Methodology – World Drug Report 2010

Considerable efforts have been made over the years to improve the estimates presented in this report. Nonetheless, challenges remain in making such estimates because of the gaps and variable quality of the data available.

A major problem relates to the irregularity and incompleteness in reporting by Member States. First, the irregular intervals at which some Governments report may result in absence of data in some years. The lack of regular data, for which UNODC tries to compensate by referring to other government sources, can influence the reported trend in a given year. Second, submitted questionnaires are not always complete or sufficiently comprehensive. Third, as will become clear in this section, many of the data collected are themselves subject to limitations and biases. These issues affect the quantity, quality and comparability of information received.

Figures presented in this *Report* have different levels of confidence and attempts have been made to provide information about the accuracy of the data thereby the reader can have the ability to make an informed decision about the quality of the data. This section presents detailed information on the data sources and methods used to make the estimates featured throughout the *Report*. This information can be used to inform the reader's understanding of the quality of the data presented.

Sources of information

Under the International Drug Conventions, Member States are formally required to provide national drug control related information annually to the 'Secretary General' of the United Nations (i.e. the Secretariat of UNODC). The Commission on Narcotic Drugs developed the Annual Reports Questionnaire (ARQ) to collect this information.

The World Drug Report 2010 is based primarily on data obtained from the ARQs returned by Governments to UNODC over the period March 2009 to March 2010. The data collected during this period normally refer to the drug situation in 2008. UNODC sent out the questionnaire to 192 countries, as well as 15 territories. UNODC received 110 replies to its questionnaire on Drug Abuse (Part II) and 114 replies to its questionnaire on Illicit Supply of Drugs (Part III). The best coverage was from countries in Europe (84% of countries filled in Part II and 93% filled in Part III of the ARQ), in Asia (67% of countries filled in Part II and Part III) and in the Americas (57% of countries filled in Part II and Part III). In the case of Africa, 30% of countries submitted Part II and Part III of the ARQ and in the Oceania region, 14% of countries submitted Part II and Part III. UNODC would like to thank those Member States who responded to the ARQs; these responses are shown on the maps which follow.

In general, the quantity of information provided on illicit drug supply is significantly better than data provided on drug abuse related information. Analysis of responses to Part III of the ARQ revealed that 88% of them were 'substantially' completed compared to just 48% of the Part II. (ARQs which were more than 50% completed were classified as having been 'substantially filled in'; less than 50% completion is classified as having been 'partially filled in'.)

In order to analyse the extent to which Member States provided information, a number of key questions in the ARQs were identified:

- For Part II, Drug Abuse, the key questions used for the analysis referred to: trends in drug use (88% of the countries returning the ARQ), lifetime prevalence among the general population (47%), youth prevalence (53%), and treatment (70%). The overall response rate of completion was 64% for the countries which submitted Part II to UNODC.
- For Part III, the Supply of Drugs, this included replies to the questions on: the quantities seized (96% of the countries returning the ARQ), trafficking (86%), prices (93%), and drug related arrests (94%). The overall analysis of these data revealed that 71% of the Part III responses were completed.

Information provided by Member States in the ARQs form the basis for the estimates and trend analysis provided in the World Drug Report. Often, this information and data is not sufficient to provide an accurate or comprehensive picture of the world's drug markets. When necessary and where available, the data from the ARQs are thus supplemented with data from other sources.

As in previous years, seizure data made available to UNODC via the ARQs was complemented primarily with data and reports from international organizations such as INTERPOL, the World Customs Organization (WCO), EUROPOL, the Organization of American States (OAC)/ Inter-American Drug Abuse Control Commission (CICAD), and data provided to UNODC by the Heads of National Law Enforcement Agencies (HONLEA) at their regional meetings, data provided through UNODC's '*Data for Africa*' project, and UNODC's '*Drug Use Information Network for Asia and the Pacific'* (DAINAP). In addition, Government reports and on-line electronic resources are used if they are located. Other sources considered included data published by the United States Department of State's Bureau for International Narcotics and Law Enforcement Affairs in its *International Narcotics Control Strategy Report (INCSR).*

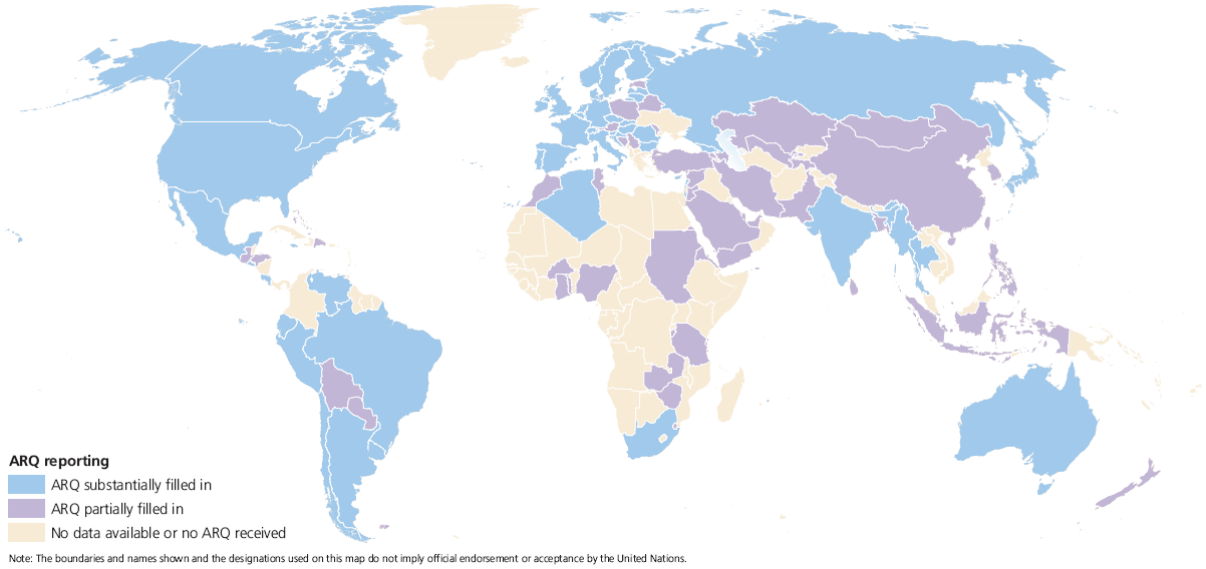
Price and purity data for Europe was complemented with data from EMCDDA. Precursor data presented are basically those collected by the International Narcotics Control Board (INCB). Demand-related information was obtained through a number of additional channels, including the drug control agencies participating in UNODC's DAINAP network, as well as various national and regional epidemiological networks such as the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and the Inter-American Drug Use Control Commission (CICAD). National government reports and scientific literature were also used as sources of information. This type of supplementary information is useful and needed as long as Member States lack the monitoring systems necessary to produce reliable, comprehensive and internationally comparable data.

To this end, UNODC encourages and supports the development of and improvement of national and regional monitoring systems. Major progress has been made over the years in some of the main drug producing countries. In close cooperation with UNODC's Illicit Crop Monitoring Programme (ICMP) and with the support of major donors these countries have developed monitoring systems designed to identify extent of and trends in the cultivation of narcotic plants. These data form another basis for the trend analysis presented in the World Drug Report.

There remain significant data limitations on the demand side. Despite commendable progress made in a number of Member States, in the area of prevalence estimates, for example, far

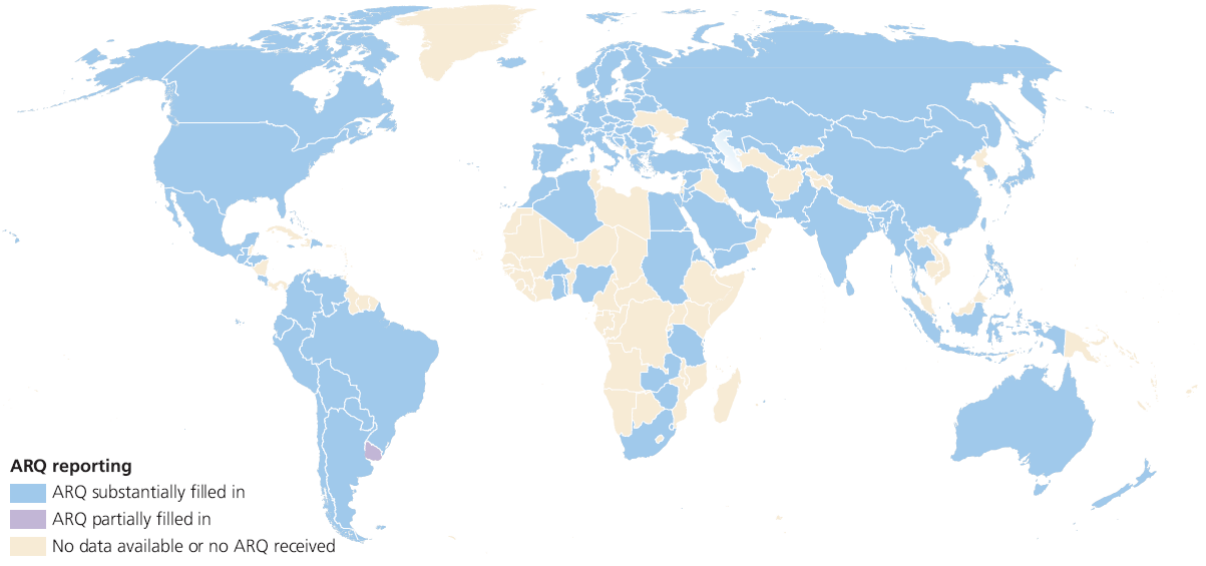
more remains to be done to provide a truly reliable basis for trend and policy analysis and needs assessments. The work being done for the 2010 *World Drug Report* provides yet another opportunity to emphasise the global need for improving data collection and monitoring to improve the evidence base for effective policy.

Member states that provided annual reports questionnaire drug demand data for 2008



Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Member states that provided annual reports questionnaire drug supply data for 2008



Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Supply side data

Drug cultivation, production and manufacture

In line with decisions of the Member States (1998 UNGASS and subsequent Commission on Narcotic Drugs resolutions), UNODC launched an Illicit Crop Monitoring Programme (ICMP) in 1999. The objective of the programme is to assist Member States in establishing national systems to monitor the extent and evolution of the illicit cultivation of narcotics crops on their territories. The results are compiled by UNODC to present global estimates on an annual basis. Data on cultivation of opium poppy and coca bush and production of opium and coca leaf, presented in this report for the main producing countries (Afghanistan, Myanmar and the People's Democratic Republic of Lao for opium and Colombia, Peru and the Plurinational State of Bolivia for coca) have been derived from these national monitoring systems operating in the countries of illicit production, covering the period up to, and including 2009. In 2009, for the first time a cannabis survey was conducted in Afghanistan. The Government of Morocco, in cooperation with UNODC, also conducted surveys on illicit cannabis cultivation and cannabis resin production in 2003, 2004 and 2005. Estimates for other countries presented in this report have been drawn from replies to UNODC's Annual Reports Questionnaire, from various other sources including reports from Governments, UNODC field offices and the United States Department of State's Bureau for International Narcotics and Law Enforcement Affairs.

Area under cultivation

Heroin, cocaine and cannabis (herb and resin) are so-called plant-based drugs. A first step towards estimating their global production is to estimate the area cultivated with opium poppy, coca bush and cannabis. Three different methods of illicit area monitoring are used by UNODC supported national monitoring systems:

- Area estimation from satellite imagery
- Area estimation from helicopter survey
- Area estimation from village survey

In the coca cultivating countries the Plurinational State of Bolivia, Colombia and Peru, the area under coca bush is identified on satellite images, which cover the whole area where coca cultivation is thought to take place. In the Plurinational State of Bolivia, aerial photography is occasionally used as well. The UNODC supported cannabis survey in Morocco and Afghanistan using a similar approach.

In Myanmar, areas with a high density of opium poppy are covered with a sample of satellite images. The final area estimate is derived by extrapolation. In low density areas, the area estimate is derived from the village survey (sample survey), which is conducted in all poppy growing areas. In the Lao People's Democratic Republic, the survey is conducted by helicopter over sample sites. Digital photographs of all opium poppy fields falling into these sites are taken, geo-referenced and analysed in a geographic information system. The area estimate is derived by extrapolation.

In Afghanistan, for opium poppy and cannabis monitoring similar methods are used as for the opium survey in Myanmar; satellite imagery over sample sites are analysed and the area measured is extrapolated. In addition, a nationally representative survey of villages is conducted in order to collect information on the socioeconomic status of farmers, including areas with high, low and zero levels of cannabis/poppy cultivation. In regions with a low level

of cannabis/poppy cultivation, which are not covered by imagery, the area estimate is derived from the village survey.

In some countries, the methods used have changed over the years as new technologies became available and to adapt to the dynamics of illicit cultivation. Only the methods used in the most recent year reported are described here briefly. A full technical description of the methods used in all years can be found in the respective national survey reports available at http://www.unodc.org/unodc/en/crop-monitoring/index.html .

Yield[a]

As a second step in the production estimation chain, the number of harvests per year and the total yield of primary plant material has to be established. The UNODC-supported national surveys use measure yield in the field and interviews with farmers, using results from both to produce the final data on yield.

Opium yield surveys are complex. Harvesting opium with the traditional lancing method can take up to 2 weeks as the opium latex that oozes out of the poppy capsule has to dry before harvesters can scrap it of and several lancings take place until the plant has dried. To avoid this lengthy process, yield surveyors measure the number of poppy capsules and their size in sample plots. Using a formula developed by scientists based on research experiments, the measured poppy capsule volume indicate how much opium gum each plant potentially yields. Thus, the per hectare opium yield can be estimated. Different formulas were developed for Southeast and Southwest Asia. In Afghanistan and Myanmar, yield surveys are carried out annually.

Coca bush, a perennial plant cultivated in tropical climate, allows several harvest per year. The number of harvests varies, as does the yield per harvest. In the Plurinational State of Bolivia and Peru, UNODC supports monitoring systems that conduct coca leaf yield surveys in several regions, by harvesting sample plots of coca fields over the course of a year, in the rhythm indicated by the coca farmer. In Colombia, where the security situation did not allow for surveyors to return to the sample fields, only one harvest was measured, and the other harvests were estimated based on information from the farmer. In all three coca countries, yield surveys are carried out only occasionally, due to the difficult security situation in many coca regions, and because of funding constraints.

Conversion factors

The primary plant material harvested - opium in the form of gum or latex from opium poppy, coca leaves from coca bush, and the cannabis plant - undergo a sequence of extraction and transformation processes, some of which are done by farmers onsite, others by traffickers in clandestine laboratories. Some of these processes are complex, involve chemical precursors and may be done be different people in different places under a variety of conditions, which are not always known. In the case of opium gum, e.g., traffickers extract the morphine contained in the gum in one process, and transform the morphine into heroin base in a second process, and finally produce heroin hydrochloride. In the case of cocaine, coca paste is produced from either sun-dried (in the Plurinational State of Bolivia and Peru) or fresh coca

[a] Further information on the methodology of opium and cannabis leaf yield surveys conducted by UNODC can be found in United Nations (2001): Guidelines for Yield Assessment of Opium Gum and Coca Leaf from Brief Field Visits. New York. (ST/NAR/33).

leaves (in Colombia), which is later transformed into cocaine base, from where cocaine hydrochloride is produced.

The results of each step, e.g. from coca leaf to coca paste, can be estimated with a conversion factor. Such conversion factors are based on interviews with the people who are involved in the process, e.g. farmers in Colombia, who reported how much coca leaf they needed to produce 1 kg of coca paste or cocaine base. Tests have also been conducted, where so-called 'cooks' or 'chemists' demonstrate how they do the processing under local conditions. A number of studies conducted by enforcement agencies in the main drug producing countries have provided the orders of magnitude for the transformation from the raw material to the end product. The problem is that this information is usually based on just a few case studies which are not necessarily representative of the entire production process. Farmer interviews are not always possible due to the sensitivity of the topic, especially if the processing is done by specialists and not by the farmers themselves. Establishing conversion ratios is complicated by the fact that traffickers may not know the quality of the substances they use, which may vary considerably, they may use a range of substances for the same purpose depending on their availability and costs, and the conditions under which the processing takes place (temperature, humidity, etc.) differ.

It is important to take into account that the margins of error of these conversion ratios - used to calculate the potential cocaine production from coca leaf or the heroin production from opium - are not known. In order to be precise, these calculations would require detailed information on the morphine content of opium or the cocaine content of the coca leaf, as well as detailed information on the efficiency of clandestine laboratories. This information is very limited. This also applies to the question of the psychoactive content of the narcotic plants. One study conducted in Afghanistan by UNODC over two years indicated, for instance, that the morphine content of Afghan opium was significantly higher than had been thought earlier. Based on this study, and in combination with information on the price structure[b], it became clear that the conversion ratio that had been used (10:1) had to be changed. In 2005, therefore, the transformation ratio was estimated at 7:1, following additional information obtained from interviews with morphine/heroin producers in Afghanistan.

Many cannabis farmers in Afghanistan and Morocco also conduct the first processing steps, either by removing the upper leaves and flowers of the plant to produce cannabis herb or by threshing and sieving the plant material to extract the cannabis resin. The herb and resin yield per hectare can be obtained by multiplying the plant material yield with an extraction factor. The complex area of cannabis resin yield in Afghanistan was investigated in 2009 with focus group interviews in more than 45 villages. The yield study included observation of the actual production of resin, which is a process of threshing and sieving the dried cannabis plants. In Morocco, this factor was established by using information from farmers on the methods used and on results from scientific laboratories[c]. Information on the yield was obtained from interviews with cannabis farmers. The estimate of global cannabis herb and resin production was not updated in 2010; given the high level of uncertainty and the remaining lack of information in many cannabis-cultivating countries.

[b] Prices suggested that, using a 10:1 conversion ratio of opium to heroin, laboratory owners would have been losing money

[c] For greater detail on studies with cannabis farmers, see: UNODC (2007). *Enquête sur le cannabis au Maroc 2005*. Vienna : United Nations Office on Drugs and Crime.

'Potential' heroin or cocaine production shows the level of production of heroin or cocaine if all of the cultivated opium or coca leaf were transformed into the end products in the respective producer country. Part of the opium or the coca leaf is directly consumed in the producing countries or in neighbouring countries, prior to the transformation into heroin or cocaine. In addition, significant quantities of the intermediate products, coca paste or morphine, are also consumed in the producing countries. These factors are partly taken into account: for example, consumption of coca leaf considered licit in Bolivia and Peru is not taken into account for the transformation into cocaine. Potential production is a hypothetical concept to be used at the global level and not as an indication of heroin or cocaine production at the country level.[d]

The approach taken to estimate ATS manufacture changed significantly in last year's *Report*. Since 2003, UNODC triangulated three estimates: 1) estimates based upon ATS consumption; 2) estimates based upon ATS drug seizures, and 3) estimates based on seized precursor chemicals likely used in the illicit manufacture of ATS.[e] There have been significant changes, however, in both ATS use and manufacture, which severely limit the usefulness of this approach.[f]

In this *Report*, UNODC therefore presented a model based only on estimated consumption, to produce a range of tentative ATS manufacture. This approach utilizes the estimated range of annual global users, and multiplies this by the average amount of pure ATS estimated to be consumed (that is to say from a range of casual to problem users) for each drug type. The average user of amphetamines-group substance was estimated to consume 10.9 grams of pure amphetamines per year (range 1.6 – 35.8); and the average 'ecstasy' user was estimated to consume 5.1 grams of pure MDMA per year (0.8 – 13.5) or the equivalent of approximately two tablets each at 50 mg, per week. The amount of seized drugs adjusted for purity at the retail and wholesale levels for each group are added to the total quantity of amphetamines-group substances and ecstasy-group substances estimated to be consumed globally in order to arrive at an estimate of tentative global manufacture. The underlying assumption here is that there are no significant changes in the overall amounts of ATS that were stockpiled. Totals are derived to estimate the lower and upper range of likely manufacture for these substances.

There are a range of issues with this approach related to the quality of the data on the level and amount of consumption by ATS users, and uncertainty around the applicability of data on consumption patterns from studies of ATS users in a limited number of countries to all such users in all countries. Further, estimates using a similar consumption-based approach for cannabis produced estimates with a much lower range compared to other methods of estimating cannabis production. Coupled with the model's assumptions the tentative manufacture estimates are not yet robust enough to be an effective indicator of annual market change, only its magnitude. Therefore caution should be taken when considering the changes in estimates produced by this method.

[d] The calculation of 'potential' cocaine production estimates for Peru, for instance, probably exceeds actual local cocaine production as some of the coca paste or cocaine base produced in Peru is thought to be exported to neighbouring Colombia and other countries for further processing into cocaine.

[e] See *Ecstasy and Amphetamines, Global Survey 2003* (United Nations publication, Sales No. E.03.XI.15).

[f] See *Amphetamines and Ecstasy: 2008 Global ATS Assessment* (United Nations publication, Sales No. E.08.XI.12).

UNODC continues to review this approach to estimating tentative ATS manufacture, and is in discussions with experts in the field to develop a more sophisticated approach to estimating global levels of ATS manufacture.

Drug trafficking

The information on drug trafficking, as presented in this report, is mainly drawn from the Annual Reports Questionnaires (ARQ). As in previous years, data for 2008 were supplemented by additional sources, such as other Government reports, the World Customs Organization (WCO), reports by the Heads of National Law Enforcement Agency (HONLEA), UNODC's individual drug seizures database, and data provided via UNODC's, 'Drug Use Information Network for Asia and the Pacific' (DAINAP) and UNODC's field offices. Priority was given to officially transmitted data in the Annual Reports Questionnaire. The analysis of quantities seized, shown in this report, was provided from 107 ARQ's over the June 2009–May 2010 period. Including information from other sources, UNODC was able to obtain seizure data from 147 countries for 2008. Seizures are thus the most comprehensive indicator of the drug situation and its evolution at the global level. Although seizures may not always reflect trafficking trends correctly at the national level, they tend to show reasonable representations of trafficking trends at the regional and global levels.

There are some technical problems as – depending on the drug type and the reporting country – seizures are variously reported by mass (kilogram - kg), by volume (litres - l) and in terms of units (ampoules, blotters, capsules, tablets, etc., or simply 'units'). In the seizure tables presented in the Statistical Annex of the World Drug Report (available online at *www.unodc.org*) seizure quantities are reproduced as reported. In the rest of the World Drug Report, seizure data are often aggregated and transformed into a unique measurement: seizures in 'kilogram equivalents'. For the purposes of the calculations a 'typical consumption unit' (at street purity) was assumed to be: for cannabis herb, 0.5 g; for cannabis resin, 0.135 g; cocaine, ecstasy and morphine, 0.1 g; heroin and amphetamines-group substances, 0.03 g; LSD, 0.00005 g (50 micrograms); and opium, 0.3 g. One litre of seizures was assumed to be equivalent to one kilogram. For opiate seizures (unless specified differently in the text), it was assumed that 10 kg of opium were equivalent to 1 kg of morphine or heroin. For ATS, which are commonly reported in tablet forms, some countries report the total cumulative weight of the tablets, while others report the total number of tablets, which are subsequently transformed downward to better represent the psychoactive dosage by removing adulterants and diluents. Though all of these transformation ratios can be disputed, they provide a means of combining all the different seizure reports into one comprehensive measure. The transformation ratios have been derived from those normally used by law enforcement agencies, in the scientific literature and by the International Narcotics Control Board, and were established in consultation with UNODC's Laboratory and Scientific Section..

Seizures are used as an indicator for trends and patterns in trafficking. In combination with changes in drug prices and/or drug purities, changes in seizures can indicate whether trafficking has increased or declined. Increase in seizures in combination with stable or falling purity adjusted drug prices is a strong indication of rising trafficking activities. Increasing seizures and rising purity adjusted drug prices, in contrast, may be a reflection of improved enforcement effectiveness. Changes in trafficking can also serve as an indirect indicator for global production and use of drugs. Seizures are, of course, only an indirect indicator for trafficking activities, influenced by a number of additional factors, such as variations in law enforcement practices and changes in reporting modalities. Seizures can also sometimes be double counted when more than one organization is involved. This applies to seizures at the

national level, and even more so at seizures where more than one country was involved. Improved international cooperation can contribute to a greater likelihood of double counting of seizures.

Overall seizures have proven to be a good indicator to reveal underlying trafficking trends if analyzed over long periods of time and across large geographical entities, While seizures at the national level may be influenced by large quantities of drugs in transit or by shifts in law enforcement priorities, it is not very likely that the same is true at the regional or at the global level. If a large drug shipment, while in transit, is taken out of the market in one country, fewer drugs will subsequently be probably seized in the neighbouring countries. Similarly, if enforcement efforts and seizures decline in one country, the neighbouring countries are likely to suffer from intensified trafficking activities, resulting in rising levels of seizures. The impact of changes in enforcement priorities of an individual country are, in general, not significant at the regional or global level.

Drug price and purity data

UNODC also collects and publishes price and purity data. These data, if properly collected and reported, can be very powerful indicators of market trends. Trends in supply can change over a shorter period of time when compared with changes in demand and shifts in prices and purities are good indicators for increases or declines of market supply. Research has shown that short-term changes in the consumer markets are first reflected in purity changes while prices tend to be rather stable over longer periods of time. UNODC collects its price data from the Annual Reports Questionnaire, and supplements this data with other sources such as DAINAP, EMCDDA and Government reports. Prices are collected at farm-gate level, wholesale level (‘kilogram prices’) and at retail level (‘gram prices’). Countries are asked to provide minimum, maximum and typical prices and purities.

When countries do not provide typical prices/purities, for the purposes of certain estimates UNODC calculates the mid-point of these estimates as a proxy for the ‘typical’ prices/purities (unless scientific studies are available which provide better estimates). What is not known, in general, is how data were collected and how reliable it is.

Although improvements have been made in some countries over the years, a number of law enforcement bodies in several countries have not yet established a regular system for collecting purity and price data. Functioning drug monitoring systems must include the monitoring of drug prices and drug purities.

Data on drug consumption

Overview

UNODC estimates of the extent of illicit drug use in the world have been published periodically since 1997. The latest estimates, presented in this report, are based on information received until April 2010.

Assessing the extent of drug use (the number of drug users) is a particularly difficult undertaking because it involves measuring the size of a ‘hidden’ population. Margins of error are considerable, and tend to multiply as the scale of estimation is raised, from local to national, regional and global levels. Despite some improvements over the years, estimates

provided by Member States to UNODC are still very heterogeneous in terms of quality and reliability. These estimates cannot simply be aggregated globally to arrive at an "exact" number of drug users in the world. In this year's *World Drug Report*, the new country data presented (not reported in previous *World Drug Reports*) are expressed in ranges to reflect the level of uncertainty and with a UNODC "best estimate." This "best estimate" reflects a point estimate which is derived from representative studies of drug use in the general population, and/ or based on modelling when general population studies are not available but other forms of information on drug use are available. Regional and global estimates are also reported as ranges reflecting the lack of information in some countries. It can be noted that the level of confidence expressed in the estimates vary across regions and across drugs.

A global estimate of the level of use of specific drugs involved the following steps:

1. Identification and analysis of appropriate sources;
2. Identification of key benchmark figures for the level of drug use in all countries where data are available (annual prevalence of drug use among the general population aged 15-64) which then serve as 'anchor points' for subsequent calculations;
3. 'Standardisation' of existing data if reported with a different reference population than the one used for the *Report* (for example, from age group 12 and above to a standard age group of 15-64) ;
4. Adjustments of national indicators to annual prevalence rate if annual prevalence is not available (for example, lifetime prevalence or current use to annual prevalence or school survey results to annual prevalence among the general population). This included the identification of adjustment factors based on information from neighbouring countries with similar cultural, social and economic situations where applicable;
5. Imputation for countries where data is not available was based on data from countries in the same subregion. Ranges were calculated considering the 10^{th} and 90^{th} percentile of the subregional distribution[g];
6. Extrapolation of available results for a subregion were calculated only for regions where prevalence estimates for at least two countries covering at least 20% of the population were available. If, due to a lack of data, subregional estimates were not extrapolated, a regional calculation was extrapolated based on the 10^{th} and 90^{th} percentile of the distribution of the data available from countries in the region.
7. Aggregation of subregional estimates rolled-up into regional results to arrive at global estimates.

Country-level estimates of the number of people who have used drugs at least once in the past year

Estimates of illicit drug consumption for a large number of countries have been received by UNODC over the years (in the form of Annual Reports Questionnaires (ARQ) submitted by Governments), and have been identified from additional sources, such as other governmental reports and research results from scientific literature. Officially transmitted information in any specific year, however, would not suffice to establish global estimates. Over the period June 2009 to April 2010, for instance, 110 countries provided UNODC with responses to the ARQ

[g] One exception was used to impute regional estimates on the past year use of amphetamine-group substance among the general population in the Near and Middle East/South-West Asia region. For this region Israel's amphetamine-group substance estimates were uniquely high due to the consumption of once legal "*Hagigat*" capsules (containing various cathinones) which does not appear to be common in neighbouring countries, therefore they were excluded in the imputations of the subregion's missing countries.

on Drug Use (Part II), but less than half of them (45 countries or territories) provided new quantitative estimates of prevalence of drug use and many did not refer to 2008 but to some previous year. For countries that did not submit information, or in cases where the data were older than 10 years, other sources were identified, where available. In nearly all cases these were government sources.

Many estimates needed to be 'adjusted' to improve comparability (see below). Since 1999, with the inclusion of estimates referring to previous years, UNODC has collected quantitative estimates of drug use for at least one drug type among the general population for 137 countries and territories and 115 for student/youth populations with a high degree of overlap. In cases of estimates referring to previous years, the prevalence rates were left unchanged and applied to new population estimates for the year 2008. Results from these countries were extrapolated to the sub-regional level and then aggregated into the global estimate.

Currently, only two countries measure drug prevalence among the general population on an annual basis. The remaining countries—typically the more economically developed—that regularly measure it do so usually every three to five years. On average prevalence estimates of the general population for individual countries in this *Report* represent data from the years 2005-2006. Therefore, caution should be used when interpreting any change in global prevalence figures, as changes may in part reflect newer reports from countries or the exclusion of older reports (typically from developing countries), rather than actual changes in use at the global level.

Detailed information is available from countries in North America, a large number of countries in Europe, a number of countries in South America, the two large countries in the Oceania region and a limited number of countries in Asia and in Africa. For other countries, available qualitative information on the drug use situation only allows for some 'guess estimates'.

One key problem in national data reported is still the level of accuracy, which varies strongly from country to country. While a number of estimates are based on sound epidemiological surveys, some are the result of guesswork. In other cases, the estimates simply reflect the aggregate number of drug users found in drug registries which cover only a small fraction of the total drug using population in a country.

Even in cases where detailed information is available, there is often considerable divergence in definitions used - registry data (people in contact with the treatment system or the judicial system) versus survey data (usually extrapolation of results obtained through interviews of a selected sample); general population versus specific surveys of groups in terms of age (such as school surveys), special settings (such as hospitals or prisons), lifetime, annual or monthly prevalence, et cetera.

In order to reduce the error from simply aggregating such diverse estimates, an attempt was made to standardize - as a far as possible - the very heterogeneous data set. Thus, all available estimates were transformed into one single indicator – annual prevalence among the general population aged 15 to 64 - using transformation ratios derived from analysis of the situation in neighbouring countries, and if such data were not available, on estimates from the USA, the most studied country worldwide with regard to drug use.

The basic assumption is that the level of drug use differs between countries, but that there are general patterns (for example, lifetime prevalence is higher than annual prevalence; young people consume more drugs than older people; males consume more drugs than do females; people involved in the criminal justice system show higher prevalence than do the general population, et cetera) which apply to most countries. It is also assumed that the ratio between lifetime prevalence and annual prevalence among the general population or between lifetime prevalence among young people and annual prevalence among the general population, except for emerging drug trends, do not vary too much among countries with similar social, cultural and economic situation. Various calculations of long-term data from a number of countries seem to confirm these assumptions.

Indicators used

The most widely used indicator at the global level is the annual prevalence rate: the number of people who have consumed an illicit drug at least once in the last twelve months prior to the study. As "annual prevalence" is the most commonly used indicator to measure prevalence, it has been adopted by UNODC as one of key indicators to measure the extent of drug use. It is also part of the Lisbon Consensus on core epidemiological demand indicators (CN.7/2000/CRP.3). All of these indicators, though, are essential for a comprehensive understanding of the potential and the magnitude of drug use problem as well as for measuring the health consequences of problem drug use[h] The basic indicators to monitor drug use, agreed by all participating organizations that formed part of the Lisbon Consensus in 2000, and endorsed by the Commission on Narcotic Drugs, are[i]:

1. - Drug consumption among the general population (estimates of prevalence and incidence);
2. Drug consumption among the youth population (estimates of prevalence and incidence);
3. - High-risk drug use (estimates of the number of injecting drug users and the proportion engaged in high-risk behaviour, estimates of the number of daily drug users);
4. Utilization of services for drug problems (number of individuals seeking help for drug problems);
5. Drug-related morbidity (prevalence of HIV, hepatitis B virus and hepatitis C virus among illicit drug consumers);
6. Drug-related mortality (deaths directly attributable to drug consumption).

The use of "annual prevalence" is a compromise between "lifetime prevalence" data (drug use at least once in a lifetime) and data on current use (drug use at least once over the last month). Lifetime prevalence data are often collected, but they are less useful in providing information about *recent* trends in the levels of drug use across countries. Data on current use could provide information to study even more recent trends. However, they often require larger samples in order to obtain meaningful results, and are thus more costly to generate, notably if it comes to drugs other than cannabis which is widespread.
The "annual prevalence" rate is usually shown as a percentage of the youth and adult population. The definitions of the age groups vary, however, from country to country. Given a

[h] For a detailed discussion on each of the indicator and setting up local and national drug use monitoring systems, please see UNODC *Toolkit Module 1:Developing an Integrated Drug Information System*, UN, 2003
[i] While in the analysis of the drug use situation and drug use trends all these indicators were considered, when it came to provide a global comparison a choice was made to rely on the one key indicator that is most available and provides an idea of the magnitude for the drug use situation: annual prevalence among the population aged 15 to 64.

highly skewed distribution of drug use among the different age cohorts in most countries (youth and young adults tend to have substantially higher prevalence rates than older adults or retired persons), differences in the age groups can lead to substantially diverging results. Typical age groups used by UNODC Member States are: 12+; 14+: 15+; 18+; 12-60; 16-59; 18-60; 15-45; 15-75; and, increasingly, aged 15-64. The revised version of the Annual Reports Questionnaire (ARQ) stipulates the age group 15-64 as the key population group to be measured. Where the age groups reported by Member States did not differ significantly from this age group, they were presented as reported and the age group specified. Where studies were based on significantly different age groups, results were typically adjusted to the age group of 15-64.

The methods used for collecting data on illicit drug use vary from country to country. This reduces comparability. The options for post adjustment to reduce these differences are limited. UNODC thus welcomes efforts at the regional level to arrive at more comparable data (as is currently the case in Europe under the auspices of EMCDDA and in the Americas under the auspices of CICAD). Guidelines for setting up internationally drug information systems with internationally accepted and comparable data definition, and methodologies are provided in the UNODC Toolkit Module 1: Developing an Integrated Drug Information System.

Diverging results have also been obtained for the same country by applying differing methodological approaches. In such cases, the sources were analysed in-depth and priority was given to the most recent data and to the methodological approaches that are considered to produce the best results. For example, it is generally accepted that nationally representative household surveys are reasonably good approaches to estimating cannabis, ATS or cocaine use among the general population, at least in countries where there are no adverse consequences for admitting illicit drug use. Thus, household survey results were usually given priority over other sources of prevalence estimates, such as reported registry data from the police or from treatment providers.

However, when it comes to heroin use (or drug injecting), or even problematic use of cocaine and ATS, annual prevalence data derived from national household surveys tend to grossly under-estimate such use [j], because heroin or other problem drug users often do not live in "typical" households (and may be homeless, in hospitals or in prisons); heroin use and other problem drug use is often highly stigmatised so that the willingness to openly report problem use may be lower; and users are often geographically concentrated in certain areas. A number of "indirect" methods have been developed to provide estimates for this group of drug users. They include various benchmark and multiplier methods (benchmark data may include treatment demand, police registration or arrest data , data on HIV and AIDS infections, other services utilization by problem drug users, or mortality data), capture-recapture methods and multivariate indicators. In countries where evidence existed that the primary "problem drug" in those countries was opiates, and an indirect estimate existed for "problem drug use" or injecting drug use (largely Western European countries and some other countries), this was used in preference to household survey estimates of heroin use.

For other drug types, priority was given to annual prevalence data found by means of household surveys. A number of countries, however, did not report annual prevalence data, but lifetime or current use of drug consumption, or they provided annual prevalence data but for a different age group. In order to arrive at basically comparable results, it was thus

[j] The problem of under-estimation is more widespread for heroin, but does also exist for other drugs such as cocaine or methamphetamine.

Indirect methods of estimating problem drug use[k]

Benchmark/Multiplier: If, for example, the number of drug users in treatment in 2009 is known (1000), and approximately 1 in 10 users is known to have attended treatment in 2009, then that treatment figure can be multiplied by a factor of 10 (1000x10=10,000) to obtain an estimate of the total number. Those two components—the known figure in treatment contact (the treatment benchmark) and the estimated proportion of abusers who were in treatment contact (giving the treatment multiplier)—are what gives the method its name. Potential data sources for benchmarks for multiplier methods to estimate prevalence of problem drug use are:

- Specialist drug treatment: Drug users on methadone, attending treatment agencies, or in residential care
- Low threshold drug agencies: Drug users attending drop-in sites or contacted by outreach workers
- Needle exchange programmes: Drug users registered at needle exchange programmes
- Casualty ward: Drug users attending casualty ward because of an overdose
- Laboratory: Drug users tested for HIV, HCV or hepatitis B virus
- Police/prisons: Drug users arrested or imprisoned for drug offences or for other crimes
- Probation: Drug users on probation
- Social services—assessments Drug users assessed by local social services
- Hostels for drug users: Drug users living in hostels
- Addict registers: Drug users reported to a central register
- Surveys of problem drug users: Community surveys of drug users
- Overdose deaths: Number of deaths due to opiate overdose

Establishing various multipliers and applying them to the registered drug using population provides a range of likely estimates of the heroin use population in a country. Either the mid-point of the range, the median or the mean of these estimates can be subsequently used to arrive at a national estimate.

Capture-recapture models are another method based on probability theory[l]. If the following information is available:

- one register (for example, an arrest register) includes a number X of persons (for example 5,000 persons for possession of heroin)
- a second register (such as a treatment register) includes a number Y of persons (for example 2,000 persons for treatment of heroin use)
- a Z number of persons appear in both registers (for example 400 persons)

The total population of heroin dependent users can be estimated through the following calculations:.
X*Y/Z or (5,000x2,000)/400 = 25,000. It can be assumed that 20% (400/2,000) of heroin-dependent users have been arrested, so that the total heroin-using population could be around 25,000 (5,000/20%).

Results can usually be improved if data from more than two registers are analysed (such as data from an arrest register, treatment register, ambulance register, mortality register, substitution treatment register, HIV register, et cetera). More sophisticated capture-

recapture models exist, and are used by some countries to make calculations based on more than two registries[m].

Covariate models in capture-recapture methods
Tilling and Sterne (1999) have developed a variation on the capture-recapture methodology that allows covariates (such as age, sex, area of residence and ethnicity) to be fitted within the modelling procedure to adjust the total prevalence estimate and derive separate estimates for the covariates. That is, the modelling procedure tests and adjusts for heterogeneity. Traditionally, heterogeneity is dealt with by stratifying the data set into subgroups and running separate models. But with each stratum, more information is being used and it is feasible only if there are sufficient numbers of records to allow subgroup models to be run. The covariate model is much more efficient, but the price for that advantage is that the modelling is more complex and demands statistical support. Moreover, examples using the method in drug abuse epidemiology have not yet been published. So it is a method to look out for in the future.

All the above methods are described in detail in the *UNODC Toolkit Module: Estimating Prevalence: Indirect Methods for Estimating the Size of the Drug Problem*

necessary to extrapolate from reported current use or lifetime prevalence data to annual prevalence rates and/or to adjust results for differences in age groups.

Extrapolation methods used

The methods used for these adjustments and extrapolations are best explained by providing a number of concrete examples:

Adjustment for differences in age groups

The approach to age adjustments is highlighted using an example from New Zealand. New Zealand carried out a household survey in 2006, covering the population aged 15-45. According to this survey, annual prevalence of ecstasy use was found to affect 3.4% of the population aged 15-45, equivalent to about 71,200 people. Given the strong association between ecstasy use and younger age groups it can be assumed that there is little ecstasy use in the 45+ age group. Thus, dividing the ecstasy using population established above by the population size 15-64 (2.764 million) gives an estimated prevalence rate of 2.6%.

The situation is slightly more complex when it comes to cannabis. New Zealand reported a cannabis prevalence rate of 17.9% among the population aged 15-45; it is more likely that use would continue past the age of 45 years, based on studies of cannabis users in other countries. An estimate of cannabis use among those aged 15-64 years was therefore derived from an extrapolation from the age structure of cannabis users found in Australia, which was then applied to existing data for New Zealand. Based on the assumption that the age structure of cannabis users in New Zealand is similar to the one found in Australia the likely annual prevalence rate of cannabis use in New Zealand for the population aged 15-64 can be estimated at around 13.3%; this is the estimate reported in the for New Zealand in 2009 *World Drug Report*. Similar approaches were also used for the age-group adjustments of data from other countries in 2010 *World Drug Report*.

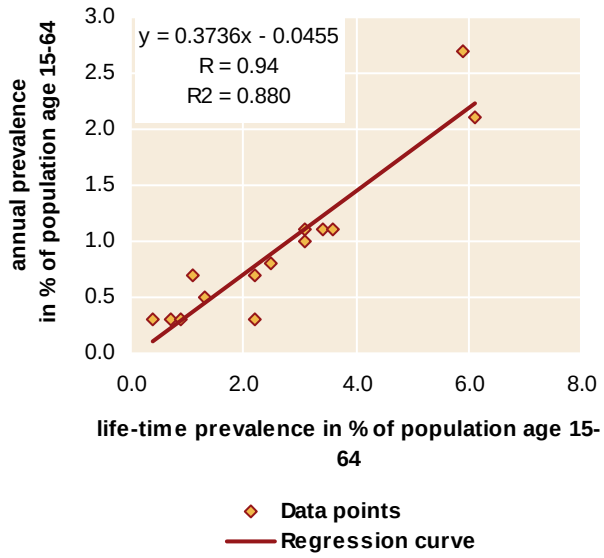
A number of countries reported prevalence rates for the age groups 15+ or 18+. In these cases it was generally assumed that there was no significant drug use above the age of 65. The

number of drug users based on the population age 15+ (or age 18+) was thus simply shown as a proportion of the population age 15-64.

Extrapolation of results from lifetime prevalence to annual prevalence

Some countries have conducted surveys in recent years but did not ask the question whether drug consumption took place over the last year. In such cases, results were extrapolated to arrive at annual prevalence estimates. Let's assume for example that a country in Europe reported a life time cocaine use of 2% and an annual prevalence rate is estimated based on this life time data. Taking data for lifetime and annual prevalence of cocaine use in countries of Western Europe it can be shown that there is a strong positive correlation between the two measures (correlation coefficient R = 0.94); that is, the higher the lifetime prevalence, the higher is the annual prevalence and vice versa. Based on the resulting regression curve (y = annual prevalence and x = lifetime prevalence) it can be estimated that a West European country with a lifetime prevalence of 2% is likely to have an annual prevalence of around 0.7% (see figure). Almost the same result is obtained by calculating the ratio of the unweighted annual prevalence rates of the West European countries and the unweighted lifetime prevalence rate (0.93/2.61 = 0.356) and multiplying this ratio with the lifetime prevalence of the country concerned (2% * 0.356 = 0.7%).

Annual and lifetime prevalence rates of cocaine use in Western Europe



Sources: UNODC, Annual Reports Questionnaire Data / EMCDDA, Annual Report

A similar approach used was also used to calculate the overall ratio by averaging the annual/lifetime ratios, calculated for each country.[n] Multiplying the resulting average ratio (0.387) with the lifetime prevalence of the country concerned provides the estimate for the annual prevalence (0.387 * 2% = 0.8%). Given this close relationship between lifetime and annual prevalence (and an even stronger correlation between annual prevalence and monthly prevalence), extrapolations from lifetime or current use data to annual prevalence data was usually given preference to other kinds of possible extrapolations.

Good quality results (showing only a small potential error) can only be expected from extrapolations done for a country in the same region. If instead of using the West European average (0.387), the ratio found in the USA was used (0.17), the estimate for a country with a lifetime prevalence of cocaine use of 2% would decline to 0.3% (2% * 0.17). Such an estimate is likely to be correct for a country with a drug history similar to the USA, which has had a cocaine problem for more than two decades which is different from Western Europe, where the cocaine problem is a phenomenon of the last decade. Therefore, data from countries in the same region with similar pattern in drug use were used, wherever possible, for extrapolation purposes. It would be difficult to use these proportions to estimate annual prevalence of cocaine use in some of the Asian countries for instance where cocaine use is just emerging.

Both approaches—the regression model and the ratio model—were taken to determine upper and lower uncertainty range estimates calculated at a 90% confidence interval among those aged 15-64 years in that country. The greater the range, the larger the level of uncertainty around the estimates. The range for each country is reported in the statistical annex, where available.

Uncertainty ranges were introduced beginning with the 2009 World Drug Report. More recent estimates (that is to say for data in the year 2007 or beyond) include an upper and lower uncertainty range is reported. There is also a UNODC "best estimate"—a point estimate—which in most cases is the mid-point between the upper and lower range estimates, unless additional quantitative or qualitative information suggested that the best estimate should be closer to the lower or upper end of the range for the country concerned. In cases where newer estimates have uncertainty ranges which are extremely narrow, only a "best estimate" may be reported reflecting high degree of certainty around the estimate. Estimates developed prior to the 2009 World Drug Report (typically reflecting data before 2007), will likely be reported as only a UNODC "best estimate" without a range.

Extrapolations based on school surveys

Analysis of countries which have conducted both school surveys and national household surveys shows that there is, in general, a positive correlation between the two variables, particularly for cannabis, ATS and cocaine. The correlation, however, is weaker than that of lifetime and annual prevalence or current use and annual prevalence among the general population. But it is stronger than the correlation between opiate use and IDU-related HIV cases, and between treatment and drug use.

These extrapolations were conducted using the ratios between school surveys and household surveys of countries in the same region or with similar social structure where applicable. As was the case with extrapolation of results from lifetime prevalence to annual prevalence two approaches were taken: a) the unweighted average of the ratios between school and household surveys in the comparison countries with an upper and lower uncertainty range estimate calculated at a 90% confidence interval; and b) a regression-based extrapolation, using the relationships between estimates from the other countries to predict the estimate in the country concerned based upon the school survey estimate in that country with an upper and lower uncertainty range estimate calculated at a 90% confidence interval. The uncertainty range and best estimate are calculated using both models, where applicable.

Extrapolations based on treatment data

For a number of developing countries, the only drug-related data available on the demand side was treatment demand. In such cases, the approach taken was to look for other countries in the region with a similar socio-economic structure, which reported annual prevalence data and treatment data. A ratio of people treated per 1000 drug users was calculated for each country. The results from different countries were then averaged and the resulting ratio was used to extrapolate the likely number of drug users from the number of people in treatment.

A note on ranges at the country level

As is no doubt clear from the discussion above, in many instances there is uncertainty about the exact values for extrapolated or imputed data. Different approaches can be used within a study, or to make estimates of the prevalence of drug use across studies. As in 2009, in this year's *World Drug Report*, where a number of estimates existed, or a variety of approaches to making estimates could be used, ranges were reported at the country level. This was intended to reflect the variation that can occur even within a country when different approaches to estimating the level of drug use are taken.

Making regional and global estimates of the number of people who use drugs

For this purpose the estimated prevalence rates of countries were applied to the population aged 15-64, as provided by the United Nations Population Division for the year 2008.

Due to the considerable uncertainty and in the spirit of reflecting data gaps, no "absolute" numbers are provided, but rather, ranges have been produced. These reflect the uncertainty that exists when data are being either extrapolated or imputed. Ranges (not absolutes) are provided for estimated numbers and prevalence in the statistical chapter. Larger ranges will exist for those subregions and regions where there is less certainty about the likely level of drug use – in other words, those regions for which fewer direct estimates are available, for a comparatively smaller proportion of the region's population.

The data being used to generate the estimates comprise only those estimates considered sufficiently robust and/or recent to be published at the country level in the 2010 *World Drug Report's* tables. Country estimates which are not published in the statistical annex of theis *Report* are not de facto included in estimates of prevalence at the country, subregional or global level.

Efforts were made to produce subregional and regional estimates. Such estimates were only made where direct estimates were published for at least two countries that comprise at least 20% of the subregion or region's population aged 15-64. For countries for which no information was available, the 10% and 90% percentile of the prevalence rates found in the subregion were applied.

Countries with one published estimate (typically those countries with a representative household survey, or an indirect prevalence estimate that did not report ranges) did not have uncertainty estimated. The same estimate is reflected as the "best estimate".

To account for populations in countries with no published estimate, the 10^{th} and 90^{th} percentile in the range of direct estimates was used to produce a lower and upper estimate. For example, there are three countries in the North Africa subregion with past year prevalence estimates for cannabis use: Algeria (a range from 5.2 – 6.4), Egypt (2.9 – 9.6) and Morocco (4.2, a point estimate). These are extrapolated to the population of the remaining three

countries without prevalence data, namely Libya, Sudan, and Tunisia. The 10th percentile of the lower bound of the uncertainty range (5,2, 2.9, and 4.2) is 3.2 and the 90th percentile of the upper bound (6.4, 9.6, and 4.2) is 8.9. The 3.2 and 8.9 figures are applied to the population of the remaining three countries without prevalence data for a subregional total lower and upper estimate.

In some cases, not all of a region's subregions had estimates due to a lack of country level data. For example, past year amphetamine-group prevalence was calculated for East and South-East Asia, however the remaining subregions—the Near and Middle East/ South West Asia, South Asia, Central Asia—had no estimates. To calculate an overall Asia lower and upper estimate for populations in subregions with no published estimate, all of the countries throughout the region were considered using the 10th and 90th percentile of the regional distribution. These results were then combined with those subregions were an estimate was possible. One exception however was for South Asia's subregional opiate and cannabis estimates. In this case, India's population accounts for 85% of the six countries in the subregion, but reliable estimates of drug use were for India were not available. Instead of using all of various prevalence estimates for Asia (that is to say estimates from the Near and Middle East to East Asia) to determine India's contribution to the subregional uncertainty, it was determined that India's contribution was best reflected by its neighbouring countries.

This produces conservative (wide) intervals for subregions where there is geographic variation and/or variance in existing country-level estimates; but it also reduces the likelihood that very skewed estimates will have a dramatic effect upon regional and global figures (since these would most likely fall outside the 10th and 90th percentile).

World Drug Report estimates of the total number of people who used illicit drugs at least once in the past year

The approach used in this year's *Report* was the same as that of last year where two ranges were produced, and the lowest and highest estimate of each the approaches were taken to estimate the lower and upper ranges, respectively, of the total illicit drug using population. This estimate is obviously tentative given the limited number of countries upon which the data informing the two approaches were based (see the list of countries below). The two approaches were as follows:

Approach 1. The global estimates of number of people using each of the five drug groups in the past year were summed together. To adjust for the fact that people use more than one drug type and these five populations overlap, the total was then adjusted downward. The size of this adjustment was made based upon household surveys conducted in the USA, Canada, Australia, the United Kingdom, Italy, Brazil, Mexico and Germany, which all assessed all five drug types, and reported an estimate of total illicit drug use. Across all of these studies, the extent to which adding each population of users overestimated the total population was an average of 116%. The summed total was then therefore divided by 1.17.

Approach 2. This approach was based on the average proportion of the total drug using population that comprises cannabis users. The average proportion was obtained from household surveys conducted in the USA, Canada, Australia, the United Kingdom, Italy, Brazil, Mexico and Germany, which all assessed all five drug types, and reported an estimate of total illicit drug use. Across all of these studies, the average proportion of total drug users that comprised cannabis users was 76%. The range of cannabis users at the global level was therefore divided by 0.76.

World Drug Report estimates of the number of "problem drug users"

There is clear utility in making estimates of the number of drug users whose use is particularly problematic. It is this subgroup of drug users who are most likely to come to the attention of health and law enforcement, and whose drug use has been estimated to cause the main burden of the disease and public health and public order burden.

The number of problem drug users are typically estimated with the number of **dependent** drug users. Sometimes an alternative approach is used, employing a definition of **injecting or long duration use of opioids, amphetamines or cocaine**, as the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) uses to guide country level indirect prevalence estimation studies.[o]

Making such estimates is a challenging undertaking, even at the country level. These challenges become even more salient when attempting to make regional and global estimates of the size of this population, where there are additional issues of data gaps at country and subregional levels on dependent or injecting drug use. The most common approach is to use some kind of indirect method or extrapolation techniques as described above.

In this *Report*, as in previous years, the following approach was taken. Each of the five range estimates for number of people using each of the five drug groups was converted into a "heroin user equivalent". This was calculated through the use of "relative risk coefficients" (see below) derived using the UNODC's Harm Index.[p]

Table: "Relative risk coefficient"

	Treatment index	IDU index	Toxicity index	Deaths index	"Relative risk coefficient"*
Opiates	100	100	100	100	**100**
Cocaine	85.3	47.8	88	18.5	**59.9**
Amphetamines	20.1	59.5	32	6.8	**29.6**
Ecstasy	3.8	6.1	20.7	1	**7.9**
Cannabis	9	0	1.5	0.6	**2.8**

* Unweighted average across the four indices.

This allows for aggregating results from different drugs into one single reference drug (in this case, heroin). Using this coefficient, each of the five drug use estimates was converted into an estimate of the number of "heroin user equivalents". A lower range was calculated through summing each of the five lower range estimates; the upper end of the range was calculated by summing the upper range of the five estimates.

To obtain an estimate of the number of "problem drug users", these totals were multiplied by the proportion of past year heroin users in the United States National Survey on Drug Use and Health (range 53-68% over the past six years of the NSDUH). Hence, The LOW estimate of "problem drug users" is the lower proportion (53%) multiplied by the lower estimated size of the heroin use equivalent population (30.2 million heroin user equivalents). The HIGH estimate of "problem drug users" is the higher proportion (68%) multiplied by the higher estimated size of the heroin use equivalent population (57.3 million heroin user equivalents).

Concluding remarks

It goes without saying that each method of extrapolating results from other countries has weaknesses. These estimates should still be interpreted with caution. The 2010 *World Drug Report* reflects the different uncertainty that exists in the data. UNODC made an attempt to reduce the risk of bias by extrapolating data using, as far as possible, data from nearby countries in the region.

The global estimates presented in this report reflect likely orders of magnitude, as opposed to precise statistics on the prevalence and evolution of global drug use. More precise ranges can be produced when a greater number of countries provide estimates based on rigorous scientific methods.