Methodology

Considerable efforts have been made over the last few years to improve all available drug related estimates. 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 2003, for the first 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 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). In addition, the ground surveys made possible through UNODC's field presence in all of the main narcotics producing countries, 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 www.unodc.org/unodc/en/crop_monitoring.

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. All of this is intended to further improve yield estimates, aiming at information that is independent from farmers' reports. In countries in which UNODC has not, as yet, undertaken yield surveys, results from other surveys conducted at the national level are used. This is currently still the case in all of the Andean countries. 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.

More problematic, in general, are the transformation ratios used to calculate the potential cocaine production from coca leaf or the heroin production from opium. 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. However, 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. Nonetheless, potential margins of error in this rapidly changing environment, with new laboratories coming on stream while others are being dismantled, are still substantial. This also applies to the question of the psychoactive content of the narcotic plants. One recent study conducted by UNODC in Afghanistan indicated that the morphine content of Afghan opium could be significantly higher than was thought so far. This could mean higher levels of heroin production than those estimated earlier. However, little is known about laboratory efficiency in Afghanistan and neighbouring countries, or about the wastage in clandestine manufacturing or losses in Afghan heroin shipments. As a consequence, UNODC has not changed the traditional 10:1 ratio for converting opium into heroin.

'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.

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 significant amounts of the coca paste or coca base produced in Peru are 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, the globally most dispersed illegal drug, all available production estimates were aggregated. In most cases, however, these estimates were not based on scientific studies and often referred to different years (as only a few countries provided such estimates in the last Annual Reports Questionnaire submitted to UNODC in 2003). The cannabis production estimate is thus less robust than the opium or cocaine estimates which are based on detailed surveys. Nonetheless, cross-checks with existing seizure statistics suggest that the magnitude of the overall cannabis estimate is probably correct. Plausibility considerations based on seizure statistics suggest that any lower production of cannabis herb was very unlikely, as this would have meant very high interception rates for cannabis. At the same time, UNODC's first scientific study on the extent of cannabis resin cultivation, conducted in Morocco, in combination with Member States reports of the origin of cannabis resin seizures, also fit well with the global cannabis herb estimates. The cannabis resin production data from Morocco suggested that significantly higher cannabis herb production estimates were unlikely as this would have meant that law enforcement – worldwide – was only concentrating on cannabis resin and ignoring cannabis herb. The strong efforts undertaken by enforcement agencies in North America (notably in Mexico and the USA), resulting in the bulk of global cannabis herb seizures, do not provide evidence that this was the case at the global level. Thus plausibility consideration established both a lower limit and an upper limit at around the current cannabis production estimates. Though the resulting global cannabis herb and global cannabis resin estimates cannot be considered to be very precise, they show magnitudes that are in line with

existing data from other sources, and they also enable the establishment of a trend, which is in line with trafficking and abuse estimates.

The potential margins of error for synthetic drugs, such as the ATS, are similar to those of the cannabis estimates, and thus significantly larger than the estimates for heroin or cocaine. 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 from the resulting mid-point estimates.

This approach, however, does not enable year-on-year production estimates for the ATS. An indirect indicator for the evolution of clandestine manufacturing activities is the detection and dismantling of laboratories producing ATS. This indicator has shown a clear increase over the last decade, in line with observations of increased trafficking and abuse. The validity of this trend indicator is, however, limited. There is, first of all, a serious problem of irregular reporting by Member States. There are also problems of consistency in reporting. For example, some countries include "kitchen" laboratories in the total number of manufacturing sites detected while others only count fully equipped clandestine laboratories. By the same token, if a country changes its reporting practice to include "kitchen" laboratories, when it earlier excluded them, the picture can be potentially distorted.

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 2003 and early 2004 and refers to the year 2002 (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 165 countries & territories in 2000, 161 in 2001 and 152 in 2002. 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, 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.

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 countries and declines of such seizures in North America and Western Europe in 2002, 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.

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* and *2000,* and *Global Illicit Drug Trends 2002 and 2003)*. The fifth round of estimates, presented in this report, is based on information received until April 2004.

Assessing the extent of drug abuse (the number of drug abusers) 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 abuse 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 abuse 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.

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 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. In 2002, for instance, only 59 countries provided UNODC with quantitative estimates of the drug situation in their

country, including 44 countries providing estimates of the prevalence of drug consumption among the general population and 56 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 2002. In addition, a number of estimates needed to be 'adjusted' (see below). Using all of these sources, estimates were established for 135 countries 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 abuse situation only allows for some 'guess estimates'. In the case of complete data gaps for individual countries, it was assumed that drug abuse 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 abusing 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. Various calculations of long-term 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[a] (20-21 January 2000) on

[a] 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).

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. Lifetime prevalence data are, in general, easier to generate but are not very illustrative. (The fact that a 50-year-old person smoked marijuana at the age of 20 does not provide much insight into the current drug abuse problem). Data on current use (e.g. monthly prevalence) are of more value. However, they often require larger samples in order to obtain meaningful results, and are thus more costly to generate.

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 abuse 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 are: 12+; 16-59; 12-60; 15+; 18+; 18-60; 15-45; 15-75; and increasingly age 15-64. In the past UNODC reported the prevalence rate in percent of the population age 15+. The new Annual Reports Questionnaire adopted by Member States stipulates the age group 15-64 as the key population group for which drug abuse it to be measured. Thus, prevalence data in this report are now reported for the age group 15-64. In case the age groups reported by Member States did not differ significantly from the 15-64 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 (e.g. age 15-45) and there were reasons to believe that drug use would be different among those 15-64, 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 abuse 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[b] They are often homeless, in hospitals or in prisons. Moreover, heroin abuse is highly stigmatized in many countries 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.

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.

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.

[b] 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.

Capture-recapture models are another method based on probability considerations, which can be undertaken without additional field research[c]. 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.[d] 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 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, simply dividing the ecstasy using population established above by the age group 15-64 gives an estimated prevalence rate of 2.25%.

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[c] 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.

[d] 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).

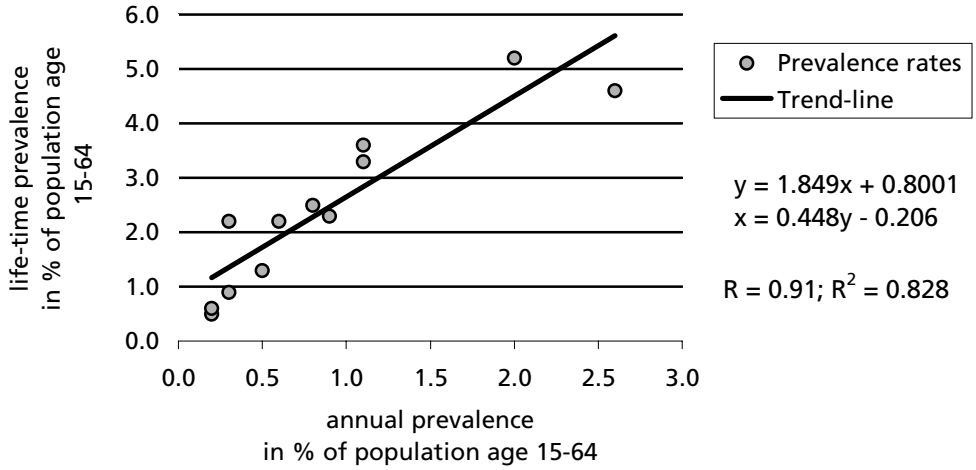
The situation is slightly more complex when it comes to cocaine. The same approach for New Zealand would lower the annual cocaine prevalence rate from 0.6% of the population age 15-45 to 0.4% of the population age 15-64. In this case, however, it must be assumed that there are still some people above the age of 45 consuming cocaine. A rate of 0.4% is thus a minimum estimate. An alternative estimation approach, however, 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 substance abuse 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 = 0.91); i.e. the higher the life-time prevalence, the higher is, in general, annual prevalence and *vice versa*. Based on the resulting regression curve (x = 0.448y - 0.206 with x = annual prevalence and y = 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% (0.448*2 - 0.206 = 0.7; also see figure).

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



Sources: UNODC, Annual Reports Questionnaire Data / EMCDDA.

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 (0.88/2.43 = 0.362) and multiplying this ratio with the life-time prevalence of the country concerned (0.362 * 2% = 0.7%).

A similar approach used was to calculate the overall ratio by averaging the annual/life-time ratios, calculated for each country[e]. Multiplying the resulting average ratio (0.347) with the lifetime prevalence of the country concerned provides the estimate for the annual prevalence (0.347 * 2% = 0.7%). This approach also enables the calculation of a confidence interval for the estimate. With a 95% probability the likely annual prevalence

[e]For each country the ratio between annual prevalence and lifetime prevalence is calculated. The results are than averaged: In our example: (0.4+0.33+0.14+0.33+0.38+0.27+0.32+0.39+0.33+0.31+0.38+0.57)/12 = 0.347.

estimate for the country concerned falls within a range of 0.6% to 0.8%[f]. 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 (0.35), 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 Eastern Europe were used to extrapolate results for countries 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. The following example shows how the extrapolations were done for cannabis. Based on available data, an average ratio of annual prevalence to lifetime prevalence of 0.38 was established for the region. Applying this ratio to the lifetime prevalence found in Hungary (5.7%) provided an estimate of 2.2% (range: 1.2%-3.2%). In the case of Slovenia, the lifetime prevalence had first to be adjusted from the population 18+ to the age group 15-64. The resulting lifetime prevalence (10%) was then multiplied with the ratio (10% * 0.38) to arrive at an estimate of annual prevalence of cannabis use in the country (3.8%; range: 2.1%-5.6%). The calculation of the confidence intervals was the same as discussed above. If the ratios found in the USA had been used instead, the estimate would have been 1.5% for Hungary and 2.7%for Slovenia. Such estimates are likely to underestimate annual prevalence of cannabis use in the two countries and were thus not used. Nonetheless, they are useful as they provide some idea of the likely magnitude of the lower limit for the country estimates.

[f] 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 (12 in this case) and 3. Calculation of the standard deviation (0.099 in this example). This allows to calculate the standard error (standard deviation: (square root of n), i.e. (0.099/(square root of 12)) = 0.0286)). The z value for alpha equalling 0.05 is 1.96. Multiplying the standard error with the z-value (0.0286*1.96) would give the confidence interval (+/- 0.056). But, given the low number of observations (where n< 30), the use of t-statistics is indicated. In this case, the standard error must be multiplied with the appropriate t-value (2.201 in this example for 12 observations 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 +/- 0.0629 (=0.0286 * 2.201). 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 +/-0.063 confidence interval to the average ratio calculated above to the mean ratio of 0.347 gives a range of ratios of 0.282 to 0.41. Using the two ratios one arrives at a minimum estimate of the annual prevalence rate of 0.56% (2% * 0.282) and a maximum estimate of the annual prevalence rate of 0.82% (2% * 0.41).

Estimates of annual prevalence of cannabis use among the general population in new EU member countries

	Age group	Life-time prevalence	Annual prevalence	Range (95% confidence interval)	Ratio	Population
Czech Republic	15-65	21.1	10.9		0.52	
Slovakia	15-64	14.6	3.6		0.25	
Poland	16+	6.5	2.4		0.37	
Estonia	18-70	5.0	2.0		0.40	
Average ratio					**0.38**	
			Estimates of annual prevalence			
Hungary	18-65	5.7	**2.2 (5.7*0.38)**	**1.2 – 3.2**		
Slovenia	18+	8.8				1,579,624
Adjusted	15-64	10.0				1,394,414
Slovenia	15-64	10.0	**3.8 (10*0.38)**	**2.1 – 5.6**		

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. Official data, submitted to UNODC, 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. Based on the country's participation in the ESPAD school surveys, a regression analysis[g] 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 both Eastern Europe and Western Europe. The actual spread of the HIV virus among IDUs and differences in drug policies (such as needle exchange programmes) 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 and is used, for the moment, as the UNODC estimate for the country. The resulting estimate (0.8%) 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.

[g] 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:

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

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 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.

The following example shows the extrapolation of school survey results for cocaine abuse in the Americas. Overall 10 countries in the region provided estimates for both annual prevalence from household surveys and estimates from student surveys. The correlation between results of annual prevalence in household surveys is clearly positive, though not very strong (R = 0.67), leading to rather large confidence intervals.

In Colombia, for instance, a youth survey, conducted in 2001, revealed a lifetime prevalence of cocaine abuse of 4.5 % among those age 10-24 and - within this group - a lifetime prevalence of 4.2% among secondary school students. Based on the average ratio between annual prevalence in household surveys and lifetime prevalence among secondary school students, an annual prevalence of 2.3% could be estimated. Using a linear regression analysis[h], based on the results of other countries in the Americas, an annual prevalence of cocaine use of 1.6% can be expected. For calculation of the global cocaine estimates, the estimates resulting from the linear regression were used. However, the range of the estimates is rather large. With 95% confidence the true results for Colombia should fall within a range of 0.8% to 2.4%.[i]

[h] The regression analysis was done using the 'Forecast' function in Excel.

[i] Calculations of the confidence interval based on a regression analysis are too detailed to provide here, but can be documented if necessary.

Estimates of annual prevalence of cocaine use in the Americas based on school survey data

	Year	Age group	Annual prevalence based on household survey		School survey	life-time	Source	Ratio
USA	2002	15-64	**3.1**		13 to 18	5.8	UNODC	0.53
Argentina	1999	16-64	1.9		12 to 18	1.3	UNODC	1.47
Chile	2002	15-64	1.6		13 to 18	5.1	UNODC	0.31
Ontario (Canada)	2000	15-64	**1.4**		11 to 19	5.2	Govt.	0.27
Bolivia	2000	12+	1.1		12 to 19	1.7	UNODC	0.66
Ecuador	1995	15-64	0.9		13 to 18	2.4	UNODC	0.38
Peru	2002	12-64	0.7		12 to 17	1.6	UNODC	0.43
Brazil	2001	15-64	**0.5**		10 to 19	2.0	UNODC	0.25
Costa Rica	2000	12-70	0.4		13 to 18	0.4	UNODC	1.00
Uruguay	2001	12-65	0.3		13 to 17	2.4	UNODC	0.13
Average								0.54
			Estimates of annual prevalence School surveys data					
	Year	Age group	Based on regression analysis	Based on average ratio	Age group	Life-time	Source:	
Colombia	2001	15-65	*1.6*	2.3	10 to 18	4.2	UNODC	
Guatemala	2001	15-65	*1.0*	1.2	12 to 19	2.2	CICAD	
Nicaragua	2001	15-65	*1.0*	1.1	12 to 19	2.1	CICAD	
St. Lucia	2002	15-65	*1.0*	1.1	12 to 19	2.1	GAP	
Barbados	2002	15-65	*0.9*	1.1	12 to 19	2.0	UNODC	
Nicaragua	2002	15-65	*0.9*	1.1	12 to 19	2.0	UNODC	
Jamaica	2001	15-65	*0.9*	1.0	12 to 16	1.9	GAP	
Guatemala	2002	15-65	*0.9*	1.0	12 to 19	1.8	UNODC	
El Salvador	2002	15-65	*0.8*	0.8	12 to 19	1.5	UNODC	
Bahamas	2001	15-65	*0.8*	0.8	12 to 19	1.5	UNODC	
Honduras	2002	15-65	*0.8*	0.8	12 to 19	1.5	UNODC	
Bahamas	2002	15-65	*0.7*	0.6	12 to 19	1.1	GAP	
St. Vincent & Grenadines	2002	15-65	*0.7*	0.6	12 to 19	1.1	GAP	
Paraguay	2001	15-65	*0.6*	0.5	12 to 19	1.0	CICAD	
Suriname	2002	15-65	*0.5*	0.4	12 to 19	0.7	UNODC	
Belize	1998	15-65	*0.6*	0.4	12 to 19	0.7	UNODC	

Note: **bold** indicates that data were adjusted for differences in age groups; *italic* indicates UNODC estimates, which were also applied for subsequent calculation purposes to estimate the global extent of cocaine abuse.

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. This is shown below in the example of opiate abuse in the Central and East European countries. For this purpose country specific prevalence rates were applied to the population age 15-64, as provided by the United Nations Population Division for the year 2002. The calculations showed an average prevalence rate of 1.2% for the sub-region. For the remaining countries in each sub-region the average prevalence rate was usually applied, unless some additional information suggested that the sub-regional average would be too high or too low for the countries concerned. For instance, all available information (mostly qualitative) suggests that opiate abuse is a problem in Serbia & Montenegro and in Bosnia Herzegovina and that it is higher there than in several other European countries; but there are no indications that opiate abuse would be substantially higher than in neighbouring countries. Using the sub-regional average would have meant estimating abuse in these two countries as higher than in neighbouring countries. However, there are also indications that due to the war-related isolation and lack of financial means of large sections of the population, prevalence of opiate abuse (though growing) could be well lower than in the neighbouring countries. Against this background, an alternative way of estimating the prevalence rate was used: the prevalence rate was estimated by taking the average prevalence rate of other countries in the immediate neighbourhood (Bulgaria, Croatia and Slovenia); in addition, the rates were adjusted downwards. A similar

method was also applied to other regions whenever existing quantitative or qualitative information indicated good reasons not to apply the sub-regional average. In general, all of these 'adjustments' affected the overall sub-regional estimate only slightly. If the sub-regional average had been applied for the two countries, the overall estimate for Central and Eastern Europe would have amounted to 2.8 million instead of 2.7 million people.

Following the detailed calculation of all of the sub-regional estimates as outlined above, 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.

Estimate of opiate abuse use in the countries of Central and Eastern Europe

	Population age 15-64 in million	Estimated number of opiate abusers in thousand	Prevalence rate in %
Belarus	6.83	6.2	0.09
Albania	2.05	10.3	0.50
Bulgaria	5.48	27.4	0.50
Croatia	2.97	20.8	0.70
Czech Republic	7.21	37.5	0.52
Estonia	0.90	10.9	1.20
Hungary	6.82	28.5	0.42
Latvia	1.58	27.1	1.72
Lithuania	2.30	12.7	0.55
TFYR Macedonia	1.38	5.5	0.40
Republic of Moldova	2.95	2.2	0.07
Poland	26.86	64.5	0.24
Romania	15.44	46.3	0.30
Russian Federation	101.36	2,128.6	2.10
Slovakia	3.78	11.4	0.30
Slovenia	1.40	7.7	0.55
Ukraine	33.68	269.4	0.80
Subtotal I	**223.0**	**2,716.9**	**1.22**
Countries for which no estimates exist:			
Bosnia Herzegovina	2.96		
Serbia & Montenegro	7.07		
Subtotal II	**10.0**	**46.9**	**0.44***
Central and Eastern Europe	**233.0**	**2,763.8**	**1.19**

* Average rate of Croatia, Bulgaria, Slovenia; adjusted (75%).

d. 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 an 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. This makes it difficult, if not impossible, to derive trends in drug consumption from these consumption estimates. Indeed, as previous 'guesstimates' were replaced with 'estimates' derived from household surveys (or from student surveys), some of the totals (notably for cannabis and, to a lesser extent for amphetamines and cocaine) declined as compared to UNODC's last estimate presented in the *Global Illicit Drug Trends 2003* publication, though other indicators suggested that drug abuse, notably for cannabis and, to a lesser extent for amphetamines, continued to increase. 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 meant that such methodological changes had 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 abuse

a. Overview

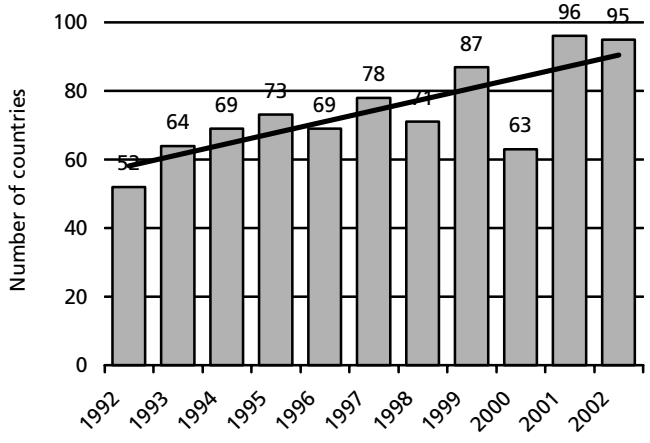
Ideally, global trends in drug abuse should be monitored by comparing estimates of drug abuse in one year with those found in a subsequent year. In practice, however, this approach does not work – at least not for the time being - as a number of changes in the global estimates are due to methodological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

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 abuse 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 abuse 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 abuse 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 abuse 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 the drug abuse problem at the global level, provided in a consistent manner over more than a decade.

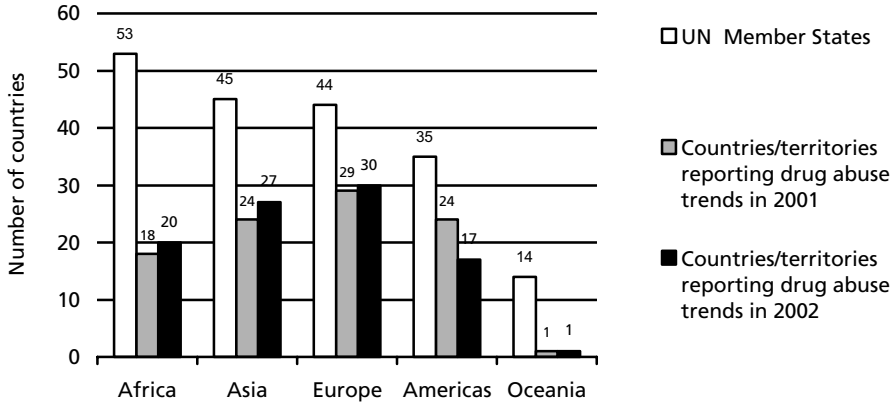
Number of countries & territories reporting drug abuse trends to UNODC



Source: UNODC, Annual Reports Questionnaire Data

Replies to the Annual Report Questionnaire (ARQ) on trends in drug abuse are more comprehensive than on estimating the numbers of drug abusers. About 90% of all countries and territories which returned Part II of the ARQ for the year 2002, in compliance with their obligations under the international drug control treaties (n = 106), provided information on drug abuse trends (n = 95). (The ARQ was distributed to 194 countries and territories; the overall response rate of the questionnaire for the year 2002 was thus 55%, in line with annual response rates varying between 40 and 60% over the last five years)[j]. The analysis on drug abuse trends for the year 2002 was based on the replies of 95 countries and territories, about the same number as a year earlier, up from 52 countries and territories a decade earlier. Overall 151 countries and territories reported drug abuse trends to UNODC over the last decade. The distribution of countries reporting in 2002 was roughly the same as a year earlier and provides a reasonably good coverage across all regions.

Regional distribution of reports received on drug abuse trends for the years 2001 and 2002



Source: UNODC, Annual Reports Questionnaire Data.

b. Aggregating trend data

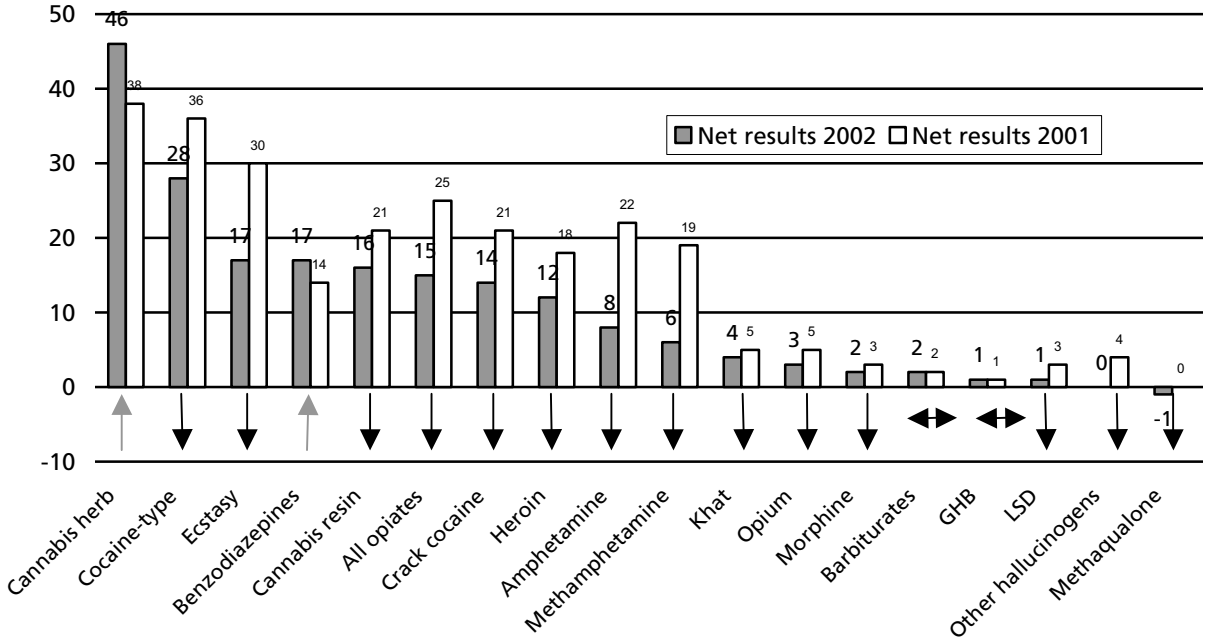
Various methods have been developed and have been used in this report for the trend aggregation.

The 'traditional' method consisted of simply counting the number of countries reporting increasing, stable and declining levels of drug abuse. 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. 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. 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. Thus, trend data for 2002, for instance, showed that there were more countries reporting increases in drug abuse than those reporting declines. However, the rate of increase declined in 2002 as compared to 2001, including for opiates, cocaine-type substances and ATS. The only exceptions to this 'downward trend' in 'the rate of increase' were cannabis and benzodiazepines.

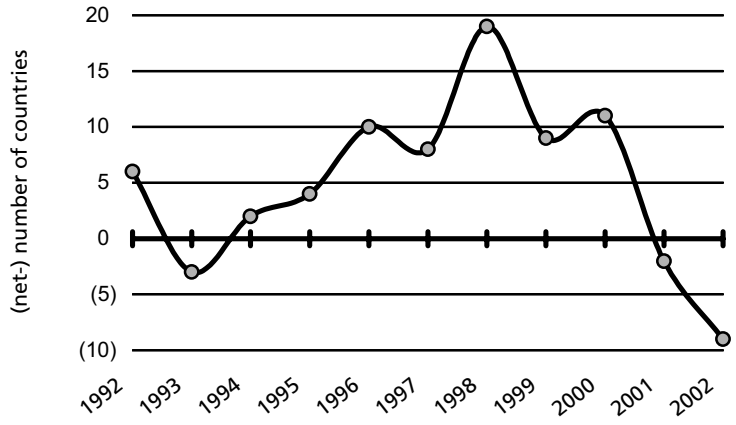
[j] The response rate was 54 per cent (103 replies submitted) for the reporting year 2001, 41 per cent (80 replies submitted) for 2000, 49 per cent (94 replies submitted) for 1999 and 58 per cent (112 replies submitted) for 1998.

Drug abuse trends in 2001 and 2002: Number of countries reporting increases less number of countries reporting declines



A variation of this method was used as well. Instead of showing the number of countries reporting increases less those reporting declines, an alternative approach was to calculate the number of countries reporting increases less those reporting stable or declining levels of abuse. The reasons for this was that authorities in a number of countries are apparently reluctant to report declining levels of abuse and, in order to be 'on the safe side', prefer to report a 'stable' trend instead. In the case of heroin, for instance, this approach shows a strong increase of heroin abuse at the global level until the late 1990s and a stabilization/decline until 2002. Detailed data from a number of countries with functioning monitoring systems in place have shown a similar trend pattern.

Heroin abuse trend: Number of countries reporting increases less number of countries reporting stable/declining levels of abuse



c. Weighted Analysis on Drug Abuse Trends ("Drug Abuse Trend Index")

A new analytical tool, called the *Weighted Analysis on Drug Abuse Trends* (WADAT), referred to in this report as *Drug Abuse Trend Index,* was designed by UNODC to allow for a better estimation of regional trends in drug abuse, taking into consideration the different population size of the countries within the regions.

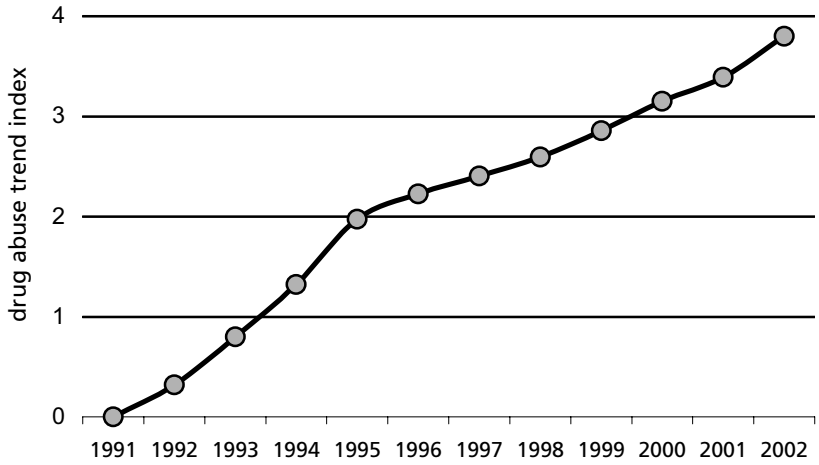
For this purpose, each degree of trend estimation was given a numerical value ranging from –2 to +2 (–2 representing a 'large decrease'; –1, 'some decrease'; 0, 'no great change'; +1, 'some increase'; and +2, 'a large

increase'). Estimates for each drug type were then multiplied by the proportion of the population of the country in relation to the total population of the region. The national estimates were added to represent annual regional trend estimate for each drug type and a cumulative trend for each region was calculated.

Ideally, the weighting should be based on the size of the drug abusing population under consideration. However, estimates are not available for all countries. This would have meant that trends reported for a number of countries would have to be ignored. Thus the size of the population was chosen as a more objective measure to calculate the relative importance of a trend reported by a country. Another question to solve was whether to use the population of the countries reporting or the total population of a region. It was decided to use the latter for this index. This allows, to some extent, better comparisons with other regions. There are, for instance, only a few countries in Africa reporting trends in ecstasy consumption. These few countries report, however, an increase. If the index were construed to take only the countries reporting into account, the result would have been a massive increase of ecstasy use across Africa, which has not been the case in Africa. Using the total population of Africa to calculate the countries' proportions, the Drug Abuse Trend Index shows only some minor increases of ecstasy use in Africa, which is more realistic.

The following table shows in some detail how the results in Africa were obtained for cannabis, the most widely consumed illegal substance in the region. If one takes South Africa for example, one can see that the country accounts for 6.2% of Africa's total population (age 15-64). South Africa reported a stable trend of cannabis use in 2001 and an increase in 2002; while cannabis herb was reported to have increased (1), cannabis resin was reported to have remained stable (0) in 2002. In such cases, the average was calculated (0.5). Applying South Africa's proportion in Africa's total population, the weighted trend for South Africa showed a value of 0.031. In the same way, the weighted trend data for all of other African countries were calculated. The sum amounted to +0.41, suggesting that there was a significant net increase in cannabis consumption in Africa in 2002. (If all countries in Africa had reported an increase, the rise in the index would have amounted to 1). The cumulative trend index, shown in this report, started with the year 1991 = 1. In 2001 it amounted to 3.39. For 2002 the new figure (0.41) was added, resulting in a total figure of 3.80 for Africa as a whole. Compared to other regions (and compared to other drugs) the increase of cannabis use in Africa was thus rather strong. The calculations show clearly that Africa – based on expert opinion - experienced an ongoing increase of cannabis use over the last decade.

Cannabis consumption trend in Africa: based on national experts' perceptions



Cannabis consumption trend Index for Africa

	Population age 15-64 in thousand	Proportion in total African population	Trends reported			Weighted trends	
			2001	2002		2001	2002
Benin	3393.7	0.75%	1.0			0.0075	
Burkina Faso	6115.6	1.35%	1.5			0.0202	
Burundi	3318.6	0.73%	0.0			0.0000	
Cameroon	8478.5	1.87%	1.0	1.0		0.0187	0.0187
Comoros	410.9	0.09%	-1.0			-0.0009	
Côte d'Ivoire	9005.4	1.99%		2.0			0.0397
Egypt	42470.9	9.37%					
Ethiopia	35457.9	7.82%	1.0	1.0		0.0782	0.0782
Gambia	771.7	0.17%	1.5			0.0026	
Ghana	11576.5	2.55%	1.0	1.0		0.0255	0.0255
Kenya	17359.1	3.83%		0.5			0.0191
Madagascar	8858.9	1.95%	1.0	0.0		0.0195	0.0000
Malawi	5974.3	1.32%		2.0			0.0264
Mauritius	828.5	0.18%	0.5	0.5		0.0009	0.0009
Morocco	19195.2	4.23%		2.0			0.0847
Namibia	1040.9	0.23%	1.0	1.0		0.0023	0.0023
Rwanda	4322.8	0.95%		0.0			0.0000
Sao Tome and Principe	85.6	0.02%	-1.0			-0.0002	
Seychelles	41.8	0.01%	1.0	1.0		0.0001	0.0001
Somalia	4709.4	1.04%		2.0			0.0208
South Africa	28140.0	6.21%	0	0.5		0.0000	0.0310
Togo	2542.1	0.56%	2	1		0.0112	0.0056
Tunisia	6383.5	1.41%	0	-1		0.0000	-0.0141
Uganda	11841.6	2.61%	1.5			0.0392	
United Republic of Tanzania	18983.3	4.19%		1			0.0419
Zambia	5400.8	1.19%		1			0.0119
Zimbabwe	6858.1	1.51%	1	1		0.0151	0.0151
Total population in Africa	453281.452	100.0%					
Sum						**0.2400**	**0.4080**
Index							
Years	1991		1998	1999	2000	2001	2002
Yearly results			0.19	0.26	0.30	0.24	0.41
Cumulative trend index	**1.0**	**..**	**2.60**	**2.86**	**3.15**	**3.39**	**3.80**

One advantage of such an analysis is that it takes the size of countries into account. In other words, the index gives more weight to the results reported from larger countries which – in absolute terms – are likely to have a higher addict population than smaller countries. This is in line with the observation that the overall impact of a rise of drug abuse in a larger country tends to have a far greater impact on global drug abuse than the rise in a smaller country. Another advantage is that the index takes into account the degree of change in drug abuse levels, thus making better use of all available information.

The Drug Abuse Trend Index is likely to show good results whenever levels of drug abuse are similar which is, in general, the case at the regional level. (Cocaine abuse is high in countries in the Americas; opiate abuse is high in countries in Asia, ecstasy use is high in countries of Western Europe etc.). It can, however, create problems if the index is used at the global level, without any further adjustments, in cases the distribution of drug abuse is very skewed. Calculating a Drug Abuse Trend Index for cocaine at the global level for instance, shows a distorted pattern as India, the world's second largest country in terms of population, recently started to report increases in cocaine use. Cocaine abuse, though rising in India, is still at very low levels in the country. But the weight of this country in terms of population meant that the index would show a sharp rise - which was not in line with actual cocaine consumption trends at the global level. Against this background, it was decided not to use the index, as it is, for the global analysis of trends for the cocaine market or the opiate market. In contrast, for cannabis or ATS which are found in all continents, the Drug Abuse Trend Index data were calculated and presented in this report.

There are also other 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. A mistake made by one expert in a country with a large population can seriously distort the global trend estimates. Moreover, it cannot be assumed that the difference between various degrees of drug abuse trends (for example, between "some decrease" and "large decrease") are interpreted in the same way in different countries (a large increase in a country with low prevalence may not have the same impact on regional trends as some increase in a country with high prevalence) or even in the same country in different reporting years, as the ARQs are often filled in by different persons. Reporting trends in the abuse of a drug type, such as cannabis, may be biased by differing trends in the abuse 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 each individual drug category was taken and an unweighted average was calculated. Of course, this is not without problems. In the example of South Africa, as shown above, it is known that cannabis resin does not play a role while cannabis herb is of major importance. The use of a simple average thus underestimates the actual increase of cannabis in this country. While for some countries, the detailed profile of substance abuse is well known, this would not be the case for others. Thus the general rule of averaging all drugs within one category was applied, though it is not without problems.

It should be also be noted that the Drug Abuse 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, in addition, a need for more drug-specific trend analysis to support its conclusions.

Irrespective of these caveats, the overall results derived from the Drug Abuse Trend Index were found to be basically in line with other indicators at the regional level – wherever comparisons could be made - thus suggesting that the Index is a valuable tool for the analysis of drug abuse trends at the regional level, and, for cannabis and ATS, at the global level as well.