national and EU experts regarding the actual expected impact.

#### **4.2.3 Political context: rising conservatism in European social policy**

The responses we received show that this growing political conservatism is expected to have a substantial influence on drug policy in the EU in the coming years. A conservative political agenda is seen as fitting well in policy making during an economic crisis. The reduction of 'unnecessary' or 'not strictly necessary' expenditures is priority. Through conservative eyes social policy is generally less important than – among others – safeguarding public security. The conservative mood which can be observed in the majority of EU Member States might therefore result in maintaining the trend of a tougher approach towards producers and sellers (see 3.8, 3.9, 3.10.2 and 3.10.3). This is also in line with a general trend of more punitive approaches to all kinds of socially undesirable behaviour, which can be seen in many EU Member States.

Rising conservatism in European social policy might at the end of the day work against the decriminalisation trend and the continuation of investments in harm reduction programmes. Regarding the latter different experts point at the declining priority of harm reduction on the political agenda of some EU Member States. The decreasing number of (injecting) heroin users in different Member States and the less urgent AIDS problem contribute to this (see 3.9). The UK is mentioned as

example where one can see some criticism on harm reduction, in particular OST, as defeatist, and a reevaluation of recovery as the way to deal with problem use/addiction.

#### **4.2.4 Divergence – a development on the rise?**

The views of the experts on the issue whether there is a growing tendency of divergence in EU drug policy are quite diverse. However, as mentioned above (3.11), we received a number of interesting reflections on the future development of drug policy in the EU.

The only issue where we could find a more widely shared view is the idea that some Member States might turn away from harm reduction. Some Member States have changed their view on harm reduction various times in the past years. But there are also Member States where harm reduction was for many years undisputed as essential element in drug policy but now the usefulness or appropriateness of at least some harm reduction measures is issue of debate as the discussion about OST in the UK shows. Additionally, a handful of experts expect that drug policy in some Member States will get harsher, supply-reduction oriented. The economic crisis and the increasing conservatism in politics are mentioned as factors supporting this tendency.

The views of national experts proved to be quite diverse reflecting the peculiarities of drug policy development in their Member States. The most widely shared point of view is that there is a tendency away from a policy which is characterised by the respondents as 'liberal', 'health driven' and 'harm reduction oriented' towards a more 'restrictive', 'repressive' or 'punitive' approach.

### **4.3 Unintended consequences**

One issue turning up regularly in the opinions of the consulted experts are unintended consequences of the pursued drug policy.

#### **4.3.1 Reinforcing drugs market trends**

All four drugs market trends we presented in the first round of our Delphi consultation (relative growth of the market share of illicit synthetic drugs, increase of scale of production, growing diversification and globalisation) are, according to many consulted experts, clearly linked with current drug prohibition.

Some experts explain **the relative growth of the market share of illicit synthetic drugs** – at least partly – as a shift from producing natural drugs. As already mentioned the prohibitionist drug control policy makes the production of synthetic drugs attractive as they are more easy and quicker to produce than natural drugs. The production of synthetic drugs is not geographically bound and easy to relocate to avoid detection. The latter also helps to shorten the trafficking lines and thereby reducing the risk of seizures. Another argument brought forward is that the current drug control policy seems to result in some countries in a shortage and/or bad quality of natural drugs. 'Spice', a mixture of herbal products and synthetic cannabinoids, is mentioned as an example of this. It seems to be especially popular in countries where natural marijuana or hash is not easily available or of poor quality.

This increase of the market share of illicit drugs is closely linked with **a growing diversification of illicit drugs**. Several respondents interpret this diversification partly as response to the current drug prohibition. Producers, sellers and users try to get round the risk of having to face criminal proceedings. In these respondents' view drug policies based on prohibition fuels the search for 'new' drugs that do not fall under the drug law. Also the user's dissatisfaction with the decreasing quality of 'traditional' illicit drugs (like heroin and cocaine but also cannabis) is seen as a result of the black market and a driving force towards diversification. Diversification brings about what could be called secondary unintended consequences. According to one expert diversification might involve serious health risks for drug users as *"we don't know enough regarding the short and long-term health effects of the substances"*.

The relocation of production (as well as the shifts in trafficking routes) – driven by interdiction efforts – are mentioned as contributing **to the growing globalisation of illicit drugs supply**. Experts also indicate that this ongoing relocation makes that

the differentiation of countries into illicit drugs “producing” and “consuming” countries becomes more and more irrelevant.

Different experts see **the increase of scale of the production of illicit drugs** as among others a consequence of the current drug prohibition, which is seen as stimulating the development of professional criminal organisations taking over drug production. This scaling up of production size also includes organising production as network of small-scale production facilities in hands of one organisation to reduce the risks (and costs) of detection.

In conclusion it may be said that according to the majority of consulted experts the existing drug control policy has substantial unintended consequences. It is seen as shaping some key features of the illicit drugs market and working as an incentive to organised crime, encouraging violence and contributing to health risks of users of illicit drugs as it stands in the way of any control on potency and quality of substances. Most respondents therefore doubt the usefulness and effectiveness of a tougher approach to drugs supply. A tougher approach is seen as counterproductive, as it fuels illicit economies, corruption and the growth of organised crime.

#### **4.3.2 Growing involvement in illicit drug business**

Several respondents state that the economic crisis might add to these unintended consequences. One additional issue mentioned here is that unemployment, social deprivation and marginalisation – effects of the economic crisis – might result in a growing involvement of users in drug production, trafficking or dealing or other crimes as a source of income, among others to finance their drug use. Experts point in particular at cannabis growing as tempting option for making ‘easy money’. According to them more ‘human resources’ involved in illicit drug business might also contribute to an increase of drugs supply.

#### **4.3.3 Increased importance of internet**

Another development which is interpreted as a response to and an unintended consequence of the current drug control policy is the increasingly important role of internet in the distribution and in particular in the retail of (illicit) drugs. Several experts state that selling and buying through internet is seen as less risky than through a traditional dealer. Internet is seen as means to get round the existing control efforts and to facilitate access to drugs. It contributes to a situation *“where a free market develops fast and without any regulation and control of among others the quality of the products sold”*. It has the potential to contribute to further globalisation and scaling up of the drugs market. These features of internet together with a growing and diversified synthetic drugs market are taken as prove for some major flaws of the existing law enforcement approach.

#### **4.3.4 Other unintended consequences**

There are also unintended consequences of developments or policies market in other areas facilitating the (illicit) drugs market. One example is the rule of free movement of people, goods and services within the EU and the Schengen Convention from 1990 (which initiated the abolition of border controls between Member States joining the Schengen area) which is facilitating the ‘free drugs market’ (see 3.3). Respondents provided more examples. Some for instance highlight the importance of the general improvement of transport infrastructure, information technology and professionalization for the globalisation of the illicit drugs market. It *“will facilitate the trade in illicit drugs as it will any other trade in commodities. Ironically as roads are built or improved in certain countries with international aid to allow for the expansion of legitimate trade and alternative crops, the transport of illicit crops will be assisted. The revolution in communications technology has augmented the global trading in licit and illicit goods alike”* (see 3.3).

One respondent points out that

*“there is information of some Member States noting that one of the consequences of spending cuts (for instance in the case of police) is that such services now choose to focus only on their ‘core activities’, thereby reducing the amount of time they devote to ‘partnership working’. This is an ‘unintended consequence’, because as we know that tackling drug crime successfully relies upon different agencies working and cooperating together, and this will lessen as agencies look to implement cuts at the direction of their higher authorities.”*

## 5 Recommendations

As already mentioned, an exploration of experts' opinions on the future developments of the drugs market and drug policy in the EU cannot easily be translated into clear-cut drug policy recommendations (see 1). The expert consultation provided us with rich information how experts view the development of the drugs market and the drug policy response in the EU in the near future (see 3). Besides short statements we received quite some elaborated and well-founded statements about the directions key trends are expected to take and which steps should be considered. The expert consultation also told us something about the support for certain directions or measures. In our discussion of these findings in the previous chapter we tried to identify key issues for the current drug policy debate. It is the basis for reflecting on appropriate policy steps in order to deal with these developments effectively and for formulating recommendations for future drug policy making in the EU. We decided to leave aside the obvious recommendations mentioned by the respondents, like more sophisticated and better targeted supply reduction measures or more harm reduction or harm reduction going beyond heroin use. These recommendations are integrated in the findings chapter at the end of the sections on the different trends (see 3). We are fully aware that there is still a need for among others better, evidence-based demand reduction (drug prevention, drug treatment and harm reduction) and supply reduction (see 3). However, we decided to primarily focus on missing requirements for innovations in drug policy.

### 5.1 Responding to the drug market trends - exploring drug policy alternatives

One important issue in our expert consultation were the different factors shaping the illicit drugs market in the EU. Besides mentioning general features of markets, experts referred repeatedly to drug prohibition as a major factor stimulating the drug market trends<sup>10</sup> we presented in the first round of our consultation (see 4.1.1). A small number of respondents indicate that improved and more effective law enforcement measures are needed, e.g. more effective precursor controls and interdiction measures targeting for instance illicit production laboratories. Other measures considered to be important are legal changes allowing for more effective enforcement measures against corruption and money laundering, and fighting international organised crime, prioritising industrial production of illicit drugs.

However, according to the majority of the experts there is good reason to doubt that simply carrying on with more of the same is an effective strategy. One frequently mentioned example of an ineffective approach is placing new psychoactive substances under the control of the current drug laws. Experts emphasise the shortcomings of prohibition and also point out that just intensifying the current drug control policy – and in particular the drug supply reduction efforts – is too costly and will not bring about the desired effect. According to them it is simply unrealistic to think that an effective control of the growing number of illicit drugs is merely a question of sufficient supply reduction capacity. Following the 'precautionary principle' – putting a new substance under the existing drug laws because there is not yet enough information available about the serious short-term or long-term health risks of its use – may sound reasonable and rational, but it is not. In the end it threatens to be used as an argument for simply prohibiting every new psychoactive substance, as we lack the information to decide whether a certain substance involves health risks. Some EU Member States have recently adopted legislation to this extent (Ireland, Poland and Romania). The current procedures ranging from detection through risk assessment to legal action look rational, but have a bias toward prohibition (Reuter 2011). As Reuter puts it, this bias "is almost impossible to avoid. The adverse consequences of mistakenly refraining from prohibiting what may turn out to be a dangerous drug are massive both for the individual decision maker and for the political party in power at the time. On the other hand the gains from correctly allowing a new psychoactive substance to enter into the market, with appropriate regulatory controls, are modest and not very salient for the decision maker or the government." (Reuter 2011, p. 27).

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<sup>10</sup> The relative growth of the market share of illicit 'synthetic' drugs, scaling up of the production, growing globalisation of drugs supply and an increasing diversification of the illicit drugs market.

There are more inadequacies in a primarily prohibitionist approach to new psychoactive substances. In recent years one can see a peak of new substances emerging in the EU. “The last two years have seen a record number of new substances identified for the first time in Europe — 24 in 2009 and 41 in 2010. Currently, about 150 substances are monitored at EU level.” (EMCDDA 2011). Yet, only very few of these substances became considerably popular among users in some Member States: BZP, Spice, mephedrone and naphyrone. Finally, a strategy of ‘more of the same’ ignores the fact that prohibition has severe unintended consequences (see 4.3). This has brought several experts to the conclusion that it is time to reconsider prohibition and to explore alternatives for control measures under the current drug laws. In the current situation there are only two options: either to submit a new substance to criminal control measures, or it can decide to leave it ‘uncontrolled’.

Different options have been discussed to do something about this. One of the more comprehensive studies in this field is the study on ‘policy options for tackling the issue of new psychoactive substances’ (GHK 2013), commissioned by the European Commission in preparation of an impact assessment for new EU legislation on new psychoactive substances. Besides exploring some approaches which can be seen as attempts to improve the current legislative system – e.g. improving the current early warning system and addressing new psychoactive substances as a group<sup>11</sup> – there are in fact two alternative approaches for the current drug control approach, which have been discussed in the past years and which we think are worth exploring. The fact that they have received some support from policy makers, politicians and researchers makes them more realistic options. One option is temporary control measures for new psychoactive substances that seem to pose health risks. The other option is regulatory regimes complementing or replacing the current prohibitive drug policy.

### **5.1.1 Temporary control measures**

Temporary control measures can be seen as adding one option between the ‘black and white’ of the current situation: either submitting a new substance to criminal control measures or leaving it ‘uncontrolled’. Some EU Member States (Germany, the Netherlands and the UK) have already introduced this option. It is part of an emergency system which allows for immediate action in case there are indications that a new substance might involve serious health risks. It helps to avoid time consuming procedures and gives time for a thorough risk assessment. In Germany and the Netherlands a substance can be placed under temporary control for a year. In case no follow-up steps are taken the control measures are withdrawn (GHK 2013, EMCDDA 2011).

Temporary measures could have the advantage to take away or to moderate the negative effects of the ‘precautionary principle’. The final decision is postponed and more thorough research could lead to the decision not to submit a substance under the current regulation of illicit substances. However, temporary control measures, i.e. placing new substances for a limited time under the same control regime as illicit drugs, might in fact end up as just a short track to immediately place a substance under control, be it temporarily. The temporary ban then allows for sufficient time to work on a permanent ban. This is why there have been proposals to review the current drug control system and develop “a single, coherent, overarching framework for regulating all psychoactive substances, such as a Control of Harmful Substances Act” (UKDPC 2011).

#### **Steps to be considered:**

- Monitoring the experiences in different Member States, in particular the outcomes of the reflection period: are substances placed under permanent control or left ‘uncontrolled’; what are the considerations leading to this decision, etc.
- Take into consideration differences between drugs markets in different Member States (different substances used).
- Explore additional options as follow-up of a temporary control regime besides permanent drug control and no control.

### **5.1.2 Regulation policies**

One of these additional options could be a drug control policy based on a regulatory regime. Regulation policies are clearly the favourite of our respondents when it comes to suggestions for changes in the current drug control policy. Therefore, we think that an exploration of the feasibility and effects/effectiveness of regulation policies is worth considering. There are two (groups of) substances which might be most suitable for this exercise, i.e. new psychoactive substances, in particular the ones which are not yet placed under criminal law control, and cannabis.

<sup>11</sup> There are two approaches here, the so-called ‘generic approach’ addressing groups of chemically kindred substances and the ‘analogue approach’ addressing substances which share more general similarities in chemical structure and pharmacological activity.

For the first (the so-called 'legal highs') a legal regime is not yet in place and different options are still under discussion. In many proposals regarding a regulation regime for the new psychoactive substances respondents emphasise that it should be similar to what is applied to the current medicines regulations. This would require new legislation, for which also the current consumer protection law might serve useful leads. Other options could be (elements from) foodstuff regulations and regulations relating to specific commodities, such as tobacco and alcohol, but also substances with other uses, such as solvents (Reuter 2011). Decriminalisation, regulation through a.o. regulatory agencies and a well controlled licensing system and taxation are frequently mentioned priorities. One interesting development here are the plans to regulate this particular market under state control in New Zealand (Fisher 2012). The core element in this law proposal is that psychoactive substances can be sold legally after having been tested and proved 'low risk'. The producers have to pay the costs involved in this testing.

Regarding cannabis, the second substance, there has been an ongoing debate to replace prohibition by regulation policies over the past years. We find some examples of regulatory regimes in practice like the cannabis coffee shops in the Netherlands and – be it less formalised – the social club model in Spain. The Dutch coffee shop model regulates only the selling of cannabis, not its production and transport. Coffee shops selling cannabis are required to comply with a set of conditions known as the 'AHOJ-G' criteria: no advertising (A), no sales of hard drugs (H), no nuisance (O), no admission to coffee shops for minors (under 18) (J), and no sales of large quantities (more than 5 grams) per transaction (G). The maximum trading stock is 500 grams, but municipalities can set a lower maximum, if they wish.

Regulation options are discussed in several countries.

#### **Steps to be considered:**

- The point of departure could be a study of the literature already available on regulation regimes relevant for new psychoactive substances and cannabis, including a review of existing regulations governing the production and sale of pharmaceuticals, and precursor chemicals. In the past years several extensive studies on regulation regimes have been published (a.o. Transform 2009). This literature includes besides presentations of plans and general discussions of feasibility of regulation regimes studies and reports on the first experiences and a thorough discussion of the legal issues involved.
- The next step could be to set up an expert committee including specialists from supply and demand reduction to discuss the findings from this literature study, to explore a feasible strategy for pilots and to prepare a proposal for these pilots including details about responsible regulatory agencies, licensing system, taxation and monitoring/ research of the experiments and how such measures could be implemented within the EU's internal market and vis-à-vis third countries.
- The third step could be carrying out a number of pilots, preferably on a limited geographical scale to facilitate control, monitoring and research.

## **5.2 Improving the knowledge base of drug policy**

Another top priority on the wish list of various respondents is improving the knowledge base of drug policy. Research, evaluation and monitoring are key priorities here. This is of course no surprise, as the majority of our respondents were researchers. A look into the research efforts of the past years shows that a lot has been done so far. Several Member States and the European Commission have made available substantial budgets for research in the drugs field. Quite a number of studies have been carried out, contributing to the evidence base for effective drug treatment options, including opioid substitution treatment. There have also been a range of research projects on the working of the illicit drugs market and the impact of drug policy.

This does not mean that the plea for more research is just self-interest of scientists. There are good arguments to justify more research in some fields, as can be taken from what has just been said about exploring drug policy alternatives. One of our respondents stated when reflecting on the impact of the economic crisis on the drugs market: "Giving the level of uncertainty, this is clearly a case first and foremost for increased research and monitoring". This statement is true for more areas. We will limit ourselves to the areas where the need for knowledge is the most urgent.

### **5.2.1 (Cost-)effectiveness of policy measures**

More research is needed about the (cost-) effectiveness of policy measures. In particular in times of austerity it is important to know which policy measures are (cost-) effective. This includes evaluation studies of current drug policy measures – both in supply and demand reduction – but also ex-ante evaluation studies of drug policy alternatives, to determine their effectiveness, cost-effectiveness and assess potential unintended consequences. An assessment of unintended consequences and an assessment of facilitators and barriers for policy measures should be part of policy making processes. The European Commission has such evaluation mechanisms in place, e.g. its impact assessment procedure. But they are not always utilised.

The experts we consulted emphasise that investments in drug policy should be guided by sound evidence. Priority should be given to proven effective measures. To be able to measure effectiveness one expert emphasises that success indicators of measures *“should be agreed upon before the measures are taken, and then policies should be evaluated timely using accurate data on these indicators”*.

As thorough cost-effectiveness studies are very time-consuming and expensive, one could consider checking the feasibility of light versions of cost-effectiveness assessments of policy measures and programmes.

### **5.2.2 Monitoring the drugs market**

Another priority is further research into and continuous monitoring of the drugs markets as basis for adequate and effective drug policy measures to reduce supply, demand and drug use related harm. Collecting on regular basis detailed information about which substances are available on the market and consumed by users provides the knowledgebase for appropriate prevention, treatment and harm reduction responses and for well-targeted enforcement and/or regulation action. There are for instance still a number of Member States where monitoring of new psychoactive substances and trends is limited (GHK 2013, p. 72). Vital parts of regular monitoring are a quality control of the substances available on the market and an early warning system, providing rapidly objective information on effects and risks to consumers and possible consumers. It speaks for itself that exchanging the information collected by research and monitoring between EU Member States is essential to ensure efficiency and (cost)- effectiveness.

### **5.2.3 Research into the effects of (combinations of) new psychoactive substances**

A crucial issue brought forward in the discussion on poly substance use is the lack of knowledge about the psychoactive effects and toxicity of new licit and illicit substances and about interactions between different substances (including pharmaceuticals). Research into the short and long-term effects of new psychoactive substances and of combinations of substances is vital to limit health risks involved in the use of these substances. A better understanding of the effects and of the practices of poly substance use is needed to develop appropriate and effective prevention- and treatment responses. The focus should be on the most prevalent substances and frequently used combinations. This research should also make use of the experience and expertise of users.

### **5.2.4 Exploring the functioning and importance of internet**

The discussion of the role and importance of internet as a drugs market place (see 4.1.4) shows that exploring the role and importance of internet as a market place for licit and illicit drugs is urgently needed. One part is of course to understand the functioning of internet as drugs market forum for licit and illicit drugs and pharmaceuticals. There are many issues which deserve exploration. What are the advantages and the limitations of the use of internet for the supplier and the buyer. Who is selling and buying through internet and why? What substances are sold? What is the share of internet sales in the illicit drugs market? The study of Cristin offers an important first insight to gain a better understanding of how internet is used for selling illicit drugs (Cristin 2012).

Another part is exploring feasible, affordable and effective control measures. The use of internet for selling and buying illicit drugs will necessitate a new approach for tackling illicit trade. The traditional approach of individual criminal investigations and prosecutions is rather time consuming and expensive, in particular for illicit drug trade through internet. Alternatives might

be disruptions of the internet drugs market by prosecuting and closing down suppliers' websites, as has already been put into practice for illegal downloading of music or movies. Existing practice targeting illegal activities on internet as for instance gambling might provide useful leads for efforts to control illicit drug trade on internet. It is worth considering exploring also ways to regulate internet trade in licit drugs and pharmaceuticals effectively.

Cristin's discussion of three potential intervention strategies: 'attacking the Tor network, attacking the financial infrastructure and attacking the delivery model' raises some interesting issues. The financial infrastructure and the delivery model are according to him the weakest spots of the system (see 4.1.4). Regarding the financial aspect he points at the theft of Bitcoins from one of the Bitcoin banks, proving that the system is far from safe. This of course might result in a loss of consumer confidence in the Bitcoin system. Hacking a Bitcoin exchange could therefore be an effective disruption strategy. Moreover, Cristin refers to certain critics claiming that Bitcoin transactions can be traceable through traffic analysis (Cristin 2012, p. 20). Both points can be leads for developing an intervention strategy. Attacks on the delivery model would involve traditional control measures like controls of the postal services and customs.

The first intervention strategy, attacking the Tor network, is more complicated. Cristin points at the fact that "Tor is routinely used by oppressed individuals to communicate without fear of reprisal". (Cristin 2012, p. 20). Disrupting the Tor network would therefore have serious unintended and unwanted consequences. Moreover, the Tor network has proved to be very difficult to attack.

One final remark regarding efforts to control illicit drug trade via internet: control and criminal investigation activities targeting internet traffic involve the risk of breaching fundamental rights as the privacy of innocent citizens. Freedom of communication through internet is a high good, but the potential of internet can at the same time be abused to undermine justice and security in society. It will be a delicate task to find the balance between respecting a human right such as the freedom of communication and protecting society against the 'subversive' potential of internet. As one of our respondents stated: one has to find "the balance between the confidentiality of honest citizen's communications and the need for the authorities to investigate or prevent criminal acts committed online."

### **5.2.5 Coordination of drug research**

Finally, in order to use the available research funds as efficiently as possible, avoiding duplication of research is a top priority. This requires coordination of drug research, at least in the EU. We are aware that this will be difficult to realise. Still, some steps have been taken in this direction. One example is the European Research Network on Illicit Drugs, financed by the European Commission, starting in 2013.

Stimulating cross-border research cooperation, bringing together drug research expertise in different Member States – also regarding research methodology - contributes to a more efficient use of the available human and financial resources. This is also advantageous for individual Member States as they can get relevant knowledge at a relatively modest price.

## **5.3 Direction of future drug policy in the EU**

The experts consulted in this Delphi study provided us with various ideas and suggestions for developing and adapting drug policy in the EU. In the first two sections of this chapter we concentrated on some key requirements for adaptations and innovations in EU drug policy, i.e. alternatives within or for the current drug policy and improving the knowledgebase underpinning drug policy making. The responses we received from the consulted experts underline that drug policy makers operate in a complex field. The drug market trends analysed in this report (increase of scale, globalisation and diversification of production and trade) and the mix of intended and unintended consequences of drug policy measures taken illustrate this complexity. Moreover, drug policy is a highly politicised and ideologically charged issue which complicates reaching an agreement on what are appropriate steps to tackle problems. As mentioned in the introduction of chapter 4 Discussion, there seems to be broader agreement on the problems than on the appropriate strategies to tackle these problems. Besides diverging views regarding the practicality and feasibility of certain policy measures there is – in particular on political level – difference of opinion about one of the principles of current drug policy, the prohibition of non-medical use of certain substances.

Taking into account the politicised character of the public debate about illicit drugs it is evident that the question whether an approach mainly based on prohibition is appropriate simply cannot be answered. Therefore, according to us, it might be better to start off from the angle: What works? Which measures are more effective and less costly than others? We do not expect that this approach, identifying and piloting possible alternatives and further research are the solution. Policy making does not follow a linear, rational model (problem-options-solutions-implementation). Various factors influence and intervene in this policy making. This rational model neglects the critical role politics, stakeholders, context and numerous 'barriers and facilitators' play. It also de-emphasizes the importance of the processes in political decision making (Ritter and Bammer 2010). So we expect that the results from exploring new ways will trigger debate in which apart from research arguments political agendas will play a role. Still we think that exploring and piloting alternatives is – as in other policy making and research areas – one element needed to critically appraise options and get things moving.

As we are dealing with a complex and global problem we also have to look for a broad, international response. However, this does not mean that we necessarily have to look for one globally applicable 'solution', a generally shared universal remedy. It might be better to focus primarily on a shared understanding of the problem and a reasonable consensus on the drug policy objectives, but leave – as far as possible – room for different approaches to reach these objectives. The EU Drug Strategy 2005-2012 can be seen as an attempt to do so. It defines the framework of actions to be undertaken and sums up ingredients of effective drug policy with the intent to provide a tool for coordinating and align drug policy in the EU Member States (Council of the European Union 2004). However, it explicitly acknowledges the importance of taking into account national and regional differences in the drugs situation for actual drug policy making in the EU Member States. Aligning drug policy in the EU does not mean that every Member State does exactly the same. To make drug policy as effective as possible one has to take into account the nature and extent of the drugs problem and the drugs markets in the different EU Member States. Also differences in policy (making) traditions should be taken into account. Though fairly vague, the guiding principle of drug policy should be to allow for divergence within a framework of general consensus. Trials of possible alternatives for insufficiently effective current policy measures are vital to make improvements. Testing alternatives generally can be well in line with international conventions like the Single Convention on Narcotic Drugs of 1961.

Ideally this approach could result in a policy mix of well-established and innovative approaches. One of our respondents put this as follows: *"Reduction of demand (education, public information etc.) coupled with alternative and broader interventions against the illicit production and supply (national and international collaboration, non judicial outcomes sought, imaginative use of taxation and business regulations etc.) and the focus on the criminal proceeds of the illicit trade. All of these measures offer policymakers attractive options in the present tight financial circumstances."*

There is one more important issue which should be taken into consideration when making drug policy. When discussing the impact of the economic crisis on the drugs market (3.10.2) several experts stated that a policy response to increased levels of drug use and a growing involvement in illicit drugs business cannot be tackled successfully by drug policy measures. They emphasised that policy strategies need to address the underlying social and economic problems of drug abuse and drug (use) related crime. In the case of the effects of the economic crisis this means policy measures targeting unemployment, social exclusion, poverty, etc. This means among others that drug use prevention has to go beyond measures addressing individual young people by providing information and education and focussing on developing life skills. In order to be more effective drug prevention but also treatment has to be integrated in a broader social and health policy framework. However, formulating proposals for such a broader policy framework goes beyond the scope of this study. But it is worth mentioning here that drug policy cannot be effective if isolated from other policy fields. This is also true for drug supply reduction, where one can already see efforts to combine the traditional actions targeting drug production and trade with other anti-crime measures aimed at, among others, money laundering, human trafficking and organised crime.

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## Annex 1: List of consulted EU experts

**Appel, Laurent;** Journalist, Auto-Support des Usagers de Drogues (ASUD)  
Observatoire Géopolitique des Criminalités (OGC)  
France

**Bewley-Taylor, David;** Senior Lecturer, Department of Political and Cultural Studies,  
College of Arts & Humanities, Swansea University  
United Kingdom

**Cipolla, Constantino;** Professor, Dipartimento di Sociologia, Università degli Studi di Bologna  
Italy

**Coletti, Maurizio;** President, Itaca  
Italy

**Coomber, Ross;** Professor of Sociology and Director, Drug and Alcohol Research Unit School of Social Science and Social  
Work Plymouth University  
United Kingdom

**Coppel, Anne;** Sociologist and Researcher, National Agency of Research  
France

**Corrigan, Des;** Former Chairperson of the National Advisory Committee on Drugs until December 2011  
Ireland

**Costes, Jean-Michel;** International expert on drug issues and former director of the French Monitoring Centre on Drugs  
and Drug Addiction (1995-2011)  
France

**De Bruin, Noud;** Chief Inspector of Police, Advisor Drugs Expertise and Policy  
Dutch National Police Agency (KLDP)  
The Netherlands

**Decorte, Tom;** Professor in Criminology, Ghent University, Faculty of Law  
Institute for Social Drug research (ISD)  
Belgium

**De Ruyver, Brice;** Director Institute for International Research on Criminal Policy  
Full Professor Criminal Law and Criminology  
Department of Criminal Law and Criminology - Faculty of Law  
Ghent University  
Belgium

**Gallà, Maurice;** Seconded National Expert, Directorate-General for Justice, European Commission until 1 January 2013  
Belgium

**Goldberg, Ted;** Retired Sociology professor at the University of Gävle  
Sweden

**Griffiths, Paul;** Scientific director, Scientific division, EMCDDA  
Portugal

**Jamin, Jaap;** Senior health education officer, Jellinek  
The Netherlands

**Kilmer, Beau;** Co-Director, RAND Drug Policy Research Center  
Senior Policy Researcher, RAND  
USA

**King, Les;** Retired coordinator of the Early-Warning System in the UK (1997 to 2011),  
part-time member of the Reitox Focal Point in the Department of Health  
United Kingdom

**Lahaie, Emmanuel;** Pharmacist and National coordinator of SINTES network, French Monitoring centre for Drugs and Drug  
addiction [Observatoire Français des Drogues et des Toxicomanies]  
France

**Lap, Mario;** Drug expert  
The Netherlands

**Leroy, Bernard;** Avocate General, Parquet Général de la Cour d'appel of Versailles  
France

**McGee, Peter;** Expert Advisor to RAND Europe  
United Kingdom

**Mravcik, Victor;** Head of the Czech National Monitoring Centre for Drugs and Drug Addiction  
Czech Republic

**Radimecky, Josef;** Senior Research Fellow, Lecturer, Manager for International Relations,  
Centre for Addictology, Medical Faculty Charles University in Prague  
Czech Republic

**Reuter, Peter;** Professor at the University of Maryland  
USA

**Rossi, Carla;** Full professor of Medical Statistics, Director of the Centre for Biostatistics  
and Bioinformatics, University of Rome "Tor Vergata"  
Italy

**Rusev, Atanas;** Former Research Fellow, Center for the Study of Democracy  
Bulgaria

**Schatz, Eberhard;** Project coordinator, CORRELATION network  
The Netherlands

**Sipp, Werner;** Independent expert  
Germany

**Shiner, Michael;** Senior Lecturer in Social Policy, Department of Social Policy,  
London School of Economics  
United Kingdom

**Singleton, Nicola;** Director of Policy & Research, UK Drug Policy Commission  
United Kingdom

**Uhl, Alfred;** Coordinator Drug Prevention Research and Documentation  
(former LBISucht and AKIS) of the Anton-Proksch-Institute (API)  
Austria

**Wainwright, Rob;** Director, Europol  
The Netherlands

**Zabransky, Tomas;** Scientific Reader, Department of Addictology, First Faculty of Medicine  
Charles University in Prague and General University Hospital in Prague  
Czech Republic

**Zeltner, Thomas;** Professor of Public Health, University of Bern  
Switzerland

## Annex 2: List of consulted experts from the seven sample Member States

### BULGARIA

**Gospodinov, Miroslav;** Inspector, Chief Directorate for Counter Organized Crime, Ministry of Interior

**Kantchelov, Alexander;** Director, Kantchelov Clinic Sofia  
President, Bulgarian Methadone Treatment Association  
President, Europad

**Raycheva, Tsveta;** Director of the National Centre for Addictions, member of National Drugs Council

**Vasilev, Georgi;** Director, Bulgarian Addictions Institute

**Zidarova, Venda;** Secretary of the National Drugs Council, Drugs department at the Ministry of Health

### CZECH REPUBLIC

**Bem, Pavel;** Member of the Chamber of Deputies of the Parliament, Member of the National Drug Commission - Office of the Government in Cabinet of Prime Minister, Member of the Global Commission on Drug Policy, Former Mayor of Prague, Psychiatrist (Addiction), Psychotherapist and University Teacher

**Frydrych, Jakub;** Director, National Drug Headquarters, Czech Republic Police

**Kalina, Kamil;** Psychiatrist and Professor of clinical psychology, 1st Medical Faculty, Charles University

**Zabransky, Tomas;** Scientific Reader, Department of Addictology, First Faculty of Medicine  
Charles University in Prague and General University Hospital in Prague

### ITALY

**Cipolla, Constantino;** Professor, Department of Sociology, University of Bologna

**Gatti, Ricardo;** Director of the Addiction Department, ASL Milano

**Patrino, Fabio;** Harm reduction desk officer, Social and Health Department Italian Red Cross

**Rossi, Carla;** Full professor of Medical Statistics, Director of the Centre for Biostatistics and Bioinformatics, University of Rome "Tor Vergata"

**Scenna, Mauro;** Lieutenant- Colonel of the Central Direction of Anti Drug Services

### THE NETHERLANDS

**Bieleman, Bert;** Director, Intraval, Office for social scientific research and consultancy

**Bruin de, Noud;** Chief Inspector of Police, Advisor Drugs Expertise and –Policy, Dutch National Police Agency (KLPD)

**Garretsen, Henk;** Professor Health Care Policy, Director Department Tranzo, Tilburg University

**Zwart de, Wil;** Senior policy officer drugs, Nutrition, Health Protection and Prevention Department, Ministry of Health, Welfare and Sport

## PORTUGAL

**Ferreira, Adelino;** Director, IDT in the Northern region of Portugal

**Mendão, Luís;** Patient activist, Chair of the BoD of GAT (NGO on HIV/AIDS)  
Chair of the Policy Group of European AIDS Treatment Group

**Mendes, Fernando;** President, IREFREA

**Pereira, Joaquim;** Director, National Unit for Fighting Drugs Trafficking

**Ribeiro, Carla;** Head of the Statistics and Research Unit, General-Directorate for Intervention on Addictive Behaviours and Dependencies

## SWEDEN

**Goldberg, Ted;** Retired Sociology professor at the University of Gävle

**Guttormsson, Ulf;** Researcher/Statistician, Council for Information on Alcohol and Other Drugs (CAN)

**Gynna-Oguz, Christina;** Director, Ministry of Health and Social Affairs

**Svensson, Bengt;** Professor in Social Work, University of Malmö

## UNITED KINGDOM

**Klein, Axel;** Lecturer in the Anthropology of Conflict, Criminal Justice and Policy, University of Kent

**Lloyd, Charlie;** Senior Lecturer, Department of Health Sciences, University of York

**McKeganey, Neil;** Director, Centre for Drug Misuse Research

**Turnbull, Paul;** Director, Institute for Criminal Policy Research, Birkbeck College, University of London



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