



European Monitoring Centre  
for Drugs and Drug Addiction

TECHNICAL REPORT

# **Estimating the size of the main illicit retail drug markets in Europe**

EMCDDA

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# Estimating the size of the main illicit retail drug markets in Europe

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## Executive summary

Estimates of the total retail market size for the EU in 2013 for cannabis, heroin, cocaine, amphetamines and ecstasy have been constructed using a demand-side approach to assist policy makers in prioritising interventions and understanding changes over time. Additional estimates are provided including Norway and Turkey for cannabis and heroin and Norway for cocaine, amphetamines and ecstasy. These initial estimates are likely to underestimate the size of the market due to gaps in the data currently available on which to base these estimates. However, the process has proved valuable in identifying key gaps in our knowledge and the intention is to repeat the estimation process and improve it over time by undertaking quality improvement work and new data collections to plug data gaps.

This report presents estimates of aggregate market size for the different drugs at EU and European level and describes in detail how these estimates were achieved. Country level estimates are not reported given the uncertainty around some of the individual estimates, which affect comparability.

Some key principles underpinned the approach taken:

- European estimates were obtained by summing individual country estimates;
- wherever possible data the data used came from routine data collections held by the EMCDDA to facilitate the planned process of updating over time;
- where imputation of missing data was necessary we sought as far as possible to base this on other related data; and
- we have sought to clearly note all imputations and assumptions made within the estimation process so that the limitations are clear.

Estimates of both quantity and value (in Euros) of retail market size have been calculated. The basic model used in the estimation process can be expressed in simple form as:

$$\begin{aligned} \text{No. of Last Year users} * \text{Amount used per year} &= \text{Total annual consumption (quantity)} \\ \text{Total annual consumption} * \text{Price (purity adjusted)} &= \text{Market value (per year)} \end{aligned}$$

For cannabis, cocaine, amphetamines and ecstasy estimates, the estimate was largely based on the number of adult users in the household population (aged 15 to 64 years), subdivided into groups according to frequency of use, obtained from General Population Surveys (GPS). Additionally estimates based on use of these drugs by problem opiate users (who are unlikely to be represented in GPS samples) have been added in as have, in the case of amphetamines, estimates of consumption by problem users in those countries where such estimates are available. For heroin, the market size estimates were based on estimates of heroin consumption by problem opiate users sub-divided according to those in treatment and those not, as it is known that consumption decreases considerably in treatment.

The overall estimates obtained from this process are as follows:

### Estimates of the size of the European illicit drug market, 2013.

	EU			EU + Norway & Turkey*		
	Amount (tonnes)			Amount (tonnes)		
	Mid	Low	High	Mid	Low	High
<b>Cannabis</b>	1,288.5	1,154.2	1,789.7	1,303.4	1,167.3	1,811.1
<b>Cocaine</b>	91.0	72.2	110.2	91.7	72.7	111.0
<b>Amphetamines</b>	76.3	52.1	101.6	78.0	53.1	104.6
<b>Ecstasy</b>	86.6	79.3	94.0	59.9	79.3	94.6
<b>Heroin</b>	138.4	121.4	162.5	141.7	124.0	169.4
	Value (EUR million)			Value (EUR million)		
	Mid	Low	High	Mid	Low	High
<b>Cannabis</b>	€ 9,313.4	€ 8,405.6	€ 12,851.2	€ 9,484.1	€ 8,555.3	€ 13,097.1
<b>Cocaine</b>	€ 5,742.2	€ 4,545.9	€ 6,962.5	€ 5,815.6	€ 4,603.1	€ 7,056.1
<b>Amphetamines</b>	€ 1,828.1	€ 1,210.3	€ 2,497.3	€ 1,892.7	€ 1,248.9	€ 2,608.9
<b>Ecstasy</b>	€ 666.1	€ 607.0	€ 723.1	€ 675.0	€ 615.2	€ 732.8
<b>Heroin</b>	€ 6,782.7	€ 6,041.6	€ 7,845.6	€ 7,064.0	€ 6,264.1	€ 8,327.3
<b>Total</b>	<b>€ 24,332.5</b>	<b>€ 20,810.4</b>	<b>€ 30,879.6</b>	<b>€ 24,931.4</b>	<b>€ 21,286.5</b>	<b>€ 31,822.1</b>

\* Turkey not included in estimates for cocaine, amphetamines and ecstasy.

Key limitations to be borne in mind when considering the estimates presented here are:

- **Undercoverage:** General population surveys of adults (aged 15 to 64) have formed the basis for most of the estimates of numbers of users but it is known that these may underrepresent some groups of users, particularly some marginalised groups. While we have attempted to use estimates of problem users and treatment data to identify use by some of these groups there are still likely to be gaps in coverage.
- **Under-reporting of use:** The estimates of both number of users and frequency and amounts used are based on self-report and it is known that, particularly with respect to stigmatised behaviours, people will often underestimate or under-report use. We have not made any adjustment for this because at present we have no good data on which to base any adjustment and the extent of under-reporting is likely to vary considerably between countries.
- **Knowledge gaps:** There are significant gaps in our knowledge of some basic data which are fundamental to estimating market size. In particular we have very little information about the amounts of drugs used by different groups of users (such as occasional versus frequent users), different forms of drugs (eg resin versus herb or ecstasy powder versus tablets), and in different countries, although we know it varies widely. Similarly the information on prices paid is limited. In such areas we have had to make assumptions and use of the best data that we can find in the circumstances.

In the light of the above limitations it is clear that the estimates presented in this report must be interpreted with caution and must be seen as minimum estimates. There is a need to develop a programme of work to improve the basic data on which such estimates are based to improve future estimates.

## 1 Introduction

Estimates of the size of the market for a range of illicit drugs can provide policy makers with information on both drug consumption and the value of the trade in drugs, contributing to their ability to prioritise interventions, and over time, evaluate change. The European Commission therefore requested that the EMCDDA commence a programme of estimating the size of the main European illicit drug markets, identifying the importance of these estimates and their potential use.

Initial estimates for cannabis, heroin, cocaine and amphetamine-type substances (ATS) have been constructed with the intention of repeating and improving the estimation process over time. The methodology used, the rationale for the approach, and the assumptions made in the process are described in this report. Wherever possible, country level data regularly monitored and updated by the EMCDDA has been used. Existing work on estimating the market size for drugs, in particular that undertaken by the Rand Organisation, Trimbos Institute and ICPR (Kilmer and Pacula, 2009; Trautmann et al., 2013) with financial support from the European Commission, has been used for additional data and to guide the estimation process.

The EMCDDA is continuously trying to improve its data collection, either by extending coverage to as many countries as possible or adjusting instruments. The estimation exercise has highlighted areas of the EMCDDA data collection that need to be augmented and improved. This is useful not only for the market size estimates, but also more generally in ensuring that the monitoring of the drug situation remains appropriate.

A section on the basic model and common concerns will be followed by a section describing the estimation process for each of the substances: cannabis, cocaine, amphetamines, ecstasy and heroin. Finally, limitations and the possibilities of improving the estimates over time will be described.

## 2 Overview of the methodology

There are two main approaches to assessing market size. Firstly, supply side or top-down approaches, which combine data on production, amounts seized and prices to get an estimate of the overall market size (UNODC, 2005). However, the second and more common approach is demand side or bottom-up in which prevalence data is combined with either assumptions on quantity used and price data to give expenditure estimates (eg van Laar et al, 2013; Kilmer & Pacula, 2009; Pudney et al, 2006; Casey et al, 2009) or with self-reported spend data to directly obtain expenditure (eg Legleye, et al., 2008), and then use price data to work backwards to get quantities used. It is a demand-side approach that has been used here.

The basic model used in such an approach can be expressed in simple form as:

$$\text{No. of Last Year users} * \text{Amount used per year} = \text{Total annual consumption (quantity)}$$
$$\text{Total annual consumption} * \text{Price (purity adjusted)} = \text{Market value (per year)}$$

That is one takes an estimate of the number of users (for cannabis this might be generated from the general population survey (GPS) last year prevalence rate) multiplied by an estimate of the average number of days of used per year and an average quantity used per day to get the estimated total

consumption. This estimate for consumption can then be multiplied by price data to obtain the market value.

However, such a simple model ignores many things that we know about the variety of patterns of use among the population and the limitations of the data sources being used. Thus even the base model needs refinement. One obvious issue concerns the heterogeneity of users and the impact on amounts used. Drug users range from people who experiment only once or twice and are likely to consume comparatively small amounts on these occasions to daily users who may use large quantities of the drug each time. To deal with this issue we have tried, as far as possible for each type of drug, to identify different types of user which changes the simple formula for calculating quantity used to:

$$\sum \{(\text{No. of LY users})_u * (\text{Amount used per year})_u\} = \text{Total annual consumption (quantity)}$$

where  $u$  denotes different types of users. However, the extent to which it is possible to identify different types of users varies between drugs and between countries, along with a range of other data issues and how these have been addressed and the rationale and assumptions made in doing this are highlighted below.

Information on the amounts of drugs used by different groups of users is an area in which the data available are extremely limited. A recent EU funded project described in the report *Further insights into aspects of the EU illicit drugs market, Part I: Drugs market: an assessment from the demand side* (Trautmann et al., 2013) attempted to obtain this information through an online survey in seven EU Member States with differing degrees of success. They also used the information to identify annual amounts used by different user groups. Given that this information was obtained quite recently and the fact that they considered the potential for integrating the findings with that of GPS it was decided to use the data on amounts used and the user types from that study as the basis for our estimates.

In order to obtain an estimate of the size of the illicit drug market in the EU we first calculate the size of the market in each country and then sum these to provide European figures. The reason for this is that we know that the patterns of use vary considerably between countries in a range of ways. For example, the survey data reported to the EMCDDA shows that the frequency of use is not necessarily related to last year prevalence rates, for example in some countries with low prevalence rates the proportion of frequent users can be comparatively high. Similarly we know that, although in general amounts used per session of use by frequent users tends to be higher than for occasional users there appears to be differences between countries in the amounts used (Trautmann et al, 2013).

There are three other issues common to the estimation of the market size for each of the drugs which need to be considered. Firstly, the data necessary for the estimates is not available for all countries and the amount of missing data varies between the different types of drugs. In these cases, missing data has had to be imputed in order to arrive at EU totals. Where possible, available country-level information has been used to fill data gaps, though in some instances country-level data is not available and by necessity information from other countries or averages of the data from other countries have been applied. Detail of how this has been done in each case is given in the relevant section below. The data gaps and need for imputation and assumptions to fill them are

clearly a weakness in the estimation and an area where improvements in data can be made over time. Information on amounts used by types of user is particularly scarce for drugs other than cannabis. Even for cannabis, the lack of consistency between countries on sub-groups of users makes applying the available information difficult.

Secondly, the general population surveys, the main data source for the number of cannabis, cocaine, amphetamines and ecstasy users, are likely to suffer from under-coverage; some groups may not be included in the sampling frame for surveys, for example, or may simply be hard to reach or enumerate. General population surveys are unlikely to include problematic or heavy drug users, who may account for a substantial amount of use of a range of drugs. An effort has been made to include problematic drug users in the overall estimates for cannabis, cocaine, and amphetamines. This is another area for future development, both in terms of improving the way in which estimates for consumption by problem drug users is estimated and by developing methods for including other sub-populations not covered in the GPS.

Thirdly, reliance on self-reported drug use raises the issue of under-reporting. Kilmer and Pacula (2009), drawing on the work by Harrison et al (2007), describe studies in the USA comparing information from biological testing with self-reported drug use and calculate a correction factor for each of the drugs. Correction factors have not been applied to the estimates here because there is no equivalent source of data on under-reporting in European countries and it is very likely that there are considerable inter-country differences due to cultural factors and the different extent of normalisation of drug use. A systematic data collection on studies of under-reporting in surveys across the EU would help establish the level of correction required, and is a further area for future development.

### **3 Cannabis**

Cannabis is the most frequently used drug and hence the data available relating to its use are relatively comprehensive and robust. The decisions made about the data to be used within the estimates, imputation processes and assumptions made are described for each component of the base model below. The main limitations and concerns are also highlighted but are discussed further along with areas for possible future developments in section 7 below.

#### ***3.1 Number of users in the general population***

##### ***Basic approach***

Cannabis users are mainly well-integrated in society and likely to be quite well represented in general population surveys (GPS). Since there is good evidence that the amount of cannabis used in a session or a day will be greater the more frequently people use it, it is important to break down the total number of users by frequency of use. Within Europe, most countries have a fairly recent GPS that includes questions on use in the last year and the last month, as well as on frequency of use (most often relating to use in the last month but sometimes in the last year). These data are reported to the EMCDDA routinely and the number of cannabis users included in the surveys is often reasonably large so that estimates of prevalence of different types of users can be constructed for most countries. Therefore for the base model the GPS data has been used as the main source of prevalence data for the estimates.



As discussed above, it was decided to use in this study the data on amounts of cannabis use by different user types published in van Laar et al (2013). To match the groups used in that publication, in each country cannabis users in the last year were sub-divided into 4 groups based on their responses to the GPS questions on use of cannabis in the last year, last month and frequency of use. The way in which frequency of use is ascertained varies between countries with some asking about number of days used and others presenting frequency groups, such as 'less than once a week'. These were matched as nearly as possible to the groupings used in the van Laar (2013) survey as follows:

- Used in last year (LY) but not in the last month (LM) (infrequent)
- Used less than once a week or 1-3 days in LM (occasional)
- Used once up to several times a week or 4-19 days in LM (regular)
- Used daily or almost daily or 20+ days in LM (intensive).

This approximation is similar to that used by van Laar et al (2013), however, the frequency of use questions are quite variable from country to country so further minor variations in the categories used were necessary.

The GPS data came from different years, as some countries are only able to conduct a GPS every four years or so. As the goal was to provide an overall EU market size estimate it was decided that it was desirable to obtain a market size estimate for a single year and, given the time lags on the provision of data to the EMCDDA, 2013 was deemed most appropriate. Thus for each country the GPS data from the nearest survey to 2013 was used and the prevalence rates for the four categories of user type were converted into numbers of users by multiplying by 2013 EUROSTAT population data for 15 to 64 year olds.

### *Imputation procedures*

Seven of the 30 countries who supply data to EMCDDA either did not have a general population survey or were missing data on some of the items necessary to calculate the number of users in the different groups. In order to obtain EU totals, it was therefore necessary to impute values in these cases. Because of the enormous inter-country variation in drug use in Europe, in conducting the imputation we sought as far as possible to use any country-specific data available and only use European averages as a last resort.

Greece, Malta, Romania, Sweden and Turkey did not have data on frequency of use in the last month but did have data on lifetime, last year and last month use. It was therefore decided to use a regression equation based on these data items in those countries that did have frequency of use data to predict the likely prevalence of occasional, regular and intensive users. Thus the proportion of the total number of last month users in each of the user categories was regressed in turn against lifetime prevalence and the ratio of last month prevalence to last year prevalence to obtain an equation with which to estimate the missing values. To obtain the prevalence of use for each of the user groups for the countries with missing data, the estimated proportion of the total number of last month users in each of the user groups obtained using the regression equation was multiplied by the prevalence in the last month.

Prevalence data for Estonia and Luxembourg had to be imputed before the estimated regression equation could be applied to obtain estimates of the proportion of last month users in each of the

user groups. In the case of Estonia, lifetime prevalence was not available. The simple average of the ratio of last year to lifetime prevalence was calculated for all the available surveys and then the last year prevalence reported by Estonia was multiplied by the inverse of this to obtain an estimate of lifetime prevalence.

Luxembourg had no adult survey. However, it does participate in the HBSC survey among schoolchildren and the Eurobarometer survey and in each of these the prevalence of cannabis use is very close to the average value. We therefore imputed EU average values for lifetime, last year and last month prevalence for Luxembourg. Applying the estimated regression equation to imputed values is clearly a weakness in the procedure, but was necessary to obtain a total number of users for Luxembourg in the absence of the necessary data.

**Table 1: Regression results: number of users in the last month in each user group against lifetime prevalence and the ratio of last month to last year prevalence**

Dependent variable:		Occasional	Frequent	Intensive
Lifetime prevalence	B	0.001	-0.004	0.003*
	SE	0	0	0
	t	0.26	-1.97	2.21
	p	0.79	0.06	0.04
Last month/last year prevalence	B	-0.736**	0.077	0.658***
	SE	-0.22	-0.19	-0.14
	t	-3.34	0.41	4.68
	p	0	0.68	0
Constant	B	0.832***	0.390***	-0.222**
	SE	-0.11	-0.1	-0.07
	t	7.26	4	-3.03
	p	0	0	0.01
r2		0.359	0.163	0.601
P		0.012	0.168	0
df_r		20	20	20

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

The regression method was adopted in order to, where possible, make use of any available data to generate the estimates. The model parameters are shown in Table 1 and it can be seen that, although a number of different models were considered, the results obtained from the selected model are not ideal. In fact in two instances, intensive users in Estonia and Sweden, the estimated values fall out of bounds, -1 and -713 respectively, and were replaced with 0 as a minimum value. We considered using the averages of the existing prevalence rates and rescaling to ensure the sum of the group prevalence matched the last month prevalence for the country being estimated. This shifted values towards the intensive users, and provided values within scale, but did not utilise the information on lifetime and last year prevalence available.

**Table 2: Estimated number of cannabis users by user group and country, 2013**

Country	Infrequent	Occasional	Regular	Intensive
Austria	102,694	45,031	41,567	10,392
Belgium	146,078	77,480	72,922	39,500
Bulgaria	73,486	32,916	56,646	8,420
Croatia	59,902	39,782	29,047	13,892
Cyprus	6,096	4,314	1,876	1,125
Czech	345,034	151,112	140,569	24,600
Denmark	152,260	67,316	16,010	14,555
Estonia	40,264	8,246	4,009	0
Finland	151,235	41,216	35,720	10,991
France	1,884,913	939,194	917,353	907,992
Germany	1,194,175	645,940	265,975	336,540
Greece	57,715	29,074	25,773	10,082
Hungary	74,539	37,947	27,105	16,263
Ireland	96,782	40,553	32,204	11,927
Italy	1,857,459	644,582	693,230	364,858
Latvia	33,793	8,647	8,647	2,982
Lithuania	31,890	8,969	4,983	0
Luxembourg	8,691	4,165	3,198	1,467
Malta	1,439	584	469	97
Netherlands	376,628	200,681	164,035	144,840
Norway	86,665	26,666	17,777	8,889
Poland	681,224	337,709	206,377	28,142
Portugal	69,045	30,333	51,435	35,609
Romania	136,223	63,594	55,991	16,638
Slovakia	86,689	32,087	19,819	1,887
Slovenia	29,580	16,389	9,529	6,479
Spain	815,771	555,450	710,491	804,863
Sweden	134,547	28,380	15,143	0
Turkey	51,088	34,936	44,831	22,410
UK	1,249,937	1,082,610	316,186	142,794
<b>EU Total</b>	<b>9,898,089</b>	<b>5,174,303</b>	<b>3,926,310</b>	<b>2,956,935</b>
<b>EU + NO, TR</b>	<b>10,035,843</b>	<b>5,235,905</b>	<b>3,988,918</b>	<b>2,988,234</b>

Table 2 shows the numbers of users by user group obtained by the above method that were taken forward into the market size estimation process. Table A.1 in the Appendix details the data on numbers of users drawn from GPS while Table A.2 provides details on prevalence rates used. The yellow shading denotes values estimated on the basis of the regression equations. The red denotes values out of range (i.e. negative values) which were replaced with 0.

### *3.2 Correction for under-coverage: Problem Opioid Users*

General population surveys are acknowledged to be unlikely to cover more problematic drug users, such as problem opiate users, who are known to often use other drugs alongside their primary problem drug (e.g. Rehm et al 2005). To correct for this type of under-coverage, an estimate of the cannabis consumption amongst problem opioid users has been made to complement the estimates derived using GPS. The simple model remains the same, multiplying the number of users by the amount used to obtain a quantity consumed, and multiplying this number by the price of the drug to obtain values.

#### *Basic approach*

Once again standard EMCDDA data collections were used as far as possible to obtain an estimate of the number of problem opioid users who use cannabis. The EMCDDA collects data, by country, on estimates of the number of problem opiate users as part of the Problem Drug Use (PDU) indicator. Data on secondary drug use amongst those entering treatment is available from the Treatment Demand Indicator (TDI). A primary drug and up to two secondary drugs are reported for entrants into treatment. We assume that the use of cannabis by people entering treatment primarily for opioid use in each country is a reasonable proxy for cannabis use among the problem opioid users more generally. On this basis, to obtain the number of problem opiate users using cannabis in each country, estimates of the number of problem opiate users in the country were multiplied by the proportion of the total number of entrants into treatment for opioids who reported using cannabis as a secondary drug.

#### *Imputation procedures*

However, there were a number of instances in which the necessary data was missing so, as in the case of the general population estimates, missing data had to be imputed in order to obtain EU estimates.

Firstly the data on the number of problem opiate users had to be imputed for six countries: Belgium, Bulgaria, Denmark, Estonia, Romania and Sweden. Different approaches were used depending on the available data. Problem drug use estimates (with upper and lower confidence intervals), defined by the EMCDDA as a broader group than problem opiate users including injecting drug users (IDUs) and long term cocaine and amphetamine use, were available for Bulgaria, Denmark, and Sweden. These were adjusted using the proportion of entrants into treatment for problem drugs who were opiate users. The upper and lower bounds were calculated in the same way using the confidence intervals of the estimates. This assumes that the treatment population reflects the overall problem drug use population (i.e. that problem users of different drugs have an equal propensity to seek treatment). This may well not be the case but in the absence of any better data source this seemed the best approach.

No data on numbers of problem drug users was available for Belgium other than information on the number of individuals in opioid substitution treatment (OST). An estimate of the average OST coverage in the EU was calculated from those countries with available data, and this then applied to the number in OST figure for Belgium to get an estimate of numbers of problem opiate users.

For Romania, information on the number of opioid injectors in Bucharest was augmented by 10% to account for those outside of the capital on the basis of information on treatment demands for opioids in the national reports.

For Estonia, a three year average (2007 to 2009) of estimates of IDUs were adjusted by an estimate of the proportion of IDUs who were opiate users taken from a study in Tallinn ([Uusküla, A. 2011](#)). For the central values for Belgium, Romania and Estonia, upper and lower bounds were calculated assuming a poisson distribution for the count.

**Table 3: Estimated number of problem opiate users and the proportion assumed to be cannabis users based on secondary drug use among treatment entrants for opioid use**

COUNTRY	Estimated numbers of Problem Opiate Users				% of treatment entrants for opiates using cannabis as secondary drug	
	Year	Central	Lower	Upper	Year	%
Austria	2013	28550	27790	29311	2014	31%
Belgium	2014	29136	28795	29477	2014	22%
Bulgaria	2009	30934	18759	43108	2013	51%
Croatia	2010	10726	9598	11853	2014	72%
Cyprus	2014	1094	874	1410	2014	53%
Czech Republic	2014	11300	10200	12400	2014	22%
Denmark	2009	16000	15069	16930		27%
Estonia	2009	5769	5617	5921		27%
Finland	2012	13836	12700	15090	2014	52%
France	2013	211000	180000	300000	2014	43%
Germany	2013	155994	142623	169364		27%
Greece	2014	17245	15098	19781	2014	40%
Hungary	2010-11	3244	2910	3577		27%
Ireland	2006	20790	18136	23576	2014	24%
Italy	2014	203000	179000	227000	2014	51%
Latvia	2014	6151	4427	9854		27%
Lithuania	2007	5458	5314	5605		27%
Luxembourg	2007	1608	1900	2463	2014	55%
Malta	2014	1614	1500	1759	2014	73%
Netherlands	2012	14000	12700	16300	2014	12%
Norway	2013	9015	6708	13977		27%
Poland	2009	15119	10444	19794	2014	35%
Portugal	2012	31858	27434	36282	2014	69%
Romania	2014	11000	10790	11210	2013	2%
Slovakia	2008	4888	3966	9782	2014	18%
Slovenia	2013	5200	4750	5740	2014	36%
Spain	2013	65648	52122	79173		27%
Sweden	2007	12110	12110	12110		27%
Turkey	2011	12733	11126	26537	2014	17%
UK	2010-11	330455	324048	342569	2014	15%

The second area requiring imputation was for the proportion of treatment entrants for opioids who reported cannabis as a secondary drug. Data on secondary drug use was not available for nine countries: Denmark, Estonia, Germany, Hungary, Latvia, Lithuania Norway, Spain, and Sweden. The overall proportion of opioid users reporting cannabis as a secondary drug in the EU and Turkey (0.27) was applied.

Aside from the obvious limitations resulting from estimating missing data, the problem opiate use estimates are for a broad range of years, with just under half referencing 2012 or later. The methods adopted to estimate the numbers of problem drug users differs across the reporting countries, weakening cross-country comparability. Regular estimates, using comparable methods from established data sources for more countries would be necessary to improve the estimates. This continues to be the long term goal of the EMCDDA and the Reitox network.

### 3.3 Amounts used by different user types

The lack of data on amounts used by the different user types for most countries is a fundamental problem for market size estimates at the present time. As discussed earlier, the data from the van Laar et al (2013) study on annual use by user type for seven countries currently presents the widest range of data in a consistent format across European countries so has been used in this study. The trimmed mean and the confidence intervals provided were used to give a high and low value for the seven countries included in that study. For other countries, the mean of the values for the seven countries in the study was used. The unweighted mean was used as it was not clear on what basis the data should be weighted. Table 4 shows the amounts used per year by the different user types that have been used.

**Table 4: Amounts of cannabis used per year by type of cannabis user used in the estimates**

Source: van Laar et al 2013

Country	Infrequent users			Occasional users			Regular users			Intensive users		
	Trimmed mean	Lower bound	Upper bound	Trimmed mean	Lower bound	Upper bound	Trimmed mean	Lower bound	Upper bound	Trimmed mean	Lower bound	Upper bound
Bulgaria	0.66	0.56	0.84	5.4	3.8	7.86	39.82	31.67	60.87	282.55	186.44	384.3
Czech	1.12	0.99	1.65	9.38	8.16	12.61	54.28	52.92	90.23	303.76	283.41	384.9
Italy	0.84	0.81	1.37	6.74	6.25	9.3	89.39	92.85	120.99	339.89	336.19	408.4
Netherlands	0.8	0.8	1.2	6.5	6.4	8.9	63.2	63.1	86.7	310.5	306.1	408.0
Portugal	0.8	0.61	1.36	10.27	6.19	15.64	79.46	48.73	140.28	183.91	144.38	258.8
Sweden	1.04	1.04	1.6	9.87	10.24	16.98	90.7	91.61	128.03	362.79	325.42	499.3
UK	0.8	0.6	1.5	6.8	5.3	11.5	55.6	45.5	88.5	373.8	307.9	575.6
Mean	0.87	0.77	1.36	7.85	6.62	11.83	67.49	60.91	102.23	308.17	269.98	417.1

The number of users within each user group derived from the GPS data is multiplied respectively by the annual amount of cannabis used per person of that user type to provide the amounts of cannabis used (by weight) in each country.

An assumption is made that problem opiate users who also use cannabis will have used cannabis within the last month. In the absence of information on the frequency of cannabis use within this group it was decided to assume that they reflected a similar pattern of use to those in the web survey of users. A weighted average amount used by country was calculated from the individual

amounts used in each of the occasional, regular and intensive groups, with the number of users in each group providing the weights. This was repeated for the lower and upper values of the amounts used. Arguably, problematic opiate users are more likely to be heavy users and assuming they are a cross section of last month cannabis users may well result in an underestimate of the amount consumed.

### 3.4 Dividing the market into herb and resin

The cannabis market in Europe is composed mainly of cannabis resin and cannabis herb. Although cannabis herb, mostly grown in Europe, is increasingly dominant in the market, across Europe there are still differences between countries in the relative importance of these two types of cannabis.

Data on variation in amounts used for these different types of cannabis is limited but the study by van Laar et al (2013), which did ask users about their use of herb and resin separately, suggests differences are small. We have assumed that amounts used are the same for resin and herb and as described above calculated a total amount used. However price data is reported to the EMCDDA for resin and herb separately and we have therefore split the total amount of use into amounts for herb and resin.

**Table 5: Seizures of herbal cannabis as a proportion of total seizures (3 year moving averages)**

Country	Proportion Herb 2012-2014	Country	Proportion Herb 2012-2014
Austria	0.855	Latvia	0.902
Belgium	0.821	Lithuania	0.931
Bulgaria	0.993	Luxembourg	0.915
Croatia	0.928	Malta	0.602
Cyprus	0.982	Netherlands	0.815
Czech Republic	0.972	Norway	0.329
Denmark	0.170	Poland	0.660
Estonia	0.925	Portugal *	0.146
Finland	0.783	Romania	0.883
France	0.140	Slovakia	0.986
Germany	0.837	Slovenia *	0.981
Greece	0.977	Spain *	0.482
Hungary	0.953	Sweden *	0.570
Ireland	0.825	Turkey	0.908
Italy	0.527	United Kingdom	0.903

Although the price information is provided to the EMCDDA separately for the two forms, there is very little data on the prevalence of use that distinguishes between the two forms and none compiled systematically across Europe. However, seizures data reported routinely to the EMCDDA does distinguish between cannabis herb and resin and is available for most EU countries. In most countries, seizures of small amounts of cannabis from users or street level dealers make up the bulk of the total number of seizures and so it was felt that the number of seizures of the different types of cannabis was the best proxy available for retail market share. The proportion of seizures that were herb was calculated based on the average of the most recent three years of data, as the data

can be quite variable (see Table 5). The total amount used in grams calculated above is multiplied by the proportion of seizures for herb to obtain total amounts used for herb and resin separately.

### *Imputation procedures*

Data was imputed for three countries. The Netherlands has not reported the number of seizures for some time so the midpoint of the amount reported from the survey in the Netherlands in van Laar et al, 2013 (p102) was used. The most recent data for number of seizures reported by France is 2008 so we have used the 2006-08 average (the quantity seized has stayed fairly stable since then so this was considered reasonable). Poland has only reported seizure numbers for one year (2012) so in this case we used the ratio of herb seizures to all seizures for all the total of all countries other than France, Netherlands and Poland.

### *3.5 Calculating the value of the market*

To translate the market size by weight into market size by value we used the price data for cannabis resin and herb submitted to EMCDDA by the National Focal Points. The data submitted is very variable both in terms of how it is collected (test purchasing, user surveys, expert opinion, etc) and in the measure of central tendency used. A standard procedure for choosing which measure of central tendency to use was adopted; the mean (the most widely available measure of central tendency) was used where it was available, if not then the median if available, followed by the mode and finally the mid-point of a range. In seven cases price data was available from more than one source and in these cases the value provided by law enforcement (the most common source) was taken (Belgium, France, Cyprus, Latvia, Poland, Norway). In Bulgaria, for practical reasons, the source with a price for both resin and herb was selected.

**Table 6: Prices for cannabis herb and resin used in the estimation process**

Country	Price EUR / gram		Country	Price EUR / gram	
	Herb	Resin		Herb	Resin
Austria	8.0	8.0	Latvia	14.0	17.0
Belgium	8.7	9.1	Lithuania	10.4	11.6
Bulgaria	7.3	20.4	Luxembourg	15.0	7.4
Croatia	11.8	10.4	Malta	22.5	21.5
Cyprus	20.0	12.0	Netherlands	4.7	8.9
Czech Republic	6.8	6.3	Norway	18.8	15.6
Denmark	10.8	10.9	Poland	7.7	8.5
Estonia	20.0	15.0	Portugal	6.2	2.6
Finland	17.0	10.0	Romania	13.6	15.9
France	8.5	6.5	Slovakia	10.0	12.0
Germany	10.8	10.0	Slovenia	5.0	10.0
Greece	15.0	20.0	Spain	4.7	5.5
Hungary	7.3	8.4	Sweden	14.0	12.0
Ireland	20.0	6.0	Turkey	9.3	9.5
Italy	8.0	10.5	United Kingdom	3.6	6.4

In most cases data from 2014 was used but there was some missing data. Denmark had no price data for either herb or resin, so in each case a simple average of the values for other countries was



imputed. In the case of Luxembourg, Norway and Romania, data for 2013 was used. The prices used are shown in table 6, the yellow highlight denotes imputed data.

These prices were applied to the market size quantity estimates to obtain a value for the cannabis market in each country that is summed to provide an EU figure.

### ***3.6 Market size estimates obtained***

The process described above was first undertaken to provide estimates of the cannabis market size in each country by both quantity and value for the number of cannabis users derived from GPS data and then for the number of problem opiate users who use cannabis. These were then summed to provide retail market size estimates for the EU and the EU plus Norway and Turkey (see Table 7 below). For a number of reasons discussed earlier and also in more detail under the section on limitations below, these are likely to be underestimates and so these should be regarded as minimum estimates to be improved in the future.

**Table 7: Estimates of the cannabis retail market size in Europe, 2013**

EU	Herb (tonnes)			Resin (tonnes)			Total cannabis (tonnes)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	627.28	565.44	871.20	621.04	557.04	851.84	1248.32	1122.48	1723.04
POU coverage	19.92	15.99	31.38	20.26	15.76	35.23	40.18	31.75	66.61
<b>TOTAL EU</b>	<b>647.20</b>	<b>581.43</b>	<b>902.58</b>	<b>641.30</b>	<b>572.80</b>	<b>887.07</b>	<b>1,288.50</b>	<b>1,154.22</b>	<b>1,789.65</b>
EU + Norway & Turkey	Herb (tonnes)			Resin (tonnes)			Total cannabis (tonnes)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	637.98	574.88	886.25	624.81	560.37	857.16	1262.79	1135.25	1743.41
POU coverage	20.18	16.18	32.09	20.41	15.86	35.57	40.59	32.04	67.66
<b>TOTAL EU + 2</b>	<b>658.16</b>	<b>591.07</b>	<b>918.34</b>	<b>645.22</b>	<b>576.23</b>	<b>892.73</b>	<b>1,303.38</b>	<b>1,167.29</b>	<b>1,811.07</b>
EU	Herb (EUR millions)			Resin (EUR millions)			Total cannabis (EUR millions)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	4,604.43	4,163.31	6,356.33	4,386.98	3,983.31	5,972.07	8,991.41	8,146.62	12,328.40
POU coverage	170.62	137.48	268.20	151.35	121.48	254.56	321.97	258.96	522.76
<b>TOTAL EU</b>	<b>4,775.05</b>	<b>4,300.80</b>	<b>6,624.53</b>	<b>4,538.33</b>	<b>4,104.78</b>	<b>6,226.63</b>	<b>9,313.38</b>	<b>8,405.58</b>	<b>12,851.16</b>
EU + Norway & Turkey	Herb (EUR millions)			Resin (EUR millions)			Total cannabis (EUR millions)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	4716.82	4262.53	6514.46	4440.13	4030.20	6047.00	9156.94	8292.73	12561.46
POU coverage	173.62	139.66	276.10	153.56	122.94	259.51	327.17	262.61	535.61
<b>TOTAL EU + 2</b>	<b>4,890.43</b>	<b>4,402.19</b>	<b>6,790.56</b>	<b>4,593.68</b>	<b>4,153.15</b>	<b>6,306.51</b>	<b>9,484.12</b>	<b>8,555.34</b>	<b>13,097.07</b>

## 4 Estimation of the market size for Cocaine, Amphetamines and Ecstasy

The same basic model as that described for Cannabis was applied to Cocaine, Amphetamines and Ecstasy, namely establishing the amount consumed by multiplying estimates of the number of users by the amount used, and converting this to a value by multiplying by price. However, less information is available for these drugs than was available for cannabis, and prevalence of use is much lower, so it is not possible to subdivide users into as many sub-groups.

No robust data on prevalence of use of these substances was available from the Turkish general population survey. It was not felt appropriate to use an average from the existing data to impute a number for Turkey, particularly as with a large population the result would noticeably influence the totals. It was therefore decided to exclude Turkey from the analysis for these substances. This is clearly a limitation, Turkey being an important country with a large population and it is hoped that data will become available in the future that will allow its inclusion. The EU estimate is not affected.

It should be noted that in most of the data available, particularly on use, it is not possible to distinguish between methamphetamine and amphetamine so these are treated together under the umbrella term 'amphetamines'.

### 4.1 Number of users in the general population

#### *Basic approach*

General population surveys are the main source of data used to establish the number of users. As for cannabis, prevalence rates obtained from GPS are multiplied by 2013 EUROSTAT population data for 15 to 64 year olds.

Far less information is available in the general population surveys on frequency of use for Cocaine, Amphetamines and Ecstasy than was available for Cannabis. Because of the lower prevalence rates for use of these drugs few countries have sufficient numbers of last year users to provide robust data on frequency of use in the last month. Hence it is not possible to distinguish the same number of user types as was possible for cannabis. The web survey conducted as part of the *Further Insights* study similarly obtained much smaller samples of users of these drugs (Frijns and van Laar, 2013). They distinguished three groups of users: infrequent users who used less than once a month or less than 11 times a year; occasional users who used 11 to 50 days a year or at least once a month but less than once a week; and frequent users who used weekly or more often or more than 50 times a year.

It is not possible to distinguish these three groups in most countries on the basis of GPS data. However it was possible to approximate two groups of users as follows:

1. Infrequent users: Those using in the last year but not in the last month (LYP – LMP)
2. Frequent: Those using in the last month (LMP).

Only last year prevalence and last month prevalence are required to distinguish the groups and the first approximates to the infrequent user group in the Frijn and van Laar (2013) study with the other approximating a combination of occasional and frequent users. Nevertheless, some countries did not have this information available to produce even these simpler groupings and values had to be imputed in such cases.

### *Imputation procedures*

In the case of Belgium, France and Norway no recent data for last month prevalence of cocaine, amphetamines and ecstasy were reported, while Malta reported data for lifetime but not last year and last month prevalence. As was the case for cannabis Luxembourg does not report any prevalence data as it has no GPS.

For France and Norway, consideration was given to using last month prevalence from previous surveys from 2005 and 2009, respectively. However because there had been significant changes in LYP, the assumption that LMP had not changed did not seem tenable. The use of a simple average was also considered but did not seem appropriate for some countries, e.g. Malta.

All countries apart from Luxembourg had some prevalence rate available, either LTP or LYP. Following the principle of making use of as much country specific data as possible it was decided to calculate the population weighted average of LYP/LTP and LMP/LTP for those countries with complete data (listwise deletion) and then estimate values for those countries with missing data by multiplying the available values of LTP and LYP by the appropriate ratio. These imputed prevalence rates were then used to estimate the number of users in the two user groups. In the absence of any prevalence data at all for Luxembourg, the population weighted average values were used for LYP and LMP. These values appear broadly in line with the other Benelux countries. The estimated prevalence rates of each user group by country used in the estimation procedure is shown in Table 8. As before, countries with imputed values are shown in yellow.

**Table 8: Estimated number of stimulant users by user group and country\* (adults aged 15-64 in the general population)**

Country	Year	Sample size	Cocaine		Amphetamines		Ecstasy	
			Infrequent (LYP-LMP)	Frequent (LMP)	Infrequent (LYP-LMP)	Frequent (LMP)	Infrequent (LYP-LMP)	Frequent (LMP)
Austria	2008	3761	17116	34231	17116	11410	17116	11410
Belgium	2008	6792	24645	11875	10281	4327	13659	8253
Bulgaria	2012	5325	4899	4899	14697	14697	39193	19596
Croatia	2012	4756	5705	8557	17115	5705	5705	5705
Cyprus	2012	3500	1219	610	1219	610	610	1219
Czech Republic	2012	2108	21565	7188	14376	14376	35941	7188
Denmark	2013	10470	21751	10876	14501	7250	3625	3625
Estonia	2008	1401	5252	875	5252	4377	8753	1751
Finland	2014	3128	10551	7034	31654	7034	28137	10551
France	2014	13488	310938	149819	88437	37224	234998	141984
Germany	2012	9084	271403	162842	162842	217123	108561	108561
Greece	2004	4351	7214	0	0	0	14429	0
Hungary	2007	2710	0	13553	13553	20329	20329	13553
Ireland	2011	5128	30244	15122	9073	3024	12098	3024
Italy	2014	18898	309576	116091	77394	0	116091	38697
Latvia	2011	4491	1352	1352	2703	1352	5407	0
Lithuania	2012	4831	3986	0	1993	1993	3986	0
Luxembourg			2533	1504	1084	717	1688	979
Malta	2013	1869	181	87	85	36	219	133
Netherlands	2014	5867	110773	66464	88618	55387	199392	77541
Norway	2013	1790	20245	9755	14075	5924	8311	5022
Poland	2014	1135	54498	0	54498	0	54498	54498
Portugal	2012	5355	6904	6904	0	0	6904	13809
Romania	2013	7200	27245	0	13622	0	13622	13622
Slovakia	2010	4055	3870	3870	3870	0	11610	7740
Slovenia	2012	7514	5634	1409	2817	1409	2817	1409
Spain	2013	23136	376510	313758	94127	94127	156879	62752
Sweden	2014	6523	30579	6116	30579	12232	24463	6116
Turkey	2011	8045	0	0	0	0	0	0
United Kingdom	2014	20080	624969	374981	166658	83329	416646	291652

\* Turkey was not included in the estimation of stimulant use.

Table 8 shows the numbers of users of stimulants by user group obtained by the above method that were taken forward into the market size estimation process. Table A.3 in the Appendix details the basic data on prevalence drawn from GPS. Table A.4 provides the stimulant prevalence levels by user group. The yellow shading denotes estimated values.

## 4.2 Number of users within the problem drug using population

### Use among problem opiate users

As was done for Cannabis, to complement the estimates derived from general population surveys, estimates of the consumption of cocaine and the consumption of amphetamines amongst problem opioid users were made (use of ecstasy/MDMA by this group is not significant). The approach was the same as for cannabis, i.e. the proportion of opiate users entering treatment who mentioned using either cocaine or amphetamines as a secondary drug was applied to estimates of the number of problem opioid users in each country.

**Table 9: Proportions of Problem Opioid Users assumed to be cocaine or amphetamine users based on secondary drug use among treatment entrants for opioid use**

COUNTRY	YEAR	COCAINE	AMPHETAMINES / METHAMPHETAMINES
Austria	2014	41%	12%
Belgium	2014	26%	6%
Bulgaria	2013	9%	37%
Croatia	2014	42%	17%
Cyprus	2014	52%	21%
Czech Republic	2014	0%	47%
Denmark	2011	22%	5%
Estonia	2013	22%	5%
Finland	2014	1%	69%
France	2014	25%	2%
Germany	2012	22%	5%
Greece	2014	7%	1%
Hungary	2012	22%	5%
Ireland	2014	8%	1%
Italy	2014	77%	5%
Latvia	2011	22%	5%
Lithuania		22%	5%
Luxembourg	2014	76%	1%
Malta	2014	61%	0%
Netherlands	2014	14%	2%
Norway	2012	22%	5%
Poland	2014	10%	34%
Portugal	2014	78%	5%
Romania	2013	2%	0%
Slovakia	2014	1%	35%
Slovenia	2014	33%	1%
Spain	2013	22%	5%
Sweden	2014	22%	5%
United Kingdom	2014	4%	4%

As for Cannabis, the number of problem opiate users for cocaine and amphetamines is calculated by multiplying the estimate of the number of problem opiate users by the proportion of the total number of entrants into treatment for opioids who reported using cocaine and amphetamines

respectively as a secondary drug. Table 9 shows the proportions of opioid users in treatment who reported using cocaine and amphetamines that were used in the estimation process (the problem opioid figures used are as in Table 3 above).

The same approach to dealing with missing data was used here as in the Cannabis example. Data on secondary drug use for cocaine and amphetamines was not available for Denmark, Estonia, Germany, Hungary, Latvia, Lithuania Norway, Spain, and Sweden. This was imputed respectively as the proportion of total number of opioid users who reported cocaine and who reported amphetamines as a secondary drug (0.22 and 0.05). However, as was the case for the estimation process based on GPS data, the Turkish data was excluded as they did not provide the necessary data and there were concerns about the applicability of average values in a country and the potential impact of the estimates of using inappropriate data for a country with such a large population size.

### *Problem stimulant users*

In some countries there are marginalised populations of problem stimulant users who, like problem opiate users, are unlikely to be represented in general population surveys. Therefore we wanted to include estimates of use by these groups wherever data was available to permit this. Seven countries report estimates of the numbers of problem stimulant users which have been produced using different approaches, including treatment multiplier (TM), capture recapture (CR), truncated poisson (TP) or other methods (OT) (see table 10).

**Table 10: Estimates of the number of problem users of amphetamines**

<b>Country</b>	<b>Year</b>	<b>Method</b>	<b>Central Estimate</b>	<b>Lower Bound of Prevalence Estimate</b>	<b>Upper Bound of Prevalence Estimate</b>
Cyprus	2014	TP	127	80	244
Czech Republic	2014	TM	36400	35000	37800
Finland	2012	CR	13898	10980	17760
Germany	2013	TM	55411	50661	60160
Latvia	2014	TM	2177	1695	2832
Norway	2013	TM	11208	8745	17072
Slovakia	2007	OT	8083	5783	15742

It was decided not to apply this method to estimates of the numbers of problem cocaine users due to concerns as to whether the users were already included in the population survey estimates. The UK has estimates for problem crack users in England as part of their problem drug use estimates but further investigation was needed concerning the overlap with other problem use and in addition information on amounts of crack used was limited. It was therefore decided not to include them at this stage. This is an area for further development in future iterations of these estimates.

### *4.3 Amounts used by different user types*

There is very little data on amounts used by different user types for Cocaine, Amphetamines and Ecstasy. Once again, the data reported in the *Further insights into aspects of the illicit EU drugs*

*market* (Frijn and van Laar, 2013 in Trautmann et al, 2013) was used to obtain the amounts for a limited number of countries, which was then applied to all countries. Based on the number of respondents to the web surveys conducted, the number of countries that were deemed to have usable data by the authors fell from the seven countries for Cannabis to three for Amphetamines and only one for Cocaine and Ecstasy. This clearly raises doubts about the estimates, but it was felt that using a consistent source in the absence of many other alternatives was the best approach.

For Amphetamines, the Netherlands, the Czech Republic and Sweden were considered to have sufficient numbers in each of the breakdown categories (Trautman et al, 2013, p226). For Ecstasy and Cocaine, the Netherlands was the only country with a sufficient sample size for the data to be used in the estimation process.

For Cocaine and Ecstasy, the amounts used for the Netherlands were applied to all countries. For Amphetamines, the average of the amounts used for Czech Republic, Netherlands, and Sweden were applied to all countries without an estimate. The groups occasional and frequent from Frijn and van Laar (2013) were combined into a single group called frequent by weighting the amounts by the size of the sample in each of the user groups (see Table 11).

**Table 11: Amounts used per year by type of stimulant user used in the estimates**

Amounts are in grams for cocaine and amphetamines and in tablets for ecstasy

Source: Frijn and van Laar, 2013

Country	Infrequent users				Frequent users			
	Sample Size	Trimmed mean	Lower bound	Upper bound	Sample Size	Trimmed mean	Lower bound	Upper bound
<b>Cocaine</b>								
Netherlands	427	2.06	1.84	2.28	227	51.84	41.82	60.97
<b>Amphetamines</b>								
Netherlands	450	1.7	1.46	1.94	445	89	74.94	103.06
Czech Republic	72	1.01	0.69	1.31	71	53.36	31.9	70.53
Sweden	134	2.04	1.65	2.37	59	147.11	94.83	198.82
Mean (weighted)		1.58	1.27	1.87		96.49	67.22	124.14
<b>Ecstasy</b>								
Netherlands	1111	9.14	8.73	9.51	666	79.92	72.11	87.51

The estimated numbers of people of each user type obtained from the general population surveys, shown in Table 8 above, were then multiplied by the relevant amount used to obtain their contribution to the market size by weight.

Problem stimulant users and those problem opiate users who used stimulants were assumed to be most likely to be frequent users. Hence, the amounts used by frequent users above were applied to the numbers of problem users in Tables 9 and 10 to provide an estimate the contribution of these groups to the cocaine and amphetamine market.



#### 4.4 Calculating the value of the market

The data on price was drawn from the EMCDDA's annual data collection and the rules followed to select a price when more than one was provided are described above in the section on Cannabis.

Luxembourg and Norway did not provide data for the price of any of the stimulant drugs in the most recent data collection, so data from the previous year was used, and prices refer to 2013 rather than 2014.

For Cocaine, no data was available for Denmark at the time of doing the estimates and the simple average of the final selected price of the remaining countries was used. Data provided subsequently gave quite similar values (EUR 78 for Cocaine, EUR 16 for amphetamine and EUR 8 for ecstasy) except for amphetamines which was significantly lower.

**Table 12: Prices for the stimulant drugs used in the estimation process**

(Cocaine and Ecstasy EUR per gram, Ecstasy EUR per tablet)

Country	Cocaine	Amphetamines	Ecstasy
Austria	100.0	40.0	9.0
Belgium	57.0	9.5	4.9
Bulgaria	65.0	4.5	6.3
Croatia	78.9	23.0	11.3
Cyprus	100.0	130.0	10.0
Czech Republic	72.0	46.2	8.4
Denmark	76.4	25.9	8.8
Estonia	100.0	15.0	8.0
Finland	100.0	30.0	20.0
France	65.0	15.0	8.5
Germany	77.0	16.2	8.8
Greece	85.0	10.0	5.5
Hungary	56.7	10.3	5.3
Ireland	70.0	15.0	10.0
Italy	71.1	27.4	15.9
Latvia-A	80.0	17.0	6.5
Lithuania	72.4	9.9	5.5
Luxembourg	82.0	46.0	7.5
Malta	68.0	30.0	8.5
Netherlands	52.4	7.0	3.7
Norway	112.5	37.5	18.8
Poland	46.1	8.9	3.3
Portugal	47.8	25.9	4.4
Romania	100.0	25.9	13.5
Slovakia	91.0	37.0	6.5
Slovenia	60.0	10.0	4.0
Spain	57.6	28.1	11.1
Sweden	100.0	28.0	14.0
Turkey	71.3	55.3	9.5
United Kingdom	49.5	12.4	6.2

Note: Yellow is estimated data, Blue data for 2013 rather than 2014.

For Amphetamine, no data was available for the Czech Republic but since most amphetamine used in that country is methamphetamine, for which a price had been provided, the price for methamphetamine was used. There was also no data available for Denmark, Portugal and Romania. In these cases, the simple average of the final selected price from those countries with data was used (25.9 euros per gram). This average price falls between the prices reported in other Scandinavian countries and in Germany (Norway 37.5, Sweden 28, Finland 30, Germany 16.2) so this seems a reasonable proxy value for Denmark. A similar situation is seen with respect to Portugal as

the mean is only slightly less than the price in Spain (28.1). However, for Romania, it does not match well with process in neighbouring countries (Bulgaria 4.5 and Hungary 10.3) so using it may have inflated the value of the amphetamine market in this country.

For Ecstasy, price data was unavailable only in the case of Denmark and the simple average of the final selected prices was used.

#### 4.5 Estimates of the size of the market for stimulant drugs

The estimates obtained for the size of the market from the above process in terms of quantities related to the different groups of users and in total are shown in Table 13 while the equivalent estimates for the value of the market are shown in Table 14.

**Table 13: Estimates of the retail market size for cocaine, amphetamines and ecstasy by quantity in Europe, 2013**

EU	Cocaine (tonnes)			Amphetamines (tonnes)			Ecstasy (million tablets)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	73.1	59.4	85.7	58.8	41.7	75.0	86.6	79.3	94.0
POU coverage	17.9	12.8	24.5	7.9	4.7	12.0			
Problem Stimulant Users				9.6	5.8	14.7			
<b>TOTAL EU</b>	<b>91.0</b>	<b>72.2</b>	<b>110.2</b>	<b>76.3</b>	<b>52.1</b>	<b>101.6</b>	<b>86.6</b>	<b>79.3</b>	<b>94.0</b>
EU + Norway	Cocaine (tonnes)			Amphetamines (tonnes)			Ecstasy (million tablets)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	73.7	59.9	86.3	59.4	42.1	75.7	59.9	79.3	94.6
POU coverage	18.0	12.8	24.6	7.9	4.7	12.1			
Problem Stimulant Users				10.7	6.4	16.8			
<b>TOTAL EU + Norway</b>	<b>91.7</b>	<b>72.7</b>	<b>111.0</b>	<b>78.0</b>	<b>53.1</b>	<b>104.6</b>	<b>59.9</b>	<b>79.3</b>	<b>94.6</b>

**Table 14: Estimates of the retail market size for cocaine, amphetamines and ecstasy by value in Europe, 2013**

EU	Cocaine (EUR millions)			Amphetamines (EUR millions)			Ecstasy (EUR millions)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	4,513.7	3,666.7	5,288.8	1,048.4	732.1	1,346.0	666.1	607.0	723.1
POU coverage	1,228.5	879.2	1,673.8	159.3	97.3	238.1			
Problem Stimulant Users				620.5	381.0	913.2			
<b>TOTAL EU</b>	<b>5,742.2</b>	<b>4,545.9</b>	<b>6,962.5</b>	<b>1,828.1</b>	<b>1,210.3</b>	<b>2,497.3</b>	<b>666.1</b>	<b>607.0</b>	<b>723.1</b>
EU + Norway	Cocaine (EUR millions)			Amphetamines (EUR millions)			Ecstasy (EUR millions)		
	Mid	Low	High	Mid	Low	High	Mid	Low	High
Users identified from:									
GPS	4,575.3	3,716.8	5,360.9	1,070.6	747.7	1,374.6	675.0	615.2	732.8
POU coverage	1,240.3	886.3	1,695.2	161.1	98.2	241.6			
Problem Stimulant Users				661.0	403.0	992.7			
<b>TOTAL EU + Norway</b>	<b>5,815.6</b>	<b>4,603.1</b>	<b>7,056.1</b>	<b>1,892.7</b>	<b>1,248.9</b>	<b>2,608.9</b>	<b>675.0</b>	<b>615.2</b>	<b>732.8</b>

## 5 Heroin

### 5.1 Number of users

It is recognised that a large proportion of opiate users lead chaotic lives and are unlikely to be well represented in general population surveys and hence very low prevalence rates are found in these surveys. Nevertheless, because those dependent on heroin and other opiates tend to consume the drugs frequently the market for opiates is an important one. Heroin is the main opiate used in Europe but in a few countries other opioids are quite important, for example in Finland and Estonia other opioids dominate the market (EMCDDA, 2015).

There is no single source of data for number of either heroin or other opioid users for all countries available at the EMCDDA, so a combination of different data collections has to be used. In light of the many gaps in the data it was decided at this stage to focus solely on an estimate of the market size for heroin in this iteration of the market size estimates.

One of the EMCDDA key indicators is the Problem Drug Use (PDU) indicator. Within the PDU indicator, data on the number of problem opiate users (POU) is part of the core dataset. In some cases, countries specify the main opioid drug used and then, if that is heroin, a Problem Heroin User estimate is provided instead of a POU estimate. This was the case for seven countries.

Where there were no estimates of problem heroin users available, it is necessary to impute this based on POU estimates in combination with treatment data (TDI indicator) if available. If this information was not available other data sources such as PDU estimates or Injecting Drug Use estimates have had to be used. In some cases published data from sources other than EMCDDA data collections has had to be used.

In estimating the size of the heroin market an important factor to take into account is whether or not the individual is in treatment, because while in treatment heroin consumption is considerably reduced. As some people may be in treatment for long periods of time, particularly if they are in Opiate Substitution Treatment (OST) this is an important consideration. Nevertheless, a significant proportion will 'top up' with heroin even while in treatment so those in treatment cannot be excluded from the estimation process. McSweeney and Skrine (2013) investigated the impact of OST on heroin use and estimated that there was a 70 % reduction in the amount of pure heroin consumed while people were retained in OST. Since many of the methods used to estimate problem heroin use make use of treatment data in some way as part of the estimation process the POU estimates may include people in OST. The reduced heroin use by this group therefore needs to be taken account of in some way. However, if the problem heroin use estimates do not include people in OST it will be necessary to make sure those are included in the market size estimation process.

Thus the basic approach involved obtaining an estimate of the number of problem heroin users subdivided into those in treatment and those out of treatment. It was decided that the best available data for estimating those in treatment was the number of clients in OST provided by the availability and access to treatment 'indicator'. This was the data collection with the most complete coverage with fairly recent data available for most countries. The approach taken for estimating the number in treatment if OST data was not available is described below along with the methods for imputing the overall number of problem heroin users where this was not directly available.

### *Imputation procedures*

The first stage of the process involved obtaining the number of problem heroin users and as indicated above only seven countries, the Czech Republic, France, Greece, Hungary, Italy, Malta and Spain, had such estimates available. In 5 of these, the Czech Republic, France, Hungary, Italy and Malta, all OST clients were included in the initial estimates, so no further adjustment on the initial estimates was necessary and the number of heroin users in treatment were assumed to equal the number of clients in OST and the number out of treatment was assumed to be the problem heroin use estimate minus the numbers in OST.

As described earlier, the confidence intervals (CIs) around the estimate of problem heroin users were used for to provide the range for the market size estimates. However, only the central heroin estimate and no CIs were provided for the heroin estimates in the Czech Republic, although it was available for the overall PDU estimate. The central estimate of POUs in that country was 11,300 users and that of heroin users 4,100. The ratio between the two values was used to estimate the CIs of the central heroin estimates by using it to adjust the CIs of the POUs estimate.

In Spain, only a proportion of OST clients were included in the initial problem heroin estimates. According to Spanish experts' opinions as reported to EMCDDA through their National reports, approximately 40% of OST clients can be still considered to be POUs and had been included in the POU estimate. However, the reliability of this estimate was not clear so it was decided not to use it in the estimation process at this time. This may have led to an overestimation of the proportion of problem heroin users in treatment and an underestimation of the heroin market in the country and this will be reviewed and additional data sought in future iterations.

In Greece, only new OST clients had been included in the initial problem heroin estimates. To avoid underestimation by not including all OST clients in the estimate an estimate of the number of old OST clients needed to added to the initial overall estimate of problem heroin users. To obtain this the number of new OST clients in 2013 was estimated as the difference in number of OST clients between 2013 and 2012. This number was then subtracted from the 2013 OST estimate to give the number of old OST clients in that year. This number was then added to the initial problem heroin estimates in Greece to give an overall total for problem heroin users. The total number of OST clients was then used as described earlier to obtain numbers in and out of treatment.

Seventeen countries provided a Problematic Opioid Users estimate: Austria, Croatia, Cyprus, Germany, Finland, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Turkey and the United Kingdom. To estimate the proportion of heroin users among opioid users the proportion of heroin users among opioid users in treatment (obtained from TDI data) was applied to the POU estimates where available. This assumes that the same proportion would apply to the out of treatment opioid users also, i.e. that users of different types of opioids in a country are equally likely to access treatment. This may not be the case, but seems a reasonable assumption in the absence of data on relative rates of treatment seeking.

In Germany and Norway, the proportion of heroin users among those in treatment for opioid problems was not available. For Germany, the proportion of heroin users among opioid injectors was available and used as a proxy, assuming that the injectors and non-injectors of opioids follow the same pattern regarding heroin consumption (and it should be noted that the TDI data suggests

that injecting users make up over half (60%) of heroin users in treatment). A four year average (2011-2014) of the % of heroin users among opioid injectors was used instead of latest data available to account for the fluctuation of this percentage across years (which ranged from a low of 55% in 2012 to a high of 60% in 2013). In the case of Norway, no information on the proportion of heroin users among opioid users from TDI was available, so an EU average of the proportion of heroin users among opioid users (76%) for 2013, the year of the available POU estimate, was used.

As a general principle, the data from the TDI that was used to adjust the POU estimates was taken from the same collection year as the POU estimate and not the most recent year available, so that both POU and TDI estimates refer to the same point in time. However, this was not possible for Ireland, Luxembourg and Lithuania, while in UK the POU estimate referred to a period spanning two years (2010 and 2011). For UK, data from TDI from 2011 were used. For Luxembourg, TDI data from the year closest to the POU estimate (2006 instead of 2007) were used. For Lithuania, no TDI data on the proportion of heroin users among opioid users were available before 2013, so the 2013 figures were used to assess the proportion of problem heroin users among POU for their 2007 estimate. For Ireland, a POU estimate was available for 2006. The report from the Irish Focal Point to the EMCDDA in 2015 provided more information in the trends in treatment provision and highlighted the development in treatment services over the previous decade as well as in drug use patterns. They reported that for the year 2004 to 2013, users of other opiates than heroin accounted for on average 3.7%. On this basis it was decided to use the value of 96.3% average for 2004-2013 for the proportion of opiate users using heroin.

To estimate the numbers in and out of treatment in these countries, where the methods for estimating the number of POU involved the use of data on individuals in OST it was assumed that this group were fully included in the initial POU estimates and therefore in the derived Problem Heroin use estimates. This applied in 10 of the 17 countries (Austria, Denmark, Ireland, Cyprus, Latvia, the Netherlands, Portugal, Slovenia, Finland and the UK).

OST clients were completely excluded from the POU estimates in Norway so they had to be added in to the derived problem heroin use estimate. The total number of OST clients, 7055 in 2013, was adjusted to allow for users of other opiates in treatment as was the case for the POU estimates (again using the EU average of 76% of people in treatment for opioid problems that were heroin users) and the estimate added to the derived estimate of problem heroin users.

In 6 countries, Croatia, Luxembourg, Lithuania, Poland, Slovakia and Turkey it was not clear whether or not OST clients were included in the POU estimates. In these cases, it was decided not to make any adjustment to the estimates to account for OST clients, since it was not clear if this would introduce extra bias. Although assuming that OST clients are included in the POU estimates, may lead to a rather conservative estimate of Problem heroin Users prevalence in these cases, in most of these countries other data indicate that OST availability was low at the time of the POU estimates so any adjustment was likely to be small anyway.

Two countries (Bulgaria and Denmark) only had estimates for all Problem Drug Users. Values for POU for these countries had been derived from calculations of the estimate of the total of POU in the EU, again by using the proportion of POU amongst PDU in treatment. Cannabis users, originally in the estimate of PDU for Denmark, were excluded (n = 10,900). The proportion of POU attributable to heroin amongst treatment entrants was derived from the TDI, and applied to the POU estimate to

obtain a problem heroin use value. This assumes the breakdown of drugs used is the same for those in and out of treatment.

Upper and lower values were provided for the PDU estimates. The confidence intervals were taken from the original calculations, where the variance of the PDU estimate was estimated assuming the interval was arrived at using the equation for a 95% Confidence Interval from a simple random sample ( $((\text{upper} - \text{lower})/3.92)^2$ ). The variance of PDU was adjusted by the square of the proportion of PDU who were POU in treatment to obtain the variance of POU and confidence intervals were calculated. The proportion of POU in treatment who were problem heroin users was applied to the upper and lower values of the POU estimates, as above. Ideally this chain of approaches should not have been used, but the nature of the original calculations only became clear at the end of the process. This will be addressed in the next iteration of the results.

In both countries, it was decided not to add any OST clients in the estimates, since it was not clear if OST clients were included in the PDU estimates and it was felt this would introduce extra bias. As before the number of clients in OST was taken as the number of heroin users in treatment and subtracted from the overall problem heroin user estimates obtained to give numbers out of treatment.

For the remaining 4 countries (Belgium, Estonia, Romania and Sweden), the only recent estimates available were for Injecting Drug Users (IDUs). There had been a previous attempt to estimate the number of Problem Heroin Users in Romania by EMCDDA in 2011, based mainly on data on IDUs in Bucharest (the estimated figure was around 11000). However, changes in the drug scene in Bucharest (a drop in the IDU estimate in Bucharest, plus a move from heroin to stimulants and back to heroin) made an update of this estimate desirable, which was done as follows. In 2014, it was estimated that there were 7189 IDUs aged 15-49 in Bucharest, according to data provided for the PDU indicator. For the same year, the proportion of heroin users among all injectors in Romania was estimated based on TDI data reported to the EMCDDA (96%). Also according to the same source (2015 Workbook), 86% of current users live in Bucharest, so 14% live out of Bucharest. Applying these proportions to the initial IDU estimate of Bucharest, provides the number of IDUs of heroin in the country as a whole ( $n=8042; (7189*0.96)/0.86$ ). The % of injectors among heroin users in treatment in 2012 in Romania was reported as 97.7%. Applying this to the estimate of injecting heroin users provides an estimate of the total number of heroin users (injectors and non-injectors, 8231;  $8042/.977$ ). No attempt was made to further adjust the estimate to meet the 15-64 age group, due to lack of available data to allow for this adjustment. Regarding OST clients, the entire OST case registry was included in the initial IDU estimation, so no further adjustment for this was necessary.

In Estonia, only trends in IDUs until 2009 were available, with significant variations across years apparent. An average of the last 3 years of data (2007-2009) was therefore used instead of a single year. The IDU estimates include heroin, fentanyl and amphetamine injectors. According to experts, in 2011, 28% of injectors in Estonia were amphetamine users, suggesting 72% were opioid injectors (. More recently the report to the EMCDDA from the Estonian Focal Point in 2015 said: "Heroin has practically disappeared from the drug market and the main opioid on the drug market is illegally produced fentanyl. Minority of drug users has reported some poppy liquid injecting" and a recent study in Narva 2014 ([Salekešin, M. 2015](#)), found that 78% of injectors injected fentanyl and 20% amphetamines, so heroin injection accounted for less than 2%. Treatment data reported to EMCDDA

shows the proportion of heroin users among those in treatment for opioid problems ranged from 25% in 2005 to 3.5% in 2013, providing additional evidence of heroin disappearing from the market. Given that pattern, the use of older TDI data (2009 or before) to get the proportion of heroin users among opioid users was not deemed appropriate and the 2013 treatment data were used instead. However, given the low prevalence of heroin use and the comparatively small population the impact of any deviations from assumptions will have little impact on the total EU drug market estimates.

In Sweden, where amphetamines are the second most consumed drug after cannabis, only an old (2007) PDU estimate was available (around 26000 users). Other drug data show an increase in amphetamines seizures until 2006 and a slight drop afterwards. It is likely that problematic heroin use has decreased especially with increasing availability of treatment. It was therefore felt the 2007 PDU estimate were no longer appropriate and more recent IDU estimates covering the period of 2008 to 2010<sup>1</sup> (~7,500 users) should be used as the basis for estimates instead. No clear information on drugs injected is available but it is assumed to be mainly heroin and amphetamine. TDI data on route of administration were used to estimate the expected percentage of heroin injectors among heroin and amphetamine injectors. Data on the average proportion of heroin users among all people receiving treatment for heroin or amphetamine problems who were injecting users for 2008-2010 was obtained. This suggested that approximately 37% of injectors are heroin injectors. Applying this proportion to the IDU estimate gives an estimate of the number of heroin injectors. To estimate the non-injecting heroin using population, the proportion of heroin users in treatment who were injectors was obtained for the same period and used to estimate the number of heroin users in total. Overall, the updated 2008-2011 estimate is much lower than the oldest (2007) estimate by approximately 2000 users. The other estimate required (for application to the OST figures to get the estimate of heroin users in treatment) is the proportion of heroin users among those in treatment for opioid problems and for this the average of the TDI data for the same three years (2008-2010) was used.

Finally, for Belgium, the IDU estimate was based on ever injecting, therefore it was considered inappropriate to base estimates on this figure. No additional information on opioid or heroin use in Belgium is available, apart from data on OST and TDI. To estimate the OST coverage in Belgium, the average coverage in Europe estimated from countries with coverage >30% (coverage <30% is considered low according to WHO and it is unlikely to reflect the situation in Belgium) was used. This figure was 55% and it was applied to the number of OST clients in Belgium (17026 in 2014) to provide an overall estimate of POU. Treatment data from Belgium indicates that 75.6% of people in treatment for problem opioid use are heroin users. Applying this to both the overall POU estimate and the number in OST allows estimation of the number of heroin users both in and out of treatment.

Once problem heroin estimates were finalized for all countries, then the proportion of heroin users in OST treatment was estimated by multiplying the proportion of heroin users in treatment (from TDI) with the number of OST clients. With this approach, the in- treatment heroin population was estimated, which was then subtracted from the total problem heroin users estimates to give the out of treatment population as well. This distinction was necessary since the in and out of treatment

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<sup>1</sup> An estimate for 2011 was also available but as this was based on data from prisons it was not included.

population are assumed to consume different quantities of heroin. Again, all estimates (OST, TDI, and PDU) were based on the same collection year, as described above. This was not possible for Finland, where the OST estimate used was from the year before the PDU and TDI figures (2011 instead of 2012) (the other exceptions were described above).

**Table 15: Estimated number of problem heroin users in and out of treatment**

COUNTRY	Year of Problem Heroin Use Estimates	Problem Heroin Use Estimates			In treatment	Out of treatment
		Central	Low	High		
Austria	2013	22412	21815	23009	13336	9076
Belgium	2014	25743	25743	25743	12872	12872
Bulgaria	2009	30655	20930	40381	2904	27751
Croatia	2010	10608	9492	11723	4980	5628
Cyprus	2014	843	674	1087	137	706
Czech Republic	2014	4100	3700	4499	1864	2236
Denmark	2009	7232	6811	7652	3338	3894
Estonia	2007-2009	200	131	412	36	164
Finland	2012	152	140	166	27	125
France	2013	110000	90000	125000	109059	941
Germany	2013	89697	82008	97384	44448	45250
Greece	2013	26062	24058	28430	9315	16747
Hungary	2010-2011	3244	2910	3577	568	2676
Ireland	2006	20021	17465	22704	7338	12683
Italy	2014	203000	179000	227000	74597	128403
Latvia	2014	3709	2669	5942	312	3397
Lithuania	2007	5070	4937	5207	485	4585
Luxembourg	2007	1818	1539	2357	1045	773
Malta	2014	1614	1500	1759	1078	536
Netherlands	2012	9800	8890	11410	6343	3457
Norway	2013	12213	10460	15984	5362	6851
Poland	2009	14030	9692	18369	644	13386
Portugal	2012	31476	27105	35847	23739	7737
Romania	2014	8231	6156	11116	579	7652
Slovakia	2008	4277	3470	8559	525	3752
Slovenia	2013	4732	4323	5223	2968	1764
Spain	2013	65648	52122	79173	56626	9022
Sweden	2008-11	4727	4488	4993	2073	2654
Turkey	2011	11969	10458	24945	7590	4379
Uk	2010-2011	284852	279329	295294	127932	156920

Table 15 shows the numbers of heroin users in and out of treatment obtained by the methods detailed in the text that were taken forward into the market size estimation process. The yellow shading denotes values that have been derived from estimates of a different problematic user group and OST values, the details of which are to be found in Table A.5 in the Appendix. The year of the problem heroin use estimate is the year of the underlying data.



## 5.2 Amounts of heroin used in and out of treatment

Most data available on amounts of heroin used in and out of treatment comes from treatment outcome research studies available for a few countries but using different methods. The available data is reviewed by McSweeney and Skrine in the *Further Insights into Illicit Drug Markets in the EU* study (Trautmann et al, 2013) and once again, this study was drawn on for the estimation process here.

McSweeney and Skrine establish estimates of the number of days and amounts used for those prior to entering treatment and the reduction in both the number of days and amounts used during treatment based on published data and a survey in four member states: Czech Republic, England, Italy, and the Netherlands.

Estimates of number of days and amount used per day pre MMT.

	low	Best	high
Frequency (days) of heroin use per month retained in OST	21	24	25
Amount (grams) consumed per day while retained in OST	0.5	0.75	1

Source: McSweeney, T. & Skrine, O. (2013) p275

Estimates of reductions in frequency amount and purity of illicit heroin consumed per month whilst retained in MMT.			
REDUCED BY	low	Best	high
Frequency (days) of heroin use per month retained n OST	0.25	0.49	0.72
Amount (grams) consumed per day while retained in OST	0	0.39	0.77
Purity of heroin consumed	0.17	0.25	0.33

Source: McSweeney, T. & Skrine, O. (2013) p280

The above were used to obtain amounts used per year for those in-treatment and those out of treatment, applying the high estimates of reduction to the low estimates of use, and the low estimates of reduction to the high estimates of use. The mid value was used in our calculations.

**Table 16: Amounts used per year by heroin users in and out of treatment used in the estimates.**

	Out of treatment			In treatment		
	mid	low	high	mid	low	high
Amounts used per year	216	126	300	67	8	225

As with the other drugs, the shortage of data on amounts used is a major limitation, here the breakdown required being in and out of treatment. In addition, we have not included purity in the calculations given the difficulties in obtaining data and linking prices to purity. This remains an area to be considered in the future.

### *5.3 Calculating the value of the market*

The data on price was drawn from the EMCDDA's annual data collection and the rules followed to select a price when more than one was provided are described above in the section on Cannabis. The price for 'brown' heroin was used as this is the most common form, and unspecified this was assumed to be brown. The prices are collected as retail prices and are not adjusted for purity given the shortage of information difficulty of linking the two data to individual samples.

For Denmark, a 2012 value was used in the absence of more recent data. Estonia and Ireland did not report, and the average of the final selected prices was used.

**Table 17: Selected prices for heroin, 2014**

Country	Price EUR / gram	Country	Price EUR / gram
Austria	60.0	Latvia	71.0
Belgium	27.7	Lithuania	59.1
Bulgaria	23.8	Luxembourg	33.3
Croatia	60.0	Malta	58.0
Cyprus	100.0	Netherlands	34.6
Czech Republic	42.5	Norway	125.0
Denmark	83.5	Poland	37.5
Estonia	57.8	Portugal	25.6
Finland	150.0	Romania	39.6
France-B	35.0	Slovakia	50.0
Germany	49.1	Slovenia	40.0
Greece	21.0	Spain	57.3
Hungary	38.3	Sweden	158.0
Ireland	57.8	Turkey	35.2
Italy	41.2	United Kingdom	62.7

Note: Yellow is estimated data, Blue data for 2012 rather than 2014.

#### 5.4 Market size estimates obtained for heroin

The estimates for market size obtained following the above procedures in terms of both quantity and monetary value are shown in Table 18 below. It needs to be borne in mind that we have not adjusted for purity (which is known to vary quite markedly between countries and over time) in these estimates so the quantity represents heroin of street level purity, whatever that may be.

**Table 18: Market size estimates for heroin**

	EU			EU + Norway & Turkey		
	Amount (tonnes)			Amount (tonnes)		
Heroin users:	Mid	Low	High	Mid	Low	High
In treatment	34.2	34.2	34.2	35.1	35.1	35.1
Out of treatment	104.2	87.2	128.3	106.6	88.9	134.3
<b>TOTAL</b>	<b>138.4</b>	<b>121.4</b>	<b>162.5</b>	<b>141.7</b>	<b>124.0</b>	<b>169.4</b>
	Value (EUR million)			Value (EUR million)		
	Mid	Low	High	Mid	Low	High
<b>TOTAL</b>	<b>6782.7</b>	<b>6041.6</b>	<b>7845.6</b>	<b>7064.0</b>	<b>6264.1</b>	<b>8327.3</b>

## 6 Overall EU drug market size

The overall EU drug market size was obtained by summing the individual estimates for cannabis, stimulants and heroin. On the basis of the assumptions made, the gaps in the data, under-coverage of data sources, and under-reporting, the individual estimates are believed to be under-estimates and can be interpreted as minimum values. Similarly the overall EU drug market size will be an under-estimate and does not consider the other illicit drugs consumed.

**Table 19: Overall EU drug market size estimates**

	EU			EU + Norway & Turkey		
	Amount (tonnes)			Amount (tonnes)		
	Mid	Low	High	Mid	Low	High
<b>Cannabis</b>	1,288.5	1,154.2	1,789.7	1,303.4	1,167.3	1,811.1
<b>Cocaine</b>	91.0	72.2	110.2	91.7	72.7	111.0
<b>Amphetamines</b>	76.3	52.1	101.6	78.0	53.1	104.6
<b>Ecstasy</b>	86.6	79.3	94.0	59.9	79.3	94.6
<b>Heroin</b>	138.4	121.4	162.5	141.7	124.0	169.4
	Value (EUR million)			Value (EUR million)		
	Mid	Low	High	Mid	Low	High
<b>Cannabis</b>	€ 9,313.4	€ 8,405.6	€ 12,851.2	€ 9,484.1	€ 8,555.3	€ 13,097.1
<b>Cocaine</b>	€ 5,742.2	€ 4,545.9	€ 6,962.5	€ 5,815.6	€ 4,603.1	€ 7,056.1
<b>Amphetamines</b>	€ 1,828.1	€ 1,210.3	€ 2,497.3	€ 1,892.7	€ 1,248.9	€ 2,608.9
<b>Ecstasy</b>	€ 666.1	€ 607.0	€ 723.1	€ 675.0	€ 615.2	€ 732.8
<b>Heroin</b>	€ 6,782.7	€ 6,041.6	€ 7,845.6	€ 7,064.0	€ 6,264.1	€ 8,327.3
<b>Total</b>	<b>€ 24,332.5</b>	<b>€ 20,810.4</b>	<b>€ 30,879.6</b>	<b>€ 24,931.4</b>	<b>€ 21,286.5</b>	<b>€ 31,822.1</b>

## 7 Limitations of the estimates and future developments

Despite the many limitations in the estimation process, and the valid concerns these raise, the importance of market size estimates to policy makers and more generally to understanding the drug situation, both in terms of supply and demand, mean that it is important to attempt such estimates with the prospect of improvement over time. Improvements will result from further consideration of the method applied and the development of expertise, and from targeting obvious data anomalies and gaps. The exercise brings into focus the areas that require improvement and suggests future developments.

The intention of this programme of work is to develop a method of estimating market size that uses data monitored by the EMCDDA as far as possible, and that can be repeated regularly, with changes or improvements in method and data documented.

The aim has been to provide an overall EU estimate. The assumptions and imputations made in order to obtain figures for all countries, and issues on the comparability of the underlying data, have prompted us not to provide specific country level estimates. As improvements are made in the method and data this may be revised.

It is clear that the limitations result in an under-estimate of the total market size. It should also be recognised that in the short to medium term, improvements in method and data availability will influence the results, making it difficult to quantify trends immediately. Many of the limitations have been discussed above but in this section the key areas of concern are summarised.

### 7.1 *Numbers of users and user groups*

#### *General population survey data*

General population survey data was used to establish the main number of users for all the drugs other than heroin. Prevalence of use was established for the various user groups, and combined with population levels to obtain the numbers of users.

Data from a general population surveys, is available for almost all countries, and for many are updated regularly, however there are inherent limitations in general population survey data that will influence the market size estimates, and also issues specific to the individual country surveys that effect comparability. Inherent to the use of general population surveys, the issues of under-coverage (some users being missed by this data source) and under-reporting (self-report of use underestimating actual use) described in the introduction are both likely to result in a substantial under-estimation of the total market size.

To partially address under-coverage, the GPS estimates were supplemented with estimates of secondary drug use of problem drug users for cannabis, cocaine and amphetamines, and problematic use of amphetamines. A further development would be to extend this to problematic use of cocaine.

One possible course of action to address under-reporting would be to adjust the final estimates by a correction factor as done by Kilmer and Pacula (2009). However, it is likely that the under-reporting varies by country, and at present there is no systematic collection of information on under-reporting across the countries. A further development would be to investigate and collect the available

information and promote the extension of these types of studies to more countries. In this iteration of the market size estimates, no correction factor has been applied, but this can be reconsidered in future iterations.

Issues related to specific country surveys that will influence the market size estimates are varied, and may inflate or deflate the estimates. First it should be noted that the surveys stem from different years and for a small number of countries are quite old. Second, looking back across time, there is within-country variability in the reported prevalence levels, which could in part be a result of survey method, small sample size or low response rates. Third, for specific countries coverage of age and geography are not standard.

In terms of further developments relating to the specific country surveys, using the available data has been the guiding criteria and continues to be the working model. The EMCDDA continues to encourage the regular completion of general population surveys and the reporting of frequency of use data. However, some consideration can be given to how the estimates would change if a greater level of imputation was used rather than using all data. Further work can be undertaken to establish the most appropriate survey results to adopt, and how to incorporate confidence intervals around the prevalence levels into the estimation. At the moment, data on confidence intervals is collected as part of the GPS but not available for all countries. In the existing estimates no adjustments have been made for different coverage of age and geography. These affect relatively few countries and it was assumed it would not dramatically influence the results, though again this can be reconsidered in the next iteration.

Finally, it was not possible given the available data to construct as many user groups for stimulants as it was for cannabis. Four user groups were established for cannabis, with seven countries without the necessary data. The data requirements were reduced for stimulants, requiring only last year and last month prevalence to construct two groups. On that basis five countries did not have complete data. In the absence of additional data, this limitation is likely to persist.

### *Problem opiate users*

The contribution of problem opiate users to the consumption of cannabis, cocaine and amphetamines is one area in which under-coverage of the GPS has been compensated. However, the available estimates of the numbers of problem opiate users vary in terms of population covered, method and year across countries. For almost half the countries, the age of some of the estimates raise concerns as to whether they reflect the situation in more recent years. Missing data, both for numbers of problem opiate users, and for secondary drugs reported by opiate users entering treatment, weaken the estimates. In a limited number of estimates the necessary meta data is not available resulting in further assumptions being made. It is not possible to anticipate whether these data gaps will inflate or deflate the estimates.

The EMCDDA continues to promote the estimation of the numbers of problem opiate users with the National Focal Points, and encourage full completion of the TDI. Improvements in understanding the content of the data and establishing meta data may be achieved in the short term

### *Problem heroin users*

No single, directly comparable estimate of the number of heroin users is currently available for the countries across Europe. Specific procedures to obtain these values were necessary for a number of countries, using estimates of problem drug use, problem opioid use, injecting drug use, opioid substitution treatment, and secondary data. Concerns remain about the comparability of the problematic user estimates given the broad range of years and methods. The impact of the underlying data sources on the estimates is not always clear. In addition, incomplete information on the role of OST in the estimates resulted in assumptions being made to establish the numbers of users in and out of treatment.

However, seven countries provided direct estimates of problem heroin users, and a further 17 provided estimates of problem opioid use, from which the application of the proportion of heroin clients amongst entrants into treatment for opioids provides an estimate of problem heroin use. In terms of further developments, the EMCDDA will seek to clarify the questions around the data and so better evaluate their use. It will also continue to encourage the countries to provide estimates of problematic use on a regular basis, with the necessary meta-data. It is hoped that this exercise and the benefits of improving knowledge on market size will act as encouragement to that end.

### *Problem amphetamine users*

Estimates of use from GPS were complemented with estimates of problem amphetamine or methamphetamine use provided by six EU member states (CY, CZ, FI, DE, LT, and SK) and Norway. A further set of countries provide estimates of problem cocaine use and it should be possible to calculate a similar correction having established more clearly the content of the estimates in the next iteration. In terms of further developments, different stimulants dominate in different countries, and it should also be possible to better identify the countries where a particular stimulant drug is dominant, and seek information on problematic use of that stimulant accordingly with the National Focal Points, to improve this part of the estimation.

### **7.2 Amounts of drugs used**

The absence of data on amounts used by user group in most EU countries is a major weakness in the estimations. By necessity we have had to apply the information on amounts used in a limited number of countries from secondary sources to the majority of countries. In order to address this issue, the EMCDDA has embarked on a pilot project with seven countries to conduct web surveys amongst drug using populations specifically to obtain information on amounts used of cannabis, cocaine, amphetamines, and ecstasy. A similar methodology to that used by Trautmann et al (2013) has been adopted, with three of the countries having participated in the original study. If the pilot proves successful, it is hoped that this survey will be adopted more broadly by the National Focal Points and be repeated to collect data on other topics.

### **7.3 Cannabis resin/herb split**

We recognise that seizures data are likely to be a poor proxy for split at retail level in some countries where seizures are mainly at higher levels of the market but we think there is insufficient other data to provide an alternative. The EMCDDA has started to collect numbers of seizures sub-divided by weight bins to reflect the different levels of the market which may improve the estimates of the cannabis/herb split in the future.

#### ***7.4 Price data used to estimate the value of the market***

As indicated above, the way in which prices are collected is very variable and may reflect different levels of the market. In addition, the central estimate provided by the NFP varies across countries, further adding to the complexity. The collection of price data is currently being reviewed at the EMCDDA, with the help of an external contractor and the National focal points, with the intention particularly of clarifying which level of the market reported prices refer to. This should improve the price estimates in the medium term.

In terms of year, the most recent data was used, though this should have reflected the year of the estimate, the previous year, 2013. The issue of the year of price data will be addressed in the next iteration. Given the variability and uncertainty around the data, a consideration is whether to use an average of the past three years.

### **8 Concluding remarks**

Future developments have been suggested with the limitations above. Broadly, they involve reducing data gaps where possible by encouraging or clarifying the reporting of the standard EMCDDA indicators or by investigation with the National Focal Points of specific topics such as under-reporting and amounts used. There is scope for improving the execution of the estimation process, which can be developed within the EMCDDA with the help of the expert group of advisors by reconsidering the various assumptions, decisions and imputations made in the process.

Despite the many limitations, the exercise represents the first attempt to establish a regular and repeated estimation of market size for the EU and Europe of cannabis, heroin, cocaine, amphetamines and ecstasy, using available monitored data as far as possible. This estimation process will be elaborated and improved and hence estimates are likely to be variable for some time. However, it should be possible relatively quickly to identify major sources of change, focus on improvements in these areas and as a result better understand the various markets.

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# ANNEX TABLES

**Table A.1: Cannabis users. Number and proportion of last month users for each user group (GPS)**

Country	Year	Sample Size	Number of users						Proportion of last month users		
			Last Month	1 to 3 per month	4 to 19 per month	20 + per month	DK	Valid last Month	Occasional	Frequent	Intensive
Austria	2008	3761	56	26	24	6		56	0.46	0.43	0.11
Belgium	2013	4931	125	51	48	26	0	125	0.41	0.38	0.21
Bulgaria	2012	5325	129	43	74	11	1	128	0.34	0.58	0.09
Croatia	2012	4756	136	63	46	22	5	131	0.48	0.35	0.17
Cyprus	2012	3500	39	23	10	6	0	39	0.59	0.26	0.15
Czech	2012	2108	90	43	40	7	0	90	0.48	0.44	0.08
Denmark	2013	10470	275	185	44	40	6	269	0.69	0.16	0.15
Estonia	2008	1401									
Finland	2014	3128	75	30	26	8	11	64	0.47	0.41	0.13
France	2014	13488	899	301	294	291	13	886	0.34	0.33	0.33
Germany	2012	9084	235	119	49	62	5	230	0.52	0.21	0.27
Greece	2004	4351									
Hungary	2007	2710	30	14	10	6		30	0.47	0.33	0.20
Ireland	2011	5128	143	68	54	20	1	142	0.48	0.38	0.14
Italy	2014	6590	280	106	114	60	0	280	0.38	0.41	0.21
Latvia	2011	4491	71	29	29	10		68	0.43	0.43	0.15
Lithuania	2012	4831	34	18	10	0		28	0.64	0.36	0.00
Luxembourg											
Malta	2013	1869									
Netherlands	2014	5867	291	115	94	83	0	292	0.39	0.32	0.28
Norway	2014	1790	30	15	10	5	0	30	0.50	0.33	0.17
Poland	2014	1135	64	36	22	3	3	61	0.59	0.36	0.05
Portugal	2012	5355	91	23	39	27		89	0.26	0.44	0.30
Romania	2013	7200	72								
Slovakia	2010	4055	57	34	21	2		57	0.60	0.37	0.04
Slovenia	2012	7514	172	86	50	34		170	0.51	0.29	0.20
Spain	2013	23136	1535	412	527	597		1536	0.27	0.34	0.39
Sweden	2014	6523	3								
Turkey	2011	8045									
UK	2014	20080	613	743	217	98	55	1058	0.70	0.21	0.09

**Table A.2: Cannabis prevalence levels and population data by country (GPS)**

Country	Year	Sample Size	LTP	LYP	LMP	Infrequent	Occasional	Regular	Intensive	2013 Population 15-64 yrs
Austria	2008	3761	14.2	3.5	1.7	1.8	0.79	0.73	0.18	5,705,240
Belgium	2013	4931	15.0	4.6	2.6	2.0	1.06	1.00	0.54	7,303,916
Bulgaria	2012	5325	7.5	3.5	2.0	1.5	0.67	1.16	0.17	4,899,092
Croatia	2012	4756	15.6	5.0	2.9	2.1	1.39	1.02	0.49	2,852,460
Cyprus	2012	3500	9.9	2.2	1.2	1.0	0.71	0.31	0.18	609,642
Czech	2012	2108	27.9	9.2	4.4	4.8	2.10	1.96	0.34	7,188,211
Denmark	2013	10470	35.6	6.9	2.7	4.2	1.86	0.44	0.40	3,625,231
Estonia	2008	1401	21.2	6.0	1.4	4.6	0.94	0.46	-0.00011	875,302
Finland	2014	3128	21.7	6.8	2.5	4.3	1.17	1.02	0.31	3,517,089
France	2014	13488	40.9	11.1	6.6	4.5	2.24	2.19	2.17	41,886,952
Germany	2012	9084	23.1	4.5	2.3	2.2	1.19	0.49	0.62	54,280,665
Greece	2004	4351	8.9	1.7	0.9	0.8	0.40	0.36	0.14	7,214,352
Hungary	2007	2710	8.5	2.3	1.2	1.1	0.56	0.40	0.24	6,776,258
Ireland	2011	5128	25.3	6.0	2.8	3.2	1.34	1.06	0.39	3,024,424
Italy	2014	6590	31.9	9.2	4.4	4.8	1.67	1.79	0.94	38,697,060
Latvia	2011	4491	12.5	4.0	1.5	2.5	0.64	0.64	0.22	1,351,725
Lithuania	2012	4831	10.5	2.3	0.7	1.6	0.45	0.25	0.00	1,993,131
Luxembourg			17.5	4.7	2.4	2.3	1.12	0.86	0.40	370,749
Malta	2013	1869	4.3	0.9	0.4	0.5	0.20	0.16	0.03	287,767
Netherlands	2014	5867	24.3	8.0	4.6	3.4	1.81	1.48	1.31	11,077,308
Norway	2014	1790	21.9	4.2	1.6	2.6	0.80	0.53	0.27	3,333,277
Poland	2014	1135	16.2	4.6	2.1	2.5	1.24	0.76	0.10	27,248,972
Portugal	2012	5355	9.4	2.7	1.7	1.0	0.44	0.74	0.52	6,904,482
Romania	2013	7200	4.6	2.0	1.0	1.0	0.47	0.41	0.12	13,622,267
Slovakia	2010	4055	10.5	3.6	1.4	2.2	0.83	0.51	0.05	3,870,038
Slovenia	2012	7514	15.8	4.4	2.3	2.1	1.16	0.68	0.46	1,408,581
Spain	2013	23136	30.4	9.2	6.6	2.6	1.77	2.26	2.57	31,375,814
Sweden	2014	6523	14.4	2.9	0.7	2.2	0.46	0.25	-0.012	6,115,751
Turkey	2011	8045	0.7	0.3	0.2	0.1	0.07	0.09	0.04	51,088,202
UK	2014	20080	29.2	6.7	3.7	3.0	2.60	0.76	0.34	41,664,581

Note: Estimated values are highlighted in yellow, estimates out of bounds in red, replaced with 0.

Table A.3: Stimulant prevalence levels by country (GPS)

Country	Year	Sample size	Cocaine			Amphetamines			Ecstasy		
			LTP	LYP	LMP	LTP	LYP	LMP	LTP	LYP	LMP
Austria	2008	3761	2.2	0.9	0.6	2.5	0.5	0.2	2.3	0.5	0.2
Belgium	2008	6792		0.5	0.16	0.0	0.2	0.06	0.0	0.3	0.11
Bulgaria	2012	5325	0.9	0.2	0.1	1.2	0.6	0.3	2.0	1.2	0.4
Croatia	2012	4756	2.3	0.5	0.3	2.6	0.8	0.2	2.5	0.4	0.2
Cyprus	2012	3500	1.3	0.3	0.1	0.7	0.3	0.1	0.9	0.3	0.2
Czech Republic	2012	2108	2.3	0.4	0.1	2.5	0.4	0.2	3.6	0.6	0.1
Denmark	2013	10470	5.2	0.9	0.3	6.6	0.6	0.2	2.3	0.2	0.1
Estonia	2008	1401	0.0	0.7	0.1	0.0	1.1	0.5	0.0	1.2	0.2
Finland	2014	3128	1.9	0.5	0.2	3.4	1.1	0.2	3.0	1.1	0.3
France	2014	13488	5.4	1.1	0.36	2.2	0.3	0.09	4.2	0.9	0.34
Germany	2012	9084	3.4	0.8	0.3	3.1	0.7	0.4	2.7	0.4	0.2
Greece	2004	4351	0.7	0.1	0.0	0.1		0.0	0.4	0.2	0.0
Hungary	2007	2710	0.9	0.2	0.2	1.8	0.5	0.3	2.4	0.5	0.2
Ireland	2011	5128	6.8	1.5	0.5	4.5	0.4	0.1	6.9	0.5	0.1
Italy	2014	18898	7.6	1.1	0.3	2.8	0.2	0.0	3.1	0.4	0.1
Latvia	2011	4491	1.5	0.2	0.1	2.2	0.3	0.1	2.7	0.4	0.0
Lithuania	2012	4831	0.9	0.2	0.0	1.2	0.2	0.1	1.3	0.2	0.0
Luxembourg				1.09	0.41		0.49	0.19		0.72	0.26
Malta	2013	1869	0.5	0.09	0.03	0.3	0.04	0.01	0.7	0.12	0.05
Netherlands	2014	5867	5.3	1.6	0.6	4.6	1.3	0.5	7.6	2.5	0.7
Norway	2013	1790	4.2	0.9	0.29	3.7	0.6	0.18	2.3	0.4	0.15
Poland	2014	1135	1.3	0.2	0.0	1.7	0.2	0.0	1.6	0.4	0.2
Portugal	2012	5355	1.2	0.2	0.1	0.5	0.0	0.0	1.3	0.3	0.2
Romania	2013	7200	0.8	0.2	0.0	0.3	0.1	0.0	0.9	0.2	0.1
Slovakia	2010	4055	0.6	0.2	0.1	0.5	0.1	0.0	1.9	0.5	0.2
Slovenia	2012	7514	2.1	0.5	0.1	0.9	0.3	0.1	2.1	0.3	0.1
Spain	2013	23136	10.3	2.2	1.0	3.8	0.6	0.3	4.3	0.7	0.2
Sweden	2014	6523	3.3	0.6	0.1	5.0	0.7	0.2	2.1	0.5	0.1
Turkey	2011	8045									
United Kingdom	2014	20080	9.8	2.4	0.9	10.3	0.6	0.2	9.2	1.7	0.7

**Table A.4: Stimulant prevalence levels used in the estimation process by user-group and country**

Country	Year	Sample size	Cocaine		Amphetamines		Ecstasy	
			Infrequent (LYP-LMP)	Frequent (LMP)	Infrequent (LYP-LMP)	Frequent (LMP)	Infrequent (LYP-LMP)	Frequent (LMP)
Austria	2008	3761	0.30	0.60	0.30	0.20	0.30	0.20
Belgium	2008	6792	0.34	0.16	0.14	0.06	0.19	0.11
Bulgaria	2012	5325	0.10	0.10	0.30	0.30	0.80	0.40
Croatia	2012	4756	0.20	0.30	0.60	0.20	0.20	0.20
Cyprus	2012	3500	0.20	0.10	0.20	0.10	0.10	0.20
Czech Republic	2012	2108	0.30	0.10	0.20	0.20	0.50	0.10
Denmark	2013	10470	0.60	0.30	0.40	0.20	0.10	0.10
Estonia	2008	1401	0.60	0.10	0.60	0.50	1.00	0.20
Finland	2014	3128	0.30	0.20	0.90	0.20	0.80	0.30
France	2014	13488	0.74	0.36	0.21	0.09	0.56	0.34
Germany	2012	9084	0.50	0.30	0.30	0.40	0.20	0.20
Greece	2004	4351	0.10	0.00	0.00	0.00	0.20	0.00
Hungary	2007	2710	0.00	0.20	0.20	0.30	0.30	0.20
Ireland	2011	5128	1.00	0.50	0.30	0.10	0.40	0.10
Italy	2014	18898	0.80	0.30	0.20	0.00	0.30	0.10
Latvia	2011	4491	0.10	0.10	0.20	0.10	0.40	0.00
Lithuania	2012	4831	0.20	0.00	0.10	0.10	0.20	0.00
Luxembourg			0.68	0.41	0.29	0.19	0.46	0.26
Malta	2013	1869	0.06	0.03	0.03	0.01	0.08	0.05
Netherlands	2014	5867	1.00	0.60	0.80	0.50	1.80	0.70
Norway	2013	1790	0.61	0.29	0.42	0.18	0.25	0.15
Poland	2014	1135	0.20	0.00	0.20	0.00	0.20	0.20
Portugal	2012	5355	0.10	0.10	0.00	0.00	0.10	0.20
Romania	2013	7200	0.20	0.00	0.10	0.00	0.10	0.10
Slovakia	2010	4055	0.10	0.10	0.10	0.00	0.30	0.20
Slovenia	2012	7514	0.40	0.10	0.20	0.10	0.20	0.10
Spain	2013	23136	1.20	1.00	0.30	0.30	0.50	0.20
Sweden	2014	6523	0.50	0.10	0.50	0.20	0.40	0.10
Turkey	2011	8045	0.00	0.00	0.00	0.00	0.00	0.00
United Kingdom	2014	20080	1.50	0.90	0.40	0.20	1.00	0.70

**Table A.5: Problematic user estimates from which problem heroin use was derived (PDU)**

Country	Year	Type of problematic user	Central estimate	Low estimate	High estimate	% of Heroin among Opioid Users in TDI	OST clients	OST clients in Problematic User Estimate
Austria	2013	POU	28550	27790	29311	78.5	16989	OST clients are fully included
Belgium	-	-	-	-	-	75.6	17026	Not applicable
Bulgaria	2009	PDU	31316	23050	42920	99.1	2930	Not clear if OST clients are included or not
Croatia	2010	POU	10726	9598	11853	98.9	5035	OST clients are fully included
Cyprus	2014	POU	1094	874	1410	77.1	178	OST clients are fully included
Czech	2014	PHU	11300	10200	12400	46.6	4000	OST clients are fully included
Denmark	2009	PDU	33074	31151	34997	45.2	7384	Not clear if OST clients are included or not
Estonia	2007-2009	IDU	8012	5242	16486	3.5	1021	Not clear if OST clients are included or not
Finland	2012	POU	13836	12700	15090	1.1	2439	OST clients are fully included
France	2013	PHU	211000	180000	300000	66.6	163752	OST clients are fully included
Germany	2013	POU	155994	142623	169364	57.5	77300	OST clients are fully included
Greece	2013	PHU	16162	14158	18530	93.4	9973	New OST clients are counted (once) for continuing OST clients are not.
Hungary	2010-2011	PHU	3244	2910	3577	79.4	715	Not clear if OST clients are included or not
Ireland	2006	POU	20790	18136	23576	96.3	7620	OST clients are fully included
Italy	2014	PHU	203000	179000	227000	98.2	75964	OST clients are fully included
Latvia	2014	POU	6151	4427	9854	60.3	518	OST clients are fully included
Lithuania	2007	POU	5458	5314	5605	92.9	522	Not clear if OST clients are included or not
Luxembourg	2007	POU	1900	1608	2463	95.7	1092	Not clear if OST clients are included or not
Malta	2014	PHU	1614	1500	1759	100	1078	OST clients are fully included
Netherlands	2012	POU	14000	12700	16300	70.0	9062	OST clients are fully included
Norway	2013	POU	9015	6708	13977	76.0	7055	OST clients are fully <b>Excluded</b>
Poland	2009	POU	15119	10444	19794	92.8	694	Not clear if OST clients are included or not
Portugal	2012	POU	31858	27434	36282	98.8	24027	OST clients are fully included
Romania	2014	IDU	7189	5377	9709	97.7	593	OST clients are fully included
Slovakia	2008	POU	4888	3966	9782	87.5	600	Not clear if OST clients are included or not
Slovenia	2013	POU	5200	4750	5740	91.0	3261	OST clients are fully included
Spain	2013	PHU	65648	52122	79173	91.4	61954	A subset of OST clients are included
Sweden	2008-11	IDU	7590	7206	8016	59.7	3472	Not known if OST clients are included or not
Turkey	2011	POU	12733	11126	26537	94.0	8074	Not clear if OST clients are included or not
UK	2010-11	POU	330455	324048	342569	86.2	148413	OST clients are fully included

1. A range of different methods were used to obtain problem heroin use estimates based on the available initial problematic user estimates and information on OST. Details appear in the body of the text by country.
2. Data available on 31st January 2016. Sweden subsequently updated the number of IDU from 7590 to 8012. This will be corrected in the next iteration of the estimates.