Methodology

Considerable efforts have been made over the last few years to improve the estimates presented in this report. Nonetheless, the data must still be interpreted with caution because of the clandestine nature of drug production, trafficking and abuse. Apart from the 'hidden' nature of the phenomenon being measured, the main problems with regard to data relate to the irregularity and incompleteness in reporting. This affects the quantity, quality and comparability of information received. First, the irregular intervals at which some Governments report may result in absence of data in some years but availability in others. The lack of regular data, for which UNODC tries to compensate by reference to other sources, can influence trend patterns. Secondly, submitted questionnaires are not always complete or sufficiently comprehensive. All figures should thus be seen as likely orders of magnitude of the drug problem, but not as precise results. It should be also noted that all figures provided, particularly those of more recent years, are subject to updating.

Sources and limitations of data on the supply side

Cultivation, production and manufacture

Global estimates are, in general, more robust on the production side, notably data for plant based drugs, than on the demand side. In line with decisions of the Member States (1998 UNGASS and subsequent CND 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 Lao PDR for opium and Colombia, Peru and Bolivia for coca) have been derived from these national monitoring systems operating in the countries of illicit production. UNODC also conducted in 2004, for the second time, a survey on cannabis resin production in Morocco, in close cooperation with the Government of Morocco. 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.

The key indicator for measuring progress made towards the supply reduction goals set out in the UNGASS Political Declaration of June 1998 is the area under cultivation of narcotic crops. Since 1999, UNODC has been supporting the establishment of national monitoring systems in the main narcotics production countries. These monitoring systems are tailored to national specificities. The direct participation of UNODC ensures the transparency of the survey activities. Through its network of monitoring experts at headquarters and in the field, the UNODC ensures the conformity of the national systems so that they meet international methodological standards and the information requirements of the international community. Most of these monitoring systems rely on remote sensing technology (i.e. analysis of satellite imagery) in combination with extensive field visits which is made possible through UNODC's field presence in all of the main narcotics producing countries. Satellite images, in combination with ground information, offer a reliable and objective way of estimating illicit crops. Depending on the local conditions, the surveys are conducted either on a census approach (coca cultivation in Colombia, Peru and Bolivia, cannabis cultivation in Morocco) or a sample approach (opium poppy cultivation in Afghanistan, Myanmar and Laos). The accuracy assessment of the individual estimates differs, but is often close to 90%, i.e. 'ground truthing' shows that about 90% of the areas analysed from satellite photos were correctly identified as poppy fields or coca fields. In the case of sampling, the potential error depends on the number of villages investigated and/or on the number of satellite photos taken which form the basis for subsequent extrapolations to the agricultural land. In the case of Afghanistan, for instance, the estimated area under poppy cultivation in the 2004 opium poppy survey showed a potential margin of error +/- 17% (or, for the areas covered by satellite photos, of +/- 13%, suggesting a 90% probability that the actual results fall within the confidence interval).

In addition, the ground surveys, assist UNODC to obtain information on yields, drug prices and various other socio-economic data that is useful for alternative development interventions. Detailed discussion of the methodological approaches can be found on http://www.unodc.org/unodc/en/crop_monitoring.html.

UNODC has also started to conduct yield surveys in some countries, measuring the yield of test fields, and to develop methodologies to extrapolate the yields from proxy variables, such as the volume of poppy capsules. This approach is already used in South-East Asia and in 2004 UNODC used this approach for the first time in Afghanistan as well, following 4 years of testing. All of this is intended to further improve yield estimates, aiming at information that is independent from farmers' reports. The accuracy of the calculated yields depends on a number of factors, including the number of sites investigated. In the case of Afghanistan the confidence interval for the mean yield results in the 2004 survey was, for instance, +/- 8% of the mean value (based on alpha = 0.05).

In countries in which UNODC has not, as yet, undertaken yield surveys, results from other surveys conducted at the national level are used instead. This is currently still the case in Andean countries, though UNODC has started to become involved in such yield surveys and expects better yield estimates over the next few years. The disadvantage of having to take recourse to yield data from other sources is that year on year variations, due to weather conditions, or due to the introduction of improved seeds, fertilizers and pesticides, are not properly reflected in the end results.

The transformation ratios used to calculate the potential cocaine production from coca leaf or the heroin production from opium are more problematic. In order to be precise, these calculations would require detailed information at the local level on the morphine content in opium or the cocaine content in the coca leaf, as well as detailed information on the clandestine laboratory efficiency, which in turn is a function of know-how, equipment and precursor chemicals. This information is not available. A number of studies conducted by enforcement agencies in the main drug producing countries have provided some 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 cases studies which are not necessarily typical for the production process in general. Potential margins of error in this rapidly changing environment, with new laboratories coming on stream while others are being dismantled, are thus, substantial. This also applies to the question of the psychoactive content of the narcotic plants. One study conducted in Afghanistan by UNODC over a couple of years, indicated, for instance, that the morphine content of Afghan opium was significantly higher than had been thought earlier. Based on this study in combination with information on the price structure (which suggested that at a 10:1 conversion ratio of opium to morphine/heroin laboratory owners would lose money) the transformation ratio for opium produced in Afghanistan was changed from a 10:1 to a new ratio of 6.5 : 1 in 2004. For other countries the traditional 10:1 ratio continues being applied. An open question remains, however, the effective laboratory efficiency in this country[a]. On the cocaine side, a number of studies have been conducted in the Andean region over the last decade investigating the transformation ratios of coca leaf to cocaine base and cocaine HCL - which also form the basis for UNODC's estimates. However, these conversion ratios are not in line with reported price patterns of these substances, raising some questions as to their appropriateness and indicating a need to revisit them. At the same time, it is obviously impossible for UNODC to set up clandestine laboratories and hire 'cooks' in order to improve its statistical basis. All of this underlines the ongoing difficulties to accurately assess global heroin and cocaine production, even though information on areas under cultivation has greatly improved over the last few years.

'Potential' heroin or cocaine production, the indicator used throughout this report, shows the level of production of heroin or cocaine if all of the opium or coca leaf were transformed into the end products. In reality, however, 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. There are important illicit opium markets in Iran or Pakistan and coca leaf is used by the local population in Bolivia, Peru and northern Chile. In addition, significant quantities of the intermediate products, coca paste or morphine, are also consumed in the producing countries.

As the transformation ratios used are rather conservative, total 'potential' production, however, may well be close to 'actual' production of the end products if one takes the *de-facto* lower amounts available for starting the transformation process into account. There are thus two kinds of potential biases in the estimates which (at least partly) can be expected to offset each other.

[a] In 2004, the German Bundeskriminalamt conducted a very interesting case study on heroin production in that country which indicated rather low levels of laboratory efficiency. However, it is difficult to generalize these findings and more such studies would be needed to determine overall laboratory efficiency in that country.

The use of the concept of 'potential production' at the country level also means that actual heroin or cocaine production is under-estimated in some countries, and over-estimated in others while the estimate for the global level should not be affected by this. The calculation of 'potential' cocaine production estimates for Peru, for instance, exceeds actual local cocaine production as some of the coca paste or coca base produced in Peru is exported to neighbouring Colombia for further processing into cocaine. Based on the same reasoning, potential cocaine production estimates for Colombia under-estimate actual cocaine production in the country. Actual cocaine manufacture in Colombia takes place from locally produced coca leaf as well as from coca base imported from Peru.

In the case of cannabis herb, the globally most dispersed illegal drug, all available production estimates were aggregated. In most cases, however, these estimates are not based on scientific studies (often reflecting potential yields of eradicated areas rather than total production) and often refer to different years (as only a limited number of countries provided such estimates in the last Annual Reports Questionnaire for the year 2003). A significant number of countries did not provide estimates at all. Thus, in addition to last year's *World Drug Report*, a systematic review was undertaken of all the countries which over the last decade were identified by other countries as a significant cannabis source countries or which reported the seizures of whole cannabis plants (which is indicative of domestic cultivation). For these countries, production was estimated to cover domestic demand, multiplying the number of estimated cannabis users by the average global cannabis herb consumption rate, derived from previous calculations. For countries that were identified as cannabis producing countries but were not identified as major cannabis exporting countries, a certain percentage of domestic demand was used to estimate local production. The percentages chosen depended on quantitative and qualitative information available for different regions. Clearly, this is not an ideal estimation technique but the best that is currently available. In a number of cases, subsequent indications of likely orders of magnitude, referred in scientific literature, came rather close to these results. This approach increased the estimate from 35,000 tons to 42,000 tons. Cross-checks with existing seizure statistics suggest that the magnitude of the overall cannabis estimate is a feasible order of magnitude. Current estimates suggest that the global cannabis herb interception rate in 2003 was 14%, more than the 'traditional' 10% rule of thumb ratio, though lower than the interception rates calculated for opiates (18% in 2002, 23% in 2003), which should be expected as heroin is far more targeted by enforcement bodies than cannabis. Using the 'traditional' 10% ratio, the production estimate would rise to 58,000 tons; but it is difficult to imagine such amounts actually being consumed. Current UNODC estimates of cannabis herb consumption are around 30,000 tons, which – taking seizures into account – would indicate a gross production of around 36,000 tons. These considerations suggest that the potential error for the cannabis herb estimate remains large although the actual figures should fall well within a +/- 50% error margin.

In the case of cannabis resin, scientific information on the – most likely - largest cannabis resin producing country is available which, in combination with seizure statistics, forms a basis for extrapolations to the global level. Given no dramatic changes of cannabis resin production in Morocco, last year's global cannabis resin estimate was maintained. That estimate was based on calculating backward from cannabis herb estimates (based exclusively on explicitly reported cannabis production estimates) and on the assumption of similar interception rates for both substances. Though the resulting global cannabis resin estimates cannot be considered to be very precise, any significant difference (>50%) in the order of magnitude is not very likely.

The potential margins of error for the ATS estimates are less than those of cannabis, but probably larger than those for the heroin or the cocaine estimates. The approach taken in this case was one of triangulation, estimating production based on reported seizures of the end products in combination with some assumptions of law enforcement effectiveness, seizure data of precursor chemicals and estimates based on the number of consumers and their likely levels of *per capita* consumption. While each individual calculation may well raise some questions, the overall results of the three approaches showed similar orders of magnitude, suggesting that actual production levels of ATS may not be too far-off (+/- 30%) from the resulting mid-point estimates. The estimation procedure remains unchanged from the one used for last year's *World Drug Report*.

Trafficking

The information on trafficking, as presented in this report, is mainly drawn from the Annual Reports Questionnaires (ARQ), submitted by Governments to UNODC in 2004 and early 2005 and refers to the year 2003 (and previous years). Additional sources, such as other governmental reports, the International Criminal Police Organization (Interpol), the World Customs Organization (WCO) and UNODC's field offices, were used to supplement the information. Priority was, however, given to officially transmitted data in the Annual

Reports Questionnaire. The analysis of quantities seized, shown in this report, was based on information provided by 157 countries and territories in 2002 and 156 in 2003. Seizures are thus the most comprehensive indicator of the drug situation and its evolution at the global level. Though they may not always reflect trafficking trends correctly at the national level, they tend to show good representations of trafficking trends at the regional and global levels.

There are some technical problems as – depending on the drugs - some countries report seizures in weight terms (kg), in volume terms (litres) while other countries report seizures in 'unit terms'. In Volume II, seizures are shown as reported. In the analytical sections of Volume I of the report, seizure data have been 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: cannabis herb: 0.5 grams, cannabis resin: 0.135 grams; cocaine and ecstasy: 0.1 grams, heroin and amphetamines: 0.03 grams, LSD: 0.00005 grams (50 micrograms). A litre of seizures was assumed to be equivalent to a 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. Though all of these transformation ratios can be disputed, they at least provide a possibility of combining all the different seizure reports into one comprehensive measure. The transformation ratios have been derived from those used by law enforcement agencies, in the scientific literature, by the INCB, and were established in consultation with UNODC's Laboratory and Scientific Section. No changes in the transformation ratios used in last year's *World Drug Report* were made.

Seizures are used as an indicator for trends and patterns in trafficking. In combination with changes in drug prices or drug purities, changes in seizures can indicate whether trafficking has increased or declined. Increases in seizures in combination with stable or falling drug prices is a strong indication of rising trafficking activities. Increasing seizures and rising 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 abuse 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. Thus, the extent to which seizure statistics from some countries constitute all reported national cases, regardless of the final destination of the illicit drug, can vary and makes it sometimes difficult to assess actual trafficking activities. The problem is exacerbated by increasing amounts of drugs being seized in countries along the main transit routes, the increasing use of 'controlled deliveries', in which countries forego the possibility of seizing drugs immediately in order to identify whole trafficking networks operating across countries, and 'upstream disruptions', making use of intelligence information to inform partner countries and enable them to seize such deliveries prior to entering the country of final destination. Some of the increase of cocaine seizures in the Andean region in recent years, for instance, may have been linked to such upstream market disruptions.

However, over longer periods of time and over larger geographical entities, seizures have proven to be a good indicator to reveal underlying trafficking trends. 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 be probably seized in the neighbouring countries. Similarly, if enforcement efforts and thus seizures decline in one country, the neighbouring countries are likely to suffer from intensified trafficking activities, resulting in rising levels of seizures. The net results, emerging from changes of enforcement priorities of an individual country, are thus, in general, not significant at the regional or at the global level. Actual changes in trafficking can thus be considered to be among the main reasons for changes in seizures at the regional level or the global level. Indeed, comparisons, on a time-series basis, of different indicators with statistical dependence have shown strong correlations (e.g. global opium production estimates and global seizures of opiates, or global coca leaf production and global cocaine seizures), supporting the statistical worth of seizure statistics at regional and global levels. At the same time, data also show that interception rates have gradually increased over the last decade, reflecting improved law enforcement effectiveness at the global level.

Price and purity data

UNODC also collects and publishes price and purity data. Price and purity data, if properly collected, can be very powerful indicators for the identification of market trends. As supply changes in the short-run are usually stronger than changes on the demand side (which tend to take place over longer time periods), shifts in prices and purities are a good indicator for actual increases or declines of market supply. Research has also shown that short-term changes in the consumer markets are – first of all - reflected in purity changes while prices tend to be rather stable over longer periods as traffickers and drug consumers at the retail level prefer 'round' prices.

UNODC collects its price data from the Annual Reports Questionnaire, and supplements this data set by other sources, such as price data collected by Europol and other organisations. Prices are collected for the farm-gate level, the wholesale level ('kilogram prices') and for the retail level ('gram prices'). Countries are asked to provide minimum, maximum and typical prices and purities. In case no typical prices/purities are provided, 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 the way such data were collected and their actual statistical representativeness. While some improvements have been made in some countries over the last few years, a number of law enforcement bodies in several countries have not, as yet, discovered the powerful strategic value of such data, once collected in a systematic way, at regular intervals, so that it can be used for statistical analysis, drug market analysis and as an early warning system.

Sources and limitations of data on consumption

Extent of drug abuse

a. Overview

UNODC estimates of the extent of drug abuse in the world have been published periodically since 1997 (see *World Drug Reports 1997, 2000,* 2004 and *Global Illicit Drug Trends 2002 and 2003)*. The sixth round of estimates, presented in this report, is based on information received until May 2005.

Assessing the extent of drug abuse (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 in recent 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 the total number of drug users in the world. Yet it is both desirable and possible to establish basic orders of magnitude - which are obviously subject to revision as new and better information is generated.

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

1. Identification and analysis of appropriate sources.
2. Identification of key benchmark figures for the level of drug use in selected countries (annual prevalence of drug abuse among the general population age 15-64) which then serve as 'anchor points' for subsequent calculations.
3. 'Standardization' of existing data (e.g. from age group 12 and above to a standard age group of 15-64).
4. Extrapolation of existing results based on information from neighbouring countries with similar cultural, social and economic situations (e.g. life-time prevalence or current use to annual prevalence, or school survey results to annual prevalence among the general population).
5. Extrapolation of available results from countries in a region to the region as a whole, using all available quantitative and qualitative information.
6. Aggregation of regional results to arrive at global results.

The approach taken to arrive at the global estimates has remained essentially the same since the first attempt was made in 1997.

Estimates of illicit 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. For 2003, for instance, 66 countries provided UNODC with quantitative estimates of their drug situation in their country, including 40 countries providing estimates of the prevalence of drug consumption among the general population and 53 countries providing estimates of prevalence of drug use among their student populations. For countries that did not submit information, other sources, where available, were identified. Alternatively, information provided by Governments in previous years was used. In such cases, the prevalence rates were left unchanged and applied to new population estimates for the year 2003. In addition, a number of estimates needed to be 'adjusted' (see below). Using all of these sources, estimates were established for 137

countries. Results from these countries were extrapolated to the sub-regional level and then aggregated into the global estimate.

Detailed information is available from countries in North America, a large number of countries in Europe, a number of countries in South America, a few countries in Oceania (though including the two largest countries) and a limited number of countries in Asia and in Africa. For other countries, available qualitative information on the drug situation only allows for some 'guess estimates'. In the case of complete data gaps for individual countries, it was assumed that drug use was likely to be close to the respective sub-regional average, unless other available indicators suggested that they were likely to be above or below such an average.

One key problem in currently available prevalence estimates from countries 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 obviously the result of guesswork. In other cases, the estimates simply reflect the aggregate number of drug addicts found in drug registries which probably 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 (e.g. school surveys), special settings (such as hospitals or prisons), life-time, annual, or monthly prevalence, etc.

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 age 15 to 64 and above - 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 abuse.

The basic assumption is that the level of drug use differs between countries, but that there are general patterns (e.g. lifetime time prevalence is higher than annual prevalence; young people consume more drugs than older people) which apply universally. It 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, do not vary too much among countries with similar social, cultural and economic situation. Data from a number of countries seem to confirm these assumptions.

In order to minimize the potential error from the use of different methodological approaches, all available estimates for the same country - after transformation - were taken into consideration and - unless methodological considerations suggested a clear superiority of one method over another - the mean of the various estimates was calculated and used as UNODC's country estimate.

b. 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 survey. As "annual prevalence" is the most commonly used indicator to measure prevalence, it has been adopted by UNODC as the key indicator to measure the extent of drug abuse. It is also part of the Lisbon Consensus[b] (20-21 January 2000) on core epidemiological demand indicators (CN.7/2000/CRP.3). The use of "annual prevalence" is a compromise between "life-time prevalence" data (drug use at least once in a life-time) and data on current use (drug use at least once over the last month). Lifetime prevalence data are, in general, easier to generate but are not very illustrative. Data on current use are of more value. However, they often require larger samples in order to

[b] The basic indicators to monitor drug abuse, agreed by all participating organizations that formed part of the Lisbon Consensus in 2000, are:
- Drug consumption among the general population (estimates of prevalence and incidence);
- Drug consumption among the youth population (estimates of prevalence and incidence);
- High-risk drug abuse (estimates of the number of injecting drug users and the proportion engaged in high-risk behaviour, estimates of the number of daily drug users);
- Utilization of services for drug problems (number of individuals seeking help for drug problems);
- Drug-related morbidity (prevalence of HIV, hepatitis B virus and hepatitis C virus among illicit drug consumers);
- Drug-related mortality (deaths directly attributable to drug consumption).

While in the analysis of the drug abuse situation and drug abuse 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 abuse situation: annual prevalence among the population aged 15 to 64.

obtain meaningful results, and are thus more costly to generate, notably if it comes to other drugs 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 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+; 16-59; 12-60; 14+: 15+; 18+; 18-60; 15-45; 15-75; and increasingly age 15-64. In the past UNODC used to work on the basis of a 15+ age group. The revised version of the Annual Reports Questionnaire (ARQ), adopted by Member States, which since 2001/02 has replaced the previous ARQ, stipulates the age group 15-64 as the key population group for which drug use to be measured against. Prevalence data in this report, like in last year's *World Drug Report*, are thus reported for the age group 15-64. In case the age groups reported by Member States did not differ significantly from this age group, they were presented as reported and the age group was explicitly added. In cases where studies were based on significantly different age groups, results were adjusted to the age group of 15-64. (See below).

The methods used for collecting data on illicit activities vary from country to country. This reduces comparability. Possibilities to reduce differences – ex post – arising due to different methodological approaches 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).

In a number of cases, diverging results are also obtained for the same country, applying differing methodological approaches. In such cases, the sources were analysed in-depth and priority was given to the methodological approaches that are usually also used in other countries. For example, it is generally accepted that household surveys are reasonably good instruments to estimate cannabis, ATS or cocaine use among the general population. 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 abuse (or drug injecting), there seems to be a general agreement that annual prevalence data derived from national household surveys tend to grossly under-estimate such abuse because severe heroin addicts often do not live in households[c] They may be homeless, in hospitals or in prisons. Moreover, heroin abuse is highly stigmatized so that the willingness to openly report a heroin abuse problem is limited. However, a number of indirect methods have been developed over the last two decades to provide estimates for this group of problem drug users. They include various multiplier methods (e.g. treatment multipliers, police data multipliers, HIV/AIDS multipliers or mortality multipliers), capture-recapture methods, and multivariate indicators.

[c] The problem of under-estimation is more widespread for heroin, but it is not excluded for other drugs, especially drugs related to problem drug use such as cocaine or methamphetamine.

Indirect methods to measure problem drug use

Treatment multiplier: If a survey among heroin addicts reveals, for instance, that one quarter of them was in treatment in the last year, the multiplication of the registered treatment population with a multiplier of four provides an estimate of the likely total number of problem heroin users in a country. Police data multiplier: Similarly, if a survey among heroin addicts reveals that one out of five addicts was arrested in the previous year, a multiplication of the persons arrested for heroin possession by the multiplier (five) provides another estimate for the number of heroin users. Establishing various multipliers and applying them to the registered drug using population, provides a range of likely estimates of the heroin abuse 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 considerations, which can be undertaken without additional field research[d]. If in one register (e.g. arrest register) 5000 persons are found (for possession of heroin) and in a second register (e.g. treatment register) 2000 persons are found (for treatment of heroin abuse), and there are 400 persons who appear in both registries, it can be assumed that 20% (400/2000) of the drug addicts have been arrested, so that the total heroin addict population could be around 25,000 (5000/20%), five times larger than the total number of arrested heroin users.[e] Results can usually be improved if data from more than two registers are analysed (e.g. data from arrest register, treatment register, ambulance register, mortality register, substitution treatment register, HIV register etc). More sophisticated capture-recapture models exist, and are used by some advanced countries, in order to make calculations based on more than two registries. However in order to arrive at reasonable orders of magnitude of the heroin problem in a particular country it is probably sufficient to calculate the various combinations shown above and subsequently report the mid-point, the median or the mean of the resulting estimates.

Another interesting approach is the use of *multivariate indicators*. For this approach, a number of local/regional studies are conducted, using various multiplier and/or capture-recapture methods. Such local studies are usually far cheaper than comprehensive national studies. They serve as anchor points for the subsequent estimation procedures. The subsequent assumption is that drug abuse at the local level correlates with other data that are readily available. For instance, heroin arrest data, heroin treatment data, IDU related HIV data, etc. are likely to be higher in communities where heroin abuse is high and lower in communities where heroin abuse is low. In addition, heroin abuse may correlate with some readily available social indicators (higher levels in deprived areas than in affluent areas; higher levels in urban than in rural areas etc). Taking all of this additional information into account, results from the local studies are then extrapolated to the national level.

Whenever such indirect estimates for problem drug use were available, they were given priority over household survey results. Most of the estimates for problem drug use were obtained from European countries. Unless there was evidence that a significant proportion of problem drug use was related to the use of other drugs, it was assumed that the problem drug use concerned opiates. In the case of some of the Nordic countries, where amphetamine use is known to account for a significant proportion of overall problem drug use, the data of reported problem drug users were corrected by applying the proportion of opiate consumers in treatment in order to arrive at estimates for opiate abuse.

For other drugs, 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

[d] Such methods were originally developed to estimate the size of animal population. If, for instance, 200 fish are caught (' capture'), marked, and released back into the lake, and then the next day 100 fish are caught, of which 10 were already marked ('re-captured'), probability considerations suggest that the number of fish captured the first day were a 10% sample of the total population. Thus the total population of the lake can be estimated at around 2000 fish.

[e] The advantage of this method is that no additional field research is necessary. There are, however, problems as the two ' sampling processes' for the registries in practice are not independent from each other so that some of the underlying assumptions of the model may be violated (e.g. the ratio could be higher as some of the people arrested are likely to be transferred to a treatment facility; thus the ratio does not correspond any longer to the true proportion of people arrested among the addicts population, and may lead to an under-estimation of the total heroin addict population).

results, it was thus 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.

c. 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 the age groups:

New Zealand, for instance, undertook a household survey in 2001, covering the population age 15-45. According to this survey, annual prevalence of ecstasy use was found to affect 3.4% of the population 15-45, equivalent to about 56,000 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 age group 15-64 gives an estimated prevalence rate of 2.2%.

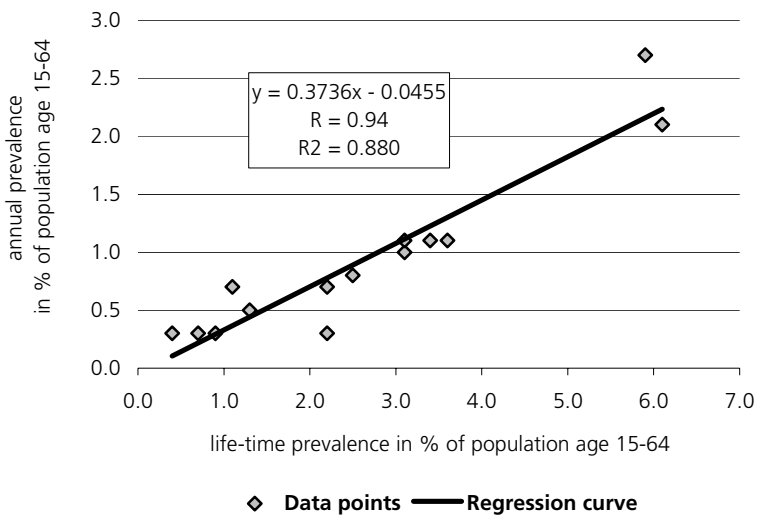
The situation is slightly more complex when it comes to cocaine. The same approach for New Zealand would lower the annual cocaine prevalence rate from 0.6% of the population age 15-45 to 0.4% of the population age 15-64. In this case, however, it must be assumed that there are still some people above the age of 45 consuming cocaine. A rate of 0.4% is thus a minimum estimate. An alternative estimation approach is indicated. Thus, the relationship between cocaine consumption among the group of those age 15-45 and those age 15-64 in other countries was investigated. The finding was that the prevalence rate of cocaine use among those age 15-64 tends to be around 75% of the prevalence rate of those age 15-45. Instead of 0.4%, the cocaine prevalence rate in New Zealand has thus been estimated to affect 0.45% of the population age 15-64.

Similar considerations were also used for the age-group adjustment of data from other countries. 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 can be still extrapolated to arrive at annual prevalence estimates and reasonably good estimates can be expected. Taking data for life-time and annual prevalence of cocaine use in countries of Western Europe, for instance, it can be shown that there is a rather strong positive correlation between the two measures (correlation coefficient R = 0.94); i.e. the higher the life-time prevalence, the higher is, in general, annual prevalence and *vice versa*. Based on the resulting regression curve (y = 0.3736 * x - 0.0455 with y = annual prevalence and x = life-time prevalence) it can be estimated that a West European country with a life-time prevalence of 2% is likely to have an annual prevalence of around 0.7% (also see figure).

Annual and life-time prevalence rates of cocaine use in Western Europe



Sources: UNODC, Annual Reports Questionnaire Data / EMCDDA, Annual Report 2004.

Almost the same result is obtained by calculating the ratio of the unweighted annual prevalence rates of the West European countries and the unweighted life-time prevalence rate (0.93/2.61 = 0.356) and multiplying this ratio with the life-time prevalence of the country concerned (2% * 0.356 = 0.7%).

A similar approach used was to calculate the overall ratio by averaging the annual/life-time ratios, calculated for each country[f]. 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%). This approach also enables the calculation of a confidence interval for the estimate. With a 95% probability the likely annual prevalence estimate for the country concerned falls within a range of 0.6% to 1%[g]. Given this close relationship between life-time and annual prevalence (and an even stronger correlation between annual prevalence and monthly prevalence), extrapolations from life-time or current use data to annual prevalence data was usually given preference to other kinds of possible extrapolations.

However, data also show that good estimation results (showing only a small potential error) can only be expected from extrapolations done for a country located within 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 United States, but it is probably not correct for a West European country where the dynamics of the drug markets showed a different pattern. The reason for the difference is that the USA has had a cocaine problem for more than two decades and is thus confronted with very high lifetime prevalence rates while it made considerable progress in reducing cocaine consumption as compared to the mid 1980s. All of this leads to a small proportion of annual prevalence to lifetime prevalence. In Western Europe, by contrast, the cocaine problem is largely a phenomenon of the last decade and still growing. The result, obviously, is a much larger ratio.

Against this background, data from countries in the same region were used, wherever possible, for extrapolation purposes. Thus, data from Central and Eastern Europe were used to extrapolate results for countries located in Central and Eastern Europe which did not collect annual prevalence rates. All of the East European countries had very low drug abuse levels during the cold war, but they grew rapidly in the 1990s. UNODC received annual prevalence estimates from the Czech Republic, Slovakia, Poland and Estonia, and lifetime prevalence estimates from Hungary and Estonia which served as a basis for developing a model for Central and Eastern Europe.

Extrapolation of results from IDU related HIV cases and other indicators

In a number of cases, countries have supplied UNODC with information that is not directly comparable with information from other countries. In such cases reported data as well as all available estimates based on extrapolation from other sources have been used to arrive at an 'UNODC estimate'.

The problem can be demonstrated using the example of the Ukraine, for which UNODC established an estimate for last year's *World Drug Report*. Official data for the year 2002 showed a prevalence rate of opiate abuse of 0.16%. Using such data would have implied that the country – in comparative terms – would have had one of the lowest levels of opiate abuse in Europe. Other available (mainly qualitative) information suggested, however, that this was not likely to be the case. Indeed, the data provided only covered the number of registered opiate users, and thus represented the lowest possible estimate of opiate abuse in the country.

[f] For each country the ratio between annual prevalence and lifetime prevalence is calculated. The results are than averaged: In our example:
(0.64 + 0.32 + 0.43 + 0.14 + 0.32 + 0.38 + 0.35 + 0.32 + 0.75 + 0.31 + 0.32 + 0.33 + 0.46+ 0.34) : 14 = 0.387

[g] The calculation of the *confidence interval* can be done as follows:

1).Determination of alpha (usually 0.05);

2).Determination of the number of observations (14 in this case) and 3. Calculation of the standard deviation (0.1502 in this example). This allows to calculate the standard error (standard deviation : (square root of n), i.e. (0.1502 : (square root of 14)) = 0.040)). The z value for alpha equalling 0.05 is 1.96. Multiplying the standard error with the z-value (0.040*1.96) would give the confidence interval (+/- 0.078). But, given the low number of observations (where n< 30), the use of t-statistics is indicated instead. In this case, the standard error must be multiplied with the appropriate t-value (2.145 for n-1 degrees of freedom (14-1) and alpha equalling 0.05 for two-sided t-statistics as can be found in t-value statistics). The result is a confidence interval of +/- 0.0858 (=0.040 * 2.145). Several spreadsheet programs provide such statistics automatically. In Excel, for instance, the 'descriptive statistics' in tool menu under 'data analysis' calculates the confidence interval automatically and uses the t-statistics, wherever appropriate. Applying the +/-0.086 confidence interval to the average ratio calculated above to the mean ratio of 0.387 gives a range of ratios of 0.301 to 0.473. Using the two ratios one arrives at a minimum estimate of the annual prevalence rate of 0.6% (2% * 0.301) and a maximum estimate of the annual prevalence rate of 0.95% (2% * 0.473).

Based on the country's participation in the ESPAD school surveys, a regression analysis[h] with data from other countries in the region suggested that a prevalence rate of around 0.9% could be expected. Based on the number of newly registered HIV cases in this country in 2002, related to injecting drug use (and thus to injecting of opiates), a linear regression analysis with opiate abuse in other countries of the region suggested that a prevalence rate of 1.2% of the population age 15-64 could be possible. However, it must be taken into account that the correlation of opiate use and school survey results is not very strong and that the correlation between opiate abuse and IDU-related HIV is very weak, as shown by available data from Eastern Europe and Western Europe. The actual spread of the HIV virus among IDUs and differences in drug policies seem to account for this. It is thus not possible to rely merely on school survey data or HIV data for extrapolation purposes. It is nonetheless likely that the actual prevalence rate falls within the range of 0.2% to 1.2%. Given the lack of any clear indication of the superiority of one method over another, the average of all three estimates was calculated (0.8%) and used as UNODC's estimate for the country. This estimate is about 4 times the number of registered opiate users in the country. This is not uncommon, as similar ratios between total use and registered use have also been found in a number of other countries.

Estimate for opiate abuse based on IDU-related HIV data and other indicators

	Opiate abuse in % of population age 15-64	Source	ESPAD 1999 in % of 15-16 year olds	IDU related HIV cases per million inhabitants in 2002 based on Euro HIV
Estonia	1.20	EMCDDA (problem drug use)	2	516
Latvia	1.72	EMCDDA(problem drug use)	4	164
Poland	0.24	EMCDDA (problem drug use)	2	5
Russia	2.10	Russian authorities	2	125
	Estimates of opiate abuse (for population age 15-64)	Source / method		
Ukraine	0.16	ARQ, registered users,	1	94
Ukraine	0.9	ESPAD, using a regression analysis		
Ukraine	1.2	HIV, using a regression analysis		
Ukraine	**0.8**	Average ('UNODC estimate')		

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. As a next step, the 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.

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 stronger than the correlation between opiate use and IDU-related HIV cases and, stronger than the link between treatment and drug use.

[h] The linear regression was calculated by using the 'forecast' function in an Excel spreadsheet.
The equation for FORECAST is a+bx, where:

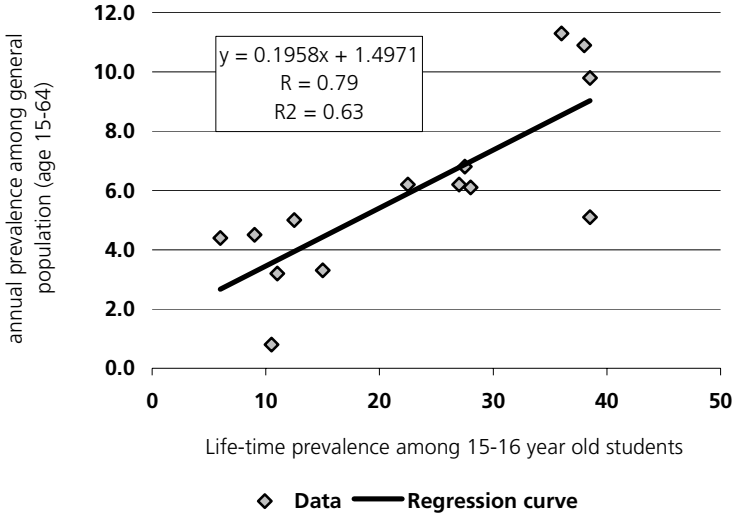
$$a = \bar{Y} - b\bar{X}$$

and:

$$b = \frac{n\sum xy - (\sum x)(\sum y)}{n\sum x^2 - (\sum x)^2}$$

The following examples shows extrapolations of school survey results for cannabis for Western Europe. The basis were the ESPAD School Survey results undertaken in 2003 and the annual prevalence estimates provided by European Member States to UNODC. As can be seen from the figure below, there is a positive correlation between the two variables; the strength of this link, as indicated above, is however, less (R = 0.79) than the strength of the link between life-time and annual prevalence.

Annual prevalence among the general population (age 15-64) and life-time prevalence among 15-16 year old students in Western Europe, 2003



Sources: UNODC, Annual Reports Questionnaire Data, EMCDDA, Annual Report 2004, Council of Europe, The ESPAD Report 2003.

In order to arrive at UNODC's final estimates for individual countries a number of additional steps were taken. This will be shown for the case of Austria. Participating in the school surveys (ESPAD) that were conducted under the auspices of the Council of Europe, Austria reported a life-time prevalence rate of cannabis use among 15-16 year students of 20.5% (average of 23% for male and 18% for female students) for the year 2003. Applying the regression curve model, cannabis use could be estimated at 5.5% (=20.5 * 0.1958 + 1.4971). Similar models were also established linking annual prevalence among the general population with annual prevalence of cannabis use and with monthly prevalence of cannabis use. The results showed very similar values (5.6% in the other two cases). In addition, the unweighted ratios of student surveys results versus general population use were calculated for all of the West European countries. This resulted in a ratio of 0.3, indicating that annual prevalence of cannabis use among the general population is, on average, equivalent to 30% of life-time use of this drug among the general population. Applying this ratio, cannabis use in Austria could be around 6.15% (=20.5 * 0.3). The confidence interval (at " = 0.05) for this estimate was calculated to range from 4.2% - 8%. Applying the same procedure for annual and 30 days use among students, results amounted to 6.4% and 7.4%, respectively. In the final step, the average of all of these estimates was calculated, resulting in an UNODC estimate of 6.1%.

The reason for using this rather unconventional approach can be demonstrated for the case of Turkey. This country is generally known to have surprisingly low levels of drug consumption by European standards -which was also re-confirmed in the 2003 ESPAD studies. However, applying the results of a simple linear regression curve, would show rather high levels of cannabis consumption. Using the combination of the two approaches (linear regression curve and use of the unweighted ratios) brings the estimates – probably – more in line with reality. As compared to the classical linear regression model, estimates based on this combination of the two methods outlined above, are slightly lower for countries with low levels of prevalence rates among their student population and slightly higher for countries with already high levels of prevalence rates. There would be, of course, a number of non-linear curves with similar properties that statisticians would prefer; given the large number of calculations and the many country specific (qualitative) information, provided to UNODC, that was attempted to be taken into account in making such estimates, it was decided to stay with simple models, as shown above, and to adjust results, wherever needed (e.g. to various combinations of estimates).

It goes without saying that each method of extrapolating results from other countries is not without problems and the results of these estimations for individual countries must be still interpreted with caution as they may well differ from reality. However, this should not influence the overall results as some under-estimates are, most probably, offset by over-estimates, and *vice-versa,* and every attempt has been made to avoid any systematic bias in the estimation process.

Estimates of annual prevalence of cannabis from school survey data in Western Europe								
	General population	**Student surveys**			**Students survey / general population ratios**			**UNODC estimates of annual prevalence:**
	Annual prevalence	Life-time	Annual prevalence	30 days prevalence	lifetime	Annual	30 days	
United Kingdom	10.9	38.0	75.6	19.5	0.29	0.35	0.56	
Spain	11.3	36.0	76.4	22.0	0.31	0.35	0.51	
France	9.8	38.5	75.9	22.0	0.25	0.31	0.45	
Germany	6.8	27.5	82.9	11.5	0.25	0.32	0.59	
Denmark	6.2	22.5	85.7	7.5	0.28	0.36	0.83	
Italy	6.2	27.0	83.4	15.5	0.23	0.28	0.40	
Netherlands	6.1	28.0	83.0	13.0	0.22	0.27	0.47	
Ireland	5.1	38.5	78.2	16.5	0.13	0.16	0.31	
Iceland	5.0	12.5	91.3	4.0	0.40	0.50	1.25	
Norway	4.5	9.0	93.3	2.5	0.50	0.75	1.80	
Greece	4.4	6.0	94.8	2.0	0.73	0.88	2.20	
Portugal	3.3	15.0	90.9	8.0	0.22	0.24	0.41	
Finland	3.2	11.0	92.9	2.5	0.29	0.43	1.28	
Malta	0.8	10.5	94.4	4.0	0.08	0.09	0.20	
Correlations (R) with annual prevalence among general population					0.79	0.80	0.84	
Average ratios					**0.30**	**0.38**	**0.80**	
Austria		20.5	17	9.5				
Turkey		4.0	3.0	2.0				
		Estimates of annual prevalence based on regression curve			**Estimates of annual prevalence based on average ratios**			**Overall averages**
Estimates for:		lifetime	12months	30 days	lifetime	12months	30 days	
Austria		5.5	5.6	5.6	6.1	6.4	7.6	**6.1**
Turkey		2.3	2.4	3.0	1.2	1.1	1.6	**1.9**

Sources: UNODC, Annual Reports Questionnaire Data, EMCDDA, Annual Report 2004, Council of Europe, The ESPAD Report 2003.

d. Extrapolation to regional and global level

The next step, after having filled, as far as possible, the data gaps, was to calculate the average prevalence for each sub-region. For this purpose the reported/estimated prevalence rates of countries were applied to the population age 15-64, as provided by the United Nations Population Division for the year 2003. For the remaining countries, for which no estimate could be made, the average prevalence rate of the respective sub-region was applied, unless some additional information suggested that the sub-regional average would be too high or too low for the countries concerned. In general, all of these 'adjustments', based on qualitative information, affected the overall sub-regional estimate only slightly. Following the detailed calculation of all of the sub-regional estimates, the individual sub-regional estimates ('number of drug users') were aggregated to form a regional estimate, and the regional estimates were then aggregated to arrive at the global estimates.

e. Concluding remarks

This process of estimation and the methods used for extrapolating the estimates are not free from risk. All of the extrapolations can potentially lead to substantial over-estimation or under-estimation. While this is definitely true for individual countries, it can be expected that over-estimates and under-estimates partly offset each other at the global level. Moreover, in order to reduce the risk of any systematic bias, estimations were based, as far as possible, on the data from a series of neighbouring countries in the region. It is, however, recognized that the currently provided estimations can change considerably once actual survey data becomes available. UNODC's methodology to arrive at global estimates by extrapolating results from a sample of countries (for which data is available) to a sub-region, also means that methodological changes in some countries can have a significant impact on the final estimates.

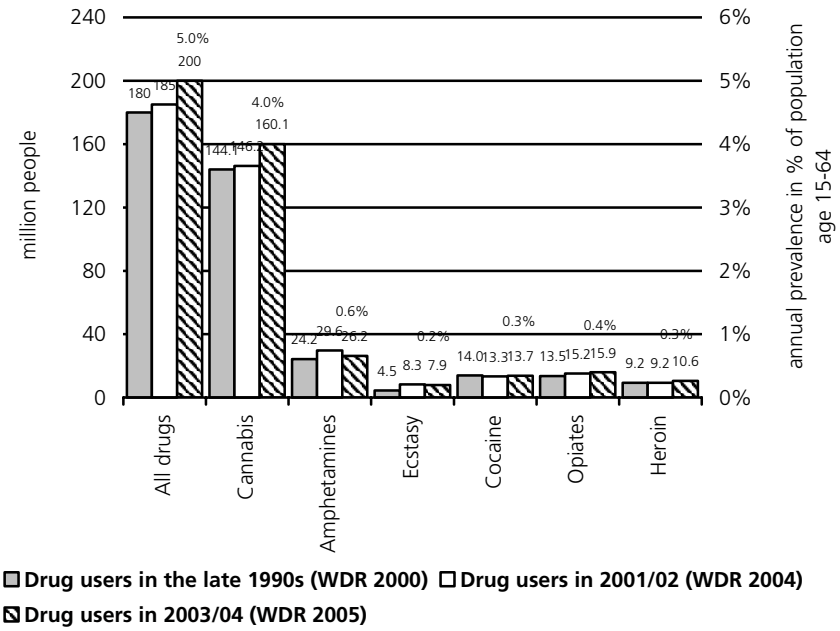
The global estimates presented in this report must therefore be treated with a high degree of caution. They provide likely orders of magnitude, as opposed to precise statistics on the prevalence and evolution of global drug abuse. Further changes can be still expected as countries provide more robust estimates based on rigorous scientific methods. Nonetheless, in the absence of global studies on drug abuse, the estimations and the estimation procedures provided in this report guarantee the best picture that is currently obtainable.

Trends in drug use

a. Overview

Ideally, global trends in drug abuse should be monitored by comparing estimates of drug use in one year with those found in a subsequent year. In practice, however, this approach does not always work – at least not for the time being - as a number of changes in the global estimates are due to methodological improvements and not due to underlying changes in drug use. Moreover, general population surveys are very expensive to conduct and only a few countries have an ongoing monitoring system based on these instruments. Some major trends at the global level may be visible, such as the increase in cannabis use. For the identification of other trends, however, the estimates are often not precise enough.

Estimates of annual prevalence of drug use at the global level in the late 1990s and in 2001-2003

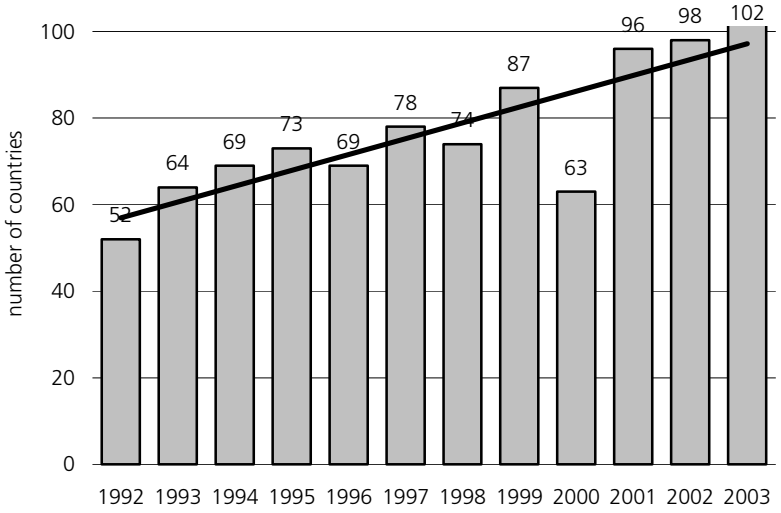


What many countries do collect, however, is routine data such as number of persons arrested for drug abuse, urine testing of arrestees, number of persons undergoing drug treatment, or they monitor drug use based on school surveys. In addition, drug experts dealing on a regular basis with drug issues – even without having precise data at hand – often have a good feeling about whether use of certain drugs is increasing, stabilizing or declining in their constituency.

This knowledge base is regularly tapped by UNODC. Member States usually pass the Annual Reports Questionnaire to drug experts in the country (often in the ministry of health) who provide UNODC with their perception, on a five-point scale, of whether there has been a 'large increase', ' some increase', ' no great change', some decrease' or a 'large decrease' in the use of the various drugs over the past year. The perceptions may be influenced by a number of factors and partial information, including police reports on seizures and arrests, reports from drug treatment centres, reports from social workers, press reports, personal impressions, etc. Any of these influencing factors could contain a reporting bias which has the potential to skew the data towards a misleading increase or decrease. Prioritization of the drug issue is another factor which influences reporting. It can probably be assumed that the countries which reply regularly to the ARQ are those which take the drug problem more seriously. In a number of cases this is a consequence of rising levels of drug use and thus increased public awareness of the problem. All of this suggests that the sample of countries replying to the ARQs may be slightly biased towards countries faced with a deteriorating drug problem. Results must thus be treated with some caution and should not be over-interpreted.

Despite these caveats, trend data provide interesting insights into the growth patterns of individual drugs as well as into regional and global growth patterns. They represent the most comprehensive data set of expert opinion available on the development of drug abuse at the global level, provided in a consistent manner over more than a decade.

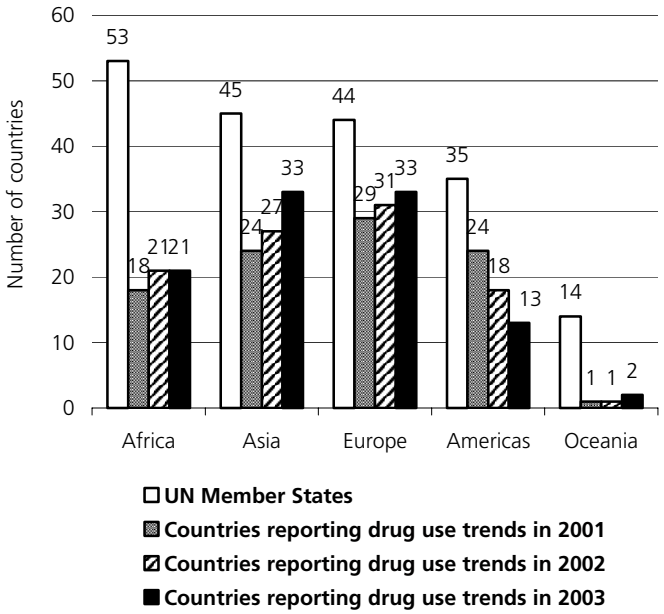
Number of countries & territories reporting drug use trends to UNODC



Source: UNODC, Annual Reports Questionnaire Data

Replies to the Annual Report Questionnaire (ARQ) on trends in drug use are more comprehensive than on estimating the number of drug users. The analysis on drug use trends for the year 2003 was based on the replies of 102 countries and territories, about the same number as a year earlier, up from 52 countries and territories in 1992. Overall 163 countries and territories reported drug use trends to UNODC over the last decade. The distribution of countries reporting in 2003 was roughly the same as a year earlier and provides a reasonably good coverage across all regions.

Regional distribution of reports received on drug use trends for the years 2001-2003



Source: UNODC, Annual Reports Questionnaire Data.

Aggregating trend data

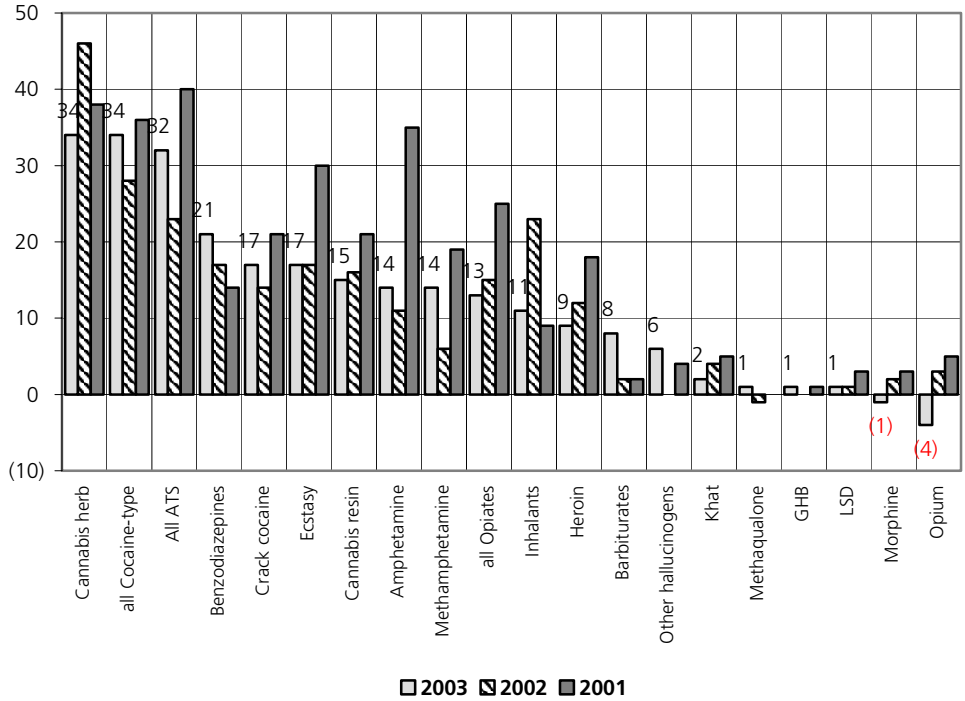
Various methods have been developed and have been used in this report for the trend aggregation.

The 'traditional' method consisted of simply counting the number of countries reporting increasing, stable and declining levels of drug use. Changes in the 'net results', i.e. number of respondents reporting increases less those reporting declines, have proven to be a good and useful indicator for showing overall changes in the trend. This is in line with business cycle trend analysis where enterprises are asked on a routine basis about their perceptions of whether production is expected to increase, remain stable, or fall over the new few months, and where the net results (Number of increasing trends less number of falling trends) are recorded and presented in order to identify changes in trends. For the purpose of calculating this indicator, the categories 'strong increase' and 'some increase' were combined into a new category 'increase'. Similarly, the categories 'strong decline' and 'some decline' were combined into a new category 'decline'.

The advantage of using this method for describing drug trends at the global level is that a large number of actors, independent of each other, express their views on the trend in their countries. Though some experts may well report wrong trend data, it is unlikely that mistakes all go in the same direction.

Drug use trends 2001, 2002 and 2003

(Number of countries reporting increases less number of countries reporting declines)



Source: Annual Reports Questionnaire Data.

Drug Use Trend Index

A rather new analytical tool, referred to in this report as *Drug Use Trend Index,* has been designed by UNODC to allow for a better presentation of regional and global trends in drug use. The *Drug Use Trend Index* builds on work done by UNODC last year which resulted in the concept of a *Weighted Analysis on Drug Abuse Trends (WADAT),* first published in UNODC's Report to the Commission on Narcotic Drugs on the *World Situation with Regard to Drug Abuse (E/CN.7/2004/2*), and subsequently used in last year's *World Drug Report* as a *Drug Abuse Trend Index.*

The index is constructed as follows: each degree of trend estimation is given a numerical value ranging from –2 to +2 (–2 representing a 'large decrease'; –1, 'some decrease'; 0, 'no great change'; +1, 'some increase'; and +2, 'a large increase'). Estimates for each drug type are then multiplied by the proportion of the drug using

population of the country in relation to the drug using population at the global level. The national estimates are subsequently added to represent a global trend estimate for each drug type. The results are finally shown as a cumulative trend curve.

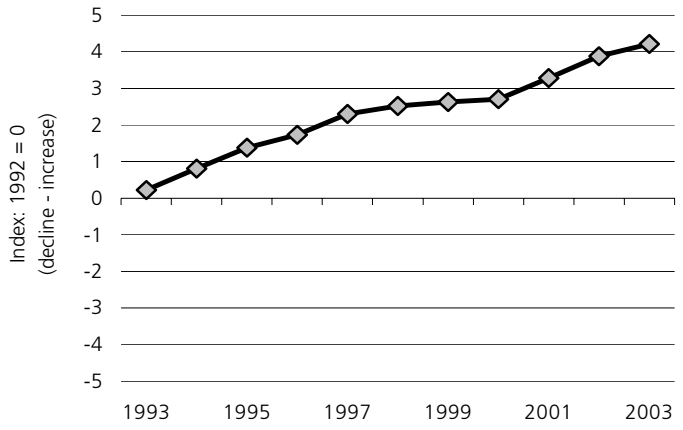
In last year's version of the index, the trends provided by Member States had been weighted by the size of a country in terms of its population. However, it was already pointed out in the methodology section of last year's WDR that – ideally - the weighting should be based on the size of the drug using population instead. The problem was that actual estimates of the size of a country's drug using population were not available for all countries. It was feared that this could mean that trends reported by a number of countries would have to be ignored. Thus the size of the population was chosen to weight the trends reported by member states.

Using the population as the weighting mechanism showed, in general, reasonable results at the regional level where drug use patterns tend to be rather similar. It created, however, a serious problem once an attempt was made to apply the index to the global level, notably for drugs which have a distinct regional distribution pattern. For instance, cocaine use is concentrated in the Americas and in Western Europe and consumption levels in Asia are still minimal. In 2002, India reported a rise in cocaine use, though rising from very low levels. The weight of this country in terms of its population meant, however, that the index showed a sharp rise at the global level, due to this information from India. The results of the index were thus potentially misleading. Against this background UNODC refrained from making use of this index at the global level for the analysis of trends in the use for cocaine or opiates, as these two substances have very distinct distribution patterns.

Thus, an alternative solution was sought to overcome the weighting by population as well as the hurdle of the non-existence of drug use estimates for some countries. The option, finally taken, was that for countries, for which no prevalence estimates exist, the average prevalence rate of the respective sub-region was taken as a proxy for the unknown actual prevalence rate of that country. Using this assumption, prevalence estimates are now available for all countries of the world. Of course, for some countries the 'weight' given to their trend data may slightly be too small or slightly too big, but the potential error resulting from this procedure is far less than the potential error from weighting the index with the general population.

The following graph shows the results for cannabis, starting with 1992 as a baseline. The fact that the index is now at 4.2, and thus above 0, indicates that experts are of the opinion that there was a net increase in cannabis consumption at the global level over the last decade, and the index also indicates that this upward movement gained momentum in recent years. But, how significant has been the increase? If all countries had reported a 'strong increase' every year from 1993 to 2003, the cumulative trend index would have reached a level of 22 (11*2); if all countries had reported 'some increase' every year, the index would be now at 11 (11*1); if countries had considered the trend to have been stable, the index would have remained at 0. If countries had reported every year 'some decline', the index would be at –11, and in case of 'strong decline' at –22.

Drug Use Trend Index – cannabis - based on expert opinion; weighted by estimated number of cannabis users, 1993-2003



Source: NODC, Annual Reports Questionnaire Data / DELTA.

One advantage of this tool is that it takes the trends reported by Member States and the size of their drug using population into account. In other words, the index gives more weight to the results reported from countries with a large drug using population than to those with small numbers of drug users. This is in line with the observation that the overall impact of a rise in drug consumption in a country with large numbers of drug users has a far greater impact on global drug consumption than the rise in some small countries where drug use just started to become noticed. Another advantage is that the index takes into account the degree of change in drug use levels, thus making better use of all information made available to UNODC by Member States.

There are, of course, also important limitations that need to be taken into account when interpreting the results. The information provided remains – in most cases – an expert opinion and is not necessarily based on hard scientific evidence. While this tool assists in the analysis of trends as reported by Member States to UNODC, the key remains the quality of the input data. A mistake made by one expert in a country with a large drug using population can now seriously distort the global trend estimates. There is also a danger, that some experts may have a political agenda. Thus, this tool cannot be seen as a substitute for serious scientific studies on trends in drug consumption in any given country. Moreover, it cannot be assumed that the difference between various degrees of drug use trends (for example, between "some decrease" and "large decrease") are always interpreted in the same way in different countries or even in the same country in different reporting years, as the ARQs are often filled in by different persons.

Reporting trends in the use of a drug type, such as cannabis, may be also biased by differing trends in the use of substances in the same drug category (for example, the trend in the use of cannabis herb may be increasing while the trend in the use of cannabis resin is decreasing). For the purposes of this report, not just the drug groups but each individual drug category was taken into consideration. The unweighted average of all reported trends (e.g. cannabis herb, cannabis resin) within a drug group (e.g. 'cannabis') was calculated. This was mainly done, in order to have consistency over time. (The drug group headings did not exist in the past). Of course, this is not without problems. In some countries, for instance, cannabis resin does not play a role while cannabis herb is of major importance. The use of a simple average may thus under-estimate the actual increase of cannabis in this country. While for some countries, the detailed profile of substance use is well known, this would not be the case for others. Thus the general rule of averaging all drugs within one category was applied.

It should be also be noted that the Drug Use Trend Index is limited in that it only provides general directions with regard to the main drug types reported by Member States, inevitably leading to very broad generalization. Thus, there is a need for more drug-specific trend analysis to support its conclusions.