A. EXTENT OF DRUG USE

Overall drug use remains stable globally

It is estimated that 1 in 20 adults, or a quarter of a billion people aged 15-64 years, used at least one drug in 2014. Although trends in drug use vary across regions, as does updated reporting on data, the extent of drug use among the world population has remained stable over the past four years. Almost 12 per cent of the total number of people who use drugs, or over 29 million people, are estimated to suffer from drug use disorders.

Cannabis remains the world’s most widely used drug, with an estimated 183 million people having used the drug in 2014, and amphetamines remain the second most widely used drug. With an estimated 33 million users, the use of opiates and prescription opioids may not be as widespread as the use of cannabis, but opioids remain major drugs of potential harm and health consequences. Where updated data are available, as an overall trend, global use of cannabis has remained stable over the past three years, although in some subregions, particularly North America and Western and Central Europe, cannabis use has increased. In the absence of recent survey data on drug use in Africa, experts in the region also perceive an increase in cannabis use. Moreover, the global trend in cocaine use, which was stable after 2010, has shown a recent trend, mainly as a result of an increase in cocaine use in South America. The global trend in the use of amphetamines is stable, although this may underplay the situation in regions where recent information on the extent of drug use is unavailable. This is particularly the case in Asia, where expert perceptions of trends and treatment admission reports suggest an increase in the use of amphetamines in the region, specifically in East and South-East Asia (see map 1).

The global picture of drug use is compounded by the fact that many people who use drugs, both occasionally and regularly, tend to be polydrug users, meaning that they use more than one substance concurrently or sequentially, usually with the intention of enhancing, potentiating or counteracting the effects of another drug. The non-medical use of prescription drugs, synthetic stimulants and new psychoactive substances (NPS) in lieu of, or in combination with, conventional drugs gives a picture that blurs

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1 Wouter Vanderplasschen and others, Poly Substance Use and Mental Health Among Individuals Presenting for Substance Abuse Treatment, Science and Society Series (Gent, Belgium, Academia Press, 2012).

2 European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), “Polydrug use: patterns and response” (Lisbon, November 2009).

3 World Health Organization (WHO), Lexicon of Alcohol and Drug Terms (Geneva, 1994).
Within polydrug use, the concomitant use of opiates and stimulants becomes more pronounced, with a significant increase in the number of NPS that are stimulants. In the past decade, the use of amphetamine and methamphetamine has been widely reported.6, 7 In the past decade, the use of amphetamine and methamphetamine has become quite widespread in different regions, while the number of NPS that are stimulants seems to be constantly increasing. Data on polydrug use are seldom systematically collected, but amphetamines and NPS seem to be reported increasingly in polydrug use patterns in different regions.

**Recent trends in polydrug use and substitution between drugs**

Polydrug use encompasses wide variations in patterns of drug use, ranging from occasional alcohol and cannabis use to the daily use of a combination of heroin, cocaine, alcohol and benzodiazepines.4, 5

Within polydrug use, the concomitant use of opiates and stimulants such as cocaine and amphetamines is fairly common and has been widely reported.6, 7 In the past decade, the use of amphetamine and methamphetamine has become quite widespread in different regions, while the number of NPS that are stimulants seems to be constantly increasing. Data on polydrug use are seldom systematically collected, but amphetamines and NPS seem to be reported increasingly in polydrug use patterns in different regions.

**Tolerance, cross-tolerance and substitution:**

Managing the effects of drugs

The interplay of individual, biological, cultural, social and environmental factors increases or attenuates the vulnerability of a person to use or to continue using drugs. Continuing to use a drug is considered a conditioned response to the positive reinforcement that the person receives as a result of using the drug.8 However, in later stages a person continues to use drugs merely to maintain drug dependence, which is characterized by, among other things, the desire and compulsion to use drugs despite evidence of harmful consequences, the development of tolerance — by increasing the quantity of the drug or drugs to achieve the same effects and a state of withdrawal — and the negative consequences experienced when the person stops using the drug or drugs.9

Drugs taken together can have a cumulative or synergistic effect, which increases the overall psychoactive experience; that is one way in which drug users may address the development of tolerance.10 A related phenomenon is “cross-tolerance” — the pharmacological ability of one drug to have generally the same effect on the nervous system as another drug. The phenomenon of cross-tolerance explains in part the frequent substitution of drugs that have a similar effect. Examples of such patterns of drug use include the use of alcohol with benzodiazepines, cannabis or cocaine; concurrent use of heroin, benzodiazepines and antihistamines; the use of alcohol or other opioids (methadone, fentanyl etc.); and the use of cocaine and other stimulants,11, 12, 13, 14

In other situations, people who use drugs may offset the negative effects of the drugs by concurrently or sequentially using additional drugs with opposite effects. One such pattern is “speedballing” — when cocaine is injected with heroin or other opioids or when heroin is used with methamphetamine or amphetamine.15

**Market dynamics: substitution and complementarity of drugs**

Market dynamics, reflected by changes in availability, purity or price, can affect the choice of drugs. In such circumstances, people who use drugs can turn to substituting...
with different drugs; transitioning to alternative routes of drug administration; decreasing their consumption of the drug; or deciding to enter treatment.\textsuperscript{16, 17} Common examples are heroin being substituted by oxycodone, desomorphine or other opioids and vice versa, as reported in various regions.\textsuperscript{18}

Economic factors and cross-price elasticity may also affect polydrug use.\textsuperscript{19} An increase in the price of one drug may result in the use of another (substitution) or it may decrease the use of another, even though its price remains the same (complementarity). For example, a study showed that an increase in the price of heroin resulted in an increase in benzodiazepine and cocaine purchases.\textsuperscript{20} In another study, cross-price elasticity analysis showed that in the case of heroin there was significant substitution with prescription opioids and, to a lesser extent, benzodiazepines and methamphetamine.\textsuperscript{21} The same study showed that there was limited substitution with other drugs as the price of methamphetamine increased.

**Recent trends in the use of heroin and the non-medical use of prescription opioids in the United States**

In the United States of America, over the past decade the non-medical use of prescription opioids and the use of heroin have continued to interplay in the market. Since the high prevalence and associated morbidity and mortality of the non-medical use of prescription opioids have become a major public health issue,\textsuperscript{22} a recent increase in heroin use has triggered a sharp increase in heroin-related overdose deaths.\textsuperscript{23, 24} Several aspects have driven this


\textsuperscript{17} Horyniak and others, “How do drug market changes affect characteristics of injecting initiation and subsequent patterns of drug use?”, (see footnote 5).


\textsuperscript{20} Petry and Bicket, “Poly drug use in heroin addicts: a behavioral economic analysis”, (see footnote 6).

\textsuperscript{21} Chalmers and others, “The effect of methamphetamine and heroin price on poly drug use” (see footnote 16).


\textsuperscript{23} United States, Center for Behavioral Health Statistics and Quality, Behavioral Health Trends in the United States: Results from the 2014 National Survey on Drug Use and Health, HHS Publication No. SMA 15-4927, NSDUH Series H-50 (Rockville, Maryland, 2015).

change: law enforcement and regulatory actions to address the irrational prescribing and reformulation of prescription opioids with abuse-deterrent technologies; implementation of programmes for monitoring prescription drugs and education of health-care professionals and the public about their appropriate use;25 and increased accessibility, reduced prices and high purity of heroin in the United States.26

In 2014, an estimated 914,000 people aged 12 years or older had used heroin in the past year — a 145 per cent increase since 2007 — while mortality related to heroin use has increased fivefold since 2000.27, 28, 29, 30

From the period 2002-2004 to the period 2011-2013, there was an increase in heroin use, particularly among people who also reported the use of other substances. The highest rate of past-year heroin use was among cocaine users (91.5 per 1,000 users),31 followed by those who reported non-medical use of prescription opioids. Nine out of 10 people who used heroin self-reported co-use of heroin with at least one other drug, and most used heroin with at least three other drugs.32 Moreover, the proportion of heroin users diagnosed with disorders related to non-medical use of prescription opioids more than doubled,
from 20.7 per cent in the period 2002-2004 to 45.2 per cent in the period 2011-2013.

The increase in heroin use in the United States has been more pronounced among a subgroup of people aged 18-25 who report a higher frequency of non-medical use of prescription opioids. Among this group, the likelihood of using heroin in the past year, ever injecting prescription opioids or becoming dependent on heroin increased with the frequency of non-medical use of prescription opioids in the previous year. Those reporting non-medical use of prescription opioids for over 100 days in the past year were nearly eight times more likely to report dependence on heroin than those who reported less frequent non-medical use of prescription opioids.

It appears that the increase in heroin use in the United States had already begun around 2006 and had preceded the changes introduced in policies and practices related to prescription opioids. Nevertheless, given the large number of non-medical users of prescription opioids, even a small proportion who switch to heroin use has translated into a much higher number of people using heroin.

Analysis suggests that the problem of opioid use is not substance-specific and requires holistic approaches to address the interconnected epidemic through prevention of initiation and treatment interventions for people with opioid use disorder.

Shift between injecting heroin, amphetamines and new psychoactive substances in Europe

In some European countries (Austria, Belgium, Czech Republic, France, Germany, Ireland, Poland, Spain and the United Kingdom), small, localized groups of high-risk drug users who are in contact with low-threshold services, psychiatric facilities and treatment centres for drug users and who used to inject heroin and amphetamines have switched to injecting NPS such as synthetic cathinones. Reports to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) suggest that drug users who inject synthetic cathinones are primarily those who have been injecting heroin and amphetamines and have now either started injecting synthetic cathinones or included it in their drug use repertoire. People who inject synthetic cathinones include those who are on opioid substitution treatment, as well as young people beginning their drug-injecting use.

In Hungary, in the period 2009-2012 a shortage of heroin and an increase in local availability of synthetic cathinones contributed to high-risk drug users switching to injecting NPS, primarily synthetic cathinones. A corresponding change in the patterns of injecting was reported both among clients of needle and syringe programmes (NSP) and those entering treatment. In 2009, the majority of

![FIG. 6](image_url)

**FIG. 6** Likelihood of past-year heroin use and other indicators depending on the frequency of non-medical use of prescription opioids in the past year


* Odds ratio adjusted for the influence of (confounders) other variables.

![FIG. 7](image_url)

**FIG. 7** Trends in injecting drugs among clients of needle and syringe programmes in Hungary, 2009-2012

people who inject drugs (PWID) were injecting heroin or amphetamine, whereas by 2012 about 43 per cent of PWID were primarily injecting synthetic cathinones and another 40 per cent were injecting amphetamine.36 This trend was self-reported, as well as confirmed through samples obtained from injecting equipment. Of the main synthetic cathinones injected by PWID, the predominant substance was pentedrone; the other substances reported were 3,4-methylenedioxyprovalerone (MDPV), mephedrone and 4-methylmethcathinone (4-MEC), all of which are stimulants.

There is evidence of similar trends in treatment settings, where the proportion of heroin users dropped considerably and the proportion of clients entering treatment for injecting amphetamine and other stimulants increased substantially in 2012.

In Hungary, the reduced availability of heroin did not change injecting practices but made users switch to other injecting substances (such as NPS and amphetamine) that were more affordable and readily available and also gave intense effects.37

**Drug market changes and patterns of injecting drug use in Australia**

In Australia, the heroin market changed considerably after 2000; heroin went from being highly accessible (cheap, high in purity and available) and the most commonly injected drug in Australia to being less accessible as a result of a heroin shortage.38 The change resulted in a decrease in the prevalence and frequency of injecting heroin, as well as a decline in adverse health consequences related to heroin use.39

The subsequent years (2001-2004) saw a sustained decrease in the availability and use of heroin in Australia. During the same period, methamphetamine emerged on the market at a relatively low price per gram of pure methamphetamine, which was readily available, and that led to an increase in methamphetamine use.40 In the years from 2004 onwards, the illicit markets for both heroin and methamphetamine continued to be very dynamic, with the price and purity of both drugs fluctuating. In the same period, the increased practice of prescribing opioids and their non-medical use (among PWID) was also observed.41

![FIG. 8 Trends in the initiation of injecting drug use, by substance, in Melbourne, Australia, 2001, 2001-2004 and since 2004](image)


A cohort study of PWID in Melbourne, who were recruited between November 2008 and March 2010, examined the impact that the changing market dynamics might have had on drug use patterns.42 Among the participants in the study, initiation with injecting heroin remained the most common practice in all three of the periods examined, although it declined in the period when heroin availability was low. In that period, the proportion of PWID who initiated injecting methamphetamine increased. In the later period (from 2004 onwards), the proportion of PWID initiating injecting with methamphetamine decreased, counterbalancing an increase in initiating injecting with heroin and other drugs, primarily prescription opioids.

In 2013, most of the participants in the study were polydrug users (44 per cent) or users primarily injecting heroin (41 per cent). Among current PWID, the practice of primarily injecting methamphetamine was not common, but the participants who initiated injecting during the period when heroin availability was low were almost twice as likely to be current polydrug injectors. Also, a combination of heroin and methamphetamine was more commonly used by current PWID, and drugs such as heroin were often used to counter the “comedown effects” of methamphetamine.43

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37 Ibid.
38 Horyniak and others, “How do drug market changes affect characteristics of injecting initiation and subsequent patterns of drug use?” (see footnote 5).
41 Horyniak and others, “How do drug market changes affect characteristics of injecting initiation and subsequent patterns of drug use?” (see footnote 5).
42 Ibid.
43 Brendan Quinn and others, “Methamphetamine use in Melbourne, Australia: baseline characteristics of a prospective meth-
The findings of the study suggest that the first drug injected reflects the characteristics of the drug market at the time, while later patterns of drug use, including polydrug use, appear to be the result of compensation or substitution mechanisms brought on by market dynamics. These patterns may reflect the cyclical nature of drug epidemics and may continue to change as drug markets evolve.

Methamphetamine smoking among heroin users and polydrug users in Greece

In recent years in Greece, both low-threshold services and treatment agencies have reported the smoking of crystaline methamphetamine on a regular basis among injecting opioid users. This practice has been reported particularly among marginalized migrant subpopulations of persons who inject opioids in Athens.44

Polydrug use in Greece is common among drug users in treatment. In 2013, almost 71 per cent of clients in treatment reported having used more than one substance, with polydrug use being more common among cocaine (80 per cent) and opioid users (77 per cent). Misuse of prescription drugs and use of cannabis and cocaine were most frequently reported among users of opioids, while primary cocaine users more frequently reported use of cannabis and opioids.45

Emerging methamphetamine use among opiate users in the Islamic Republic of Iran

In the Islamic Republic of Iran, where opiates remain the main drug consumed by problem drug users, methamphetamine use has emerged as another drug of concern in recent years. Methamphetamine use has also been described as a new form of polydrug use among opiate users.46 Many local studies of opiate users in methadone treatment have reported the use of methamphetamine among the clients of treatment centres. For example, a study at an opioid substitution treatment clinic in Zahedan Province showed that methamphetamine use among opioid users in treatment increased from 6 per cent in 2009 to almost 20 per cent in 2011.47 Another study of 378 people seeking treatment at a therapeutic community centre found that the urine samples of nearly 7 per cent of those people had tested positive for methamphet-amine.48, 49 Methamphetamine use has reportedly had a negative influence on opioid-dependent patients in treatment who wrongly believed that methamphetamine use could help control their opiate dependence and associated problems such as depression and poor sexual performance and increase their physical energy, attention and concentration and improve social relationships.50 Methamphetamine use among heroin users has also been reported in other parts of Asia.51

Problem drug use as reflected in demand for treatment for drug use

Information about people in treatment for drug use disorders can be taken as a proxy for understanding the nature, as well as a latent indicator, of trends in drug use resulting in severe health consequences.

According to global estimates, nearly one in six people with drug use disorders access treatment services each year. Opioids stand out as a major drug of concern in North America, Europe (particularly Eastern and South-Eastern Europe) and Asia. In Eastern and South-Eastern Europe, nearly three out of every four people in treatment for drug use disorders are treated for opioid use. The number of people in treatment for cocaine use disorders remains quite high in Latin America and the Caribbean, where nearly half of people in treatment for drug use disorders are treated for cocaine use. Treatment related to cannabis use disorders is more prominent in Africa and Oceania than in other regions. This may be related to the limited treatment options for users of other drugs in Africa, where nearly half of all admissions to treatment for drug use disorders are for the use of non-specified substances, which masks the true extent of the use of drugs of concern other than cannabis. Amphetamines remain a problem primarily in East and South-East Asia and to some extent in North America; while the number of people in treatment for disorders related to the use of amphetamines has been increasing in Asia, half of the people in treatment for drug use in the region are treated for opioid use disorders.

The number and characteristics of people seeking treatment for the first time are indirect indicators of trends in health consequences caused by the use of different substances in a region. At the global level, the proportion of

FIG. 9  Total number of people in treatment for drug use, including people in treatment for the first time, by drug type and region, 2014

Source: Responses to the annual report questionnaire.
Note: The figures are based on data for 2014 or the latest year since 2010 for which data are available. For each region, the number of people in treatment for the use of different drugs in the region is weighted by the total number of people treated in a country. Member States in Oceania (in particular, Australia and New Zealand) do not provide information on the proportion of people in treatment for the first time, and therefore information for Oceania is not reflected in the figures.
people seeking treatment for cannabis use disorders for the first time remains high — nearly 50 per cent. In Asia, among those being treated for disorders related to the use of amphetamines, nearly 60 per cent are reported to be in treatment for the first time; in Europe and Latin America, nearly 40 per cent of those being treated for cocaine use disorders are reported to be in treatment for the first time. People seeking treatment for disorders related to the use of cannabis and amphetamines are younger (on average, 24 and 25 years of age, respectively) than people seeking treatment for disorders related to the use of other drugs, including those seeking such treatment for the first time. This reflects increasing trends in the use of cannabis and amphetamines and the resulting increase in people seeking treatment for disorders related to the use of those drugs. Fewer people are in treatment for the first time for opioid or cocaine use disorders; however, they are typically in their thirties and, in many subregions, reflect an ageing cohort of users in treatment and show an overall decrease in the proportion of treatment demand.

Moreover, based on data reported by Member States, it is estimated that between 40 and 80 per cent of people in treatment for drug use are diagnosed with polydrug use, which reflects the complexity of drug use patterns and the challenges of treating people with drug use disorders effectively.

Trends in treatment demand over the past decade also corroborate the changing patterns of drug use observed in different regions and subregions. While demand for treatment for cannabis use disorders has increased in all regions since 2003, it has done so to a much greater extent in the Americas, Western and Central Europe and Oceania. At the same time, in the Americas, the proportion of people in treatment for cocaine use has decreased over the past decade. In Asia, there has been a substantial increase in treatment for the use of amphetamine-type stimulants (ATS) and a decrease in treatment for disorders related to opioid use. In Eastern and South-Eastern Europe, treatment for opioid use disorders has been a matter of concern over the past decade.

The increase in treatment demand related to cannabis use in some regions warrants special attention. There is great variability in the definition and practice of what constitutes treatment of cannabis use disorders. Treatment at present consists of behavioural or psychosocial interventions that may vary from a one-time online contact, or a brief intervention in an outpatient setting, to a more comprehensive treatment plan including treatment of other co-morbidities in an outpatient or inpatient setting.

53 Wayne Hall, Maria Renström and Vladimir Poznyak, eds., The Health and Social Effects of Nonmedical Cannabis Use (Geneva, WHO, 2016).
What are the potential driving forces behind changes in the number of people in treatment for cannabis use?

The nature and extent of the potential health risks and harms associated with cannabis use are continually under debate. Cannabis use can be perceived to be relatively harmless when compared with the use of other controlled psychoactive substances and also in relation to the use of tobacco or alcohol. However, lower risk does not mean no risk: there are harmful health effects associated with a higher frequency of cannabis use and initiation at a very young age, especially among adolescents during the time of their cognitive and emotional development. Adverse health effects of cannabis use associated with cognitive impairments or psychiatric symptoms are well documented in the scientific literature. Hence, cannabis use disorders require clinically significant treatment interventions. The transition from drug use to drug dependence occurs for a much smaller proportion of cannabis users than for opioid, amphetamine or cocaine users. However, because so many people use cannabis, this translates into a large number who experience cannabis use disorders; for example, in the United States, of the 22.2 million current cannabis users in 2014, 4.2 million people aged 12 or older had a cannabis use disorder diagnosed in the previous year.

Cannabis use disorders are estimated to occur in approximately 1 out of every 11 persons (9 per cent) who have ever used cannabis, and the proportion increases significantly to one out of every six persons (17 per cent) who started using cannabis in their teens and to 25-50 per cent of daily cannabis users.

Factors that may influence the number of people in treatment when cannabis is the primary drug of concern include: changes in the number of people who actually need treatment; changes in referrals to treatment; changes in awareness of potential problems associated with cannabis use; and changes in the availability of treatment for cannabis. Unfortunately, detailed information on trends in the number of people in treatment and on potential driving forces is sparse, and consequently the analysis presented below is limited to the situation in the United States and in European countries.

Are changing patterns of treatment for cannabis use a result of more harmful consumption patterns?

The risk of adverse health effects increases with more harmful consumption patterns. In the United States, the number of daily (or near-daily) cannabis users, measured by the number using cannabis on 20 or more days in the past month and the number using cannabis on 300 or more days in the past year, rose significantly after 2006, by 58 and 74 per cent, respectively. However, this increase in daily (or near-daily) cannabis use has not translated into an increased number of people seeking treatment, even when those in treatment referred by the criminal justice system are excluded.

In Europe, where treatment for cannabis use disorders has been on the increase, approximately 1 per cent of the population aged 15-64 are daily (or near-daily) cannabis users; although data on daily use are sparse, there is little evidence...
that this rate has changed over the past decade. In several countries in Europe with some of the highest numbers of people in treatment for cannabis use (Germany, Spain and the United Kingdom of Great Britain and Northern Ireland), the prevalence of past-month cannabis use has been stable or declining in the past decade, although the number of persons in treatment for cannabis use has risen continually.

One factor that could explain increased negative health effects of cannabis use could be decreasing age of initiation, but there is little evidence that cannabis users are now starting at an earlier age. The age of initiation of cannabis use reported by those in treatment has changed little over time in the United States and has followed no clear trend in Europe; therefore, it has probably not been an important factor influencing the trends observed in the number of persons in treatment.

Increases in the potency of cannabis products (the delta-9-tetrahydrocannabinol or tetrahydrocannabinol (THC) content), including in the ratio of THC to cannabidiol (a cannabinoid with anti-psychotic properties that may partially counterbalance the harm caused by THC), have received considerable attention in relation to possible increases in adverse health effects. There is evidence in some countries that there is now a large variety of cannabis products on the market and that high-potency preparations have become more widely available. Nevertheless, the interplay between high-potency cannabis products and dosage and how it translates into harm for users is not well understood. Users may adjust (titrate) the amounts of cannabis they consume to achieve the desired psychoactive effect, although this has been shown to be more difficult for inexperienced users and users of high-potency cannabis.

Are changing patterns of treatment for cannabis use a result of changes in referrals from the criminal justice system?

Several countries have adopted alternative measures to incarceration in minor cases involving possession of cannabis for personal consumption without aggravating circumstances (for example, fines, warnings, probation, counselling or even exemption from punishment). In the United States and the majority of countries in Europe, there is the option of referral or diversion away from criminal sanctions and into treatment. Thus, the criminal justice response to cases involving possession of cannabis for personal use can have an impact on the number of persons in treatment for cannabis use.

In the United States, persons referred to treatment from the criminal justice system constitute a significant proportion (47–58 per cent in the period 1992-2012) of those in treatment for cannabis use reported by those in treatment. In some countries in Europe with some of the highest numbers of people in treatment for cannabis use (Germany, Spain and the United Kingdom of Great Britain and Northern Ireland), the prevalence of past-month cannabis use has been stable or declining in the past decade, although the number of persons in treatment for cannabis use has risen continually.

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Number of people in treatment for cannabis use and the prevalence of past-month cannabis use in Germany, Spain and the United Kingdom, 2006-2013

Note: The data presented in the figures are for persons in treatment for cannabis use in Germany, Spain and the United Kingdom, but the prevalence rates refer to England and Wales only; for Spain, the prevalence rate given for 2007 refers to the years 2007/08.


Note: The data on treatment presented in the figure are for people aged 12 years and older for whom cannabis was the primary drug of concern.

treatment for cannabis use.76 However, over the same 20-year period, 40 per cent of those referred from the criminal justice system reported that they had not used cannabis in the month prior to entering treatment, and only 22 per cent reported daily use of cannabis. The number of arrests for cannabis possession follows a pattern that is for the most part similar to the number of people in treatment for cannabis, suggesting that changes in treatment for cannabis use in the United States are possibly a reflection of changes in arrests for cannabis possession.

In Europe, referrals from the criminal justice system (from the police, the courts and probation services) also make an important contribution to the number of persons in treatment as a result of their cannabis use. Typically, one in five persons who are in treatment and for whom cannabis was the primary drug of concern were referred from the criminal justice system,77 with the proportion ranging...
from 3.9 per cent in the Netherlands to 80.6 per cent in Hungary.88 Unfortunately, information is not available with regard to changes over time.

**Have barriers and facilitators of access to treatment influenced the trend in treatment for cannabis use?**

Given that persons who are dependent on cannabis are often reluctant to seek treatment,79 an awareness and understanding, particularly among youth, of the potential risk from cannabis use may encourage users to seek help. In the United States there has been a continuous decline in the perception among youth that cannabis use is harmful. The proportion of secondary school students who see a “great risk” from regular cannabis use has declined since the early 1990s and there has been a particularly rapid decline since the mid-2000s. In 2014, less than 40 per cent of twelfth-grade students (ages 17-18) perceived a “great risk” from regular cannabis use, down from nearly 80 per cent in the early 1990s.80 In Europe, the perception of harm from cannabis use is higher among youth than in the United States and has not shown a decline. According to European surveys conducted in 2003, 2007 and 2011, the percentage of students perceiving “great risk” of harm from regular cannabis use has been maintained at 70-72 per cent.81 The greater perception of risk from cannabis use observed in Europe may have been a factor in the increasing numbers in treatment.

There could be considerable unmet demand for treatment for cannabis use in Europe. It is estimated that there are 3 million daily (or near-daily) cannabis users (persons who used cannabis 20 or more days in the previous month) in the region.82 Based on a number of studies, cannabis dependence has been estimated to occur in 25-50 per cent of daily users.83, 84 In Europe, a total number of approximately 206,000 persons received treatment in 2010 for which cannabis was either the primary or secondary reason for entering treatment,85 suggesting that 10-30 per cent of all daily dependent cannabis users were receiving treatment.

At the health-care policy level and in international research, treatment for cannabis use has been receiving a relatively high level of visibility and public funding in Europe.86 Since 2008, the number of persons in treatment for cannabis use has been increasing in Europe, which in part is a reflection of the expansion in the provision of treatment.87 In many countries in Europe, important strides have been made in the provision of treatment with programmes that have been implemented, expanded or modified to address the needs of cannabis users, some having adolescents and young adults as their target groups.88, 89

**Gender and drug use**

Men are considered to be three times more likely than women to use cannabis, cocaine or amphetamines, whereas women are more likely than men to engage in the non-medical use of prescription opioids and tranquilizers. Gender disparities in drug use are more attributable to opportunities to use drugs in a social environment than to either gender being more or less susceptible or vulnerable to the use of drugs.90 Men are considered to have more opportunities than women to use drugs, but both genders are equally likely to use drugs once an opportunity to do so occurs.91, 92

**Gender divide in drug use is narrowing among the younger generation**

In most surveys, the prevalence of drug use is reportedly higher among young people than among adults and the gender divide in drug use is narrower among young people than among adults.93 In Europe, for every two girls who use cannabis there are three boys, whereas the prevalence of cannabis use among adults is nearly twice as high among men than among women.94 In the United States, the use

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82 *Prevalence of Daily Cannabis Use* (see footnote 67).
83 Hall and Pacula, “Cannabis use and dependence” (see footnote 66).
84 *Prevalence of Daily Cannabis Use* (see footnote 67).
85 Ibid.
89 Treatment of Cannabis-related Disorders in Europe (see footnote 87).
90 See *World Drug Report 2015*.
94 *The 2011 ESPAD Report*; and the unweighted average of the prevalence of past-year drug use for European Union member States reported by EMCDDA.
of cannabis, cocaine and prescription opioids among young people (ages 12-17) was fluctuating over the past decade but overall the gender gap has remained similar.

Gender divide in drug use is changing

In recent years, in countries with established drug use, the gender divide in drug use has also been changing in the adult population, partly reflecting increasing opportunities to use a particular substance. In the United States, among the population aged 12 and older, heroin use remains higher among men than among women. However, over the past decade more women than men have started using heroin: the prevalence of past-year heroin use among women was 0.08 per cent in the period 2002-2004 and twice that figure (0.16 per cent) in the period 2011-2013, whereas the prevalence of past-year heroin use among men increased by half in the same period. The increase in heroin use was significantly higher among men and women who were younger (18-25 years old) and more frequent users of prescription opioids.95

In the United Kingdom, overall drug use in the adult population declined between 1996 and the period 2013-2014. However, this decline was more marked among women (-30 per cent) than men (-13 per cent). While the prevalence of amphetamine use declined by 75 per cent for both men and women, the decline in cannabis use was greater among women (-40 per cent) than among men (-20 per cent).96

B. HEALTH IMPACT OF DRUG USE

Almost 12 million people inject drugs worldwide

The joint UNODC/WHO/UNAIDS/World Bank estimate for the number of people who inject drugs (PWID) for 2014 is 11.7 million (range: from 8.4 to 19.0 million), or 0.25 per cent (range: 0.18-0.40 per cent) of the population aged 15-64. PWID experience some of the most severe health-related harms associated with unsafe drug use, overall poor health outcomes, including a high risk for non-fatal and fatal overdoses, and a greater chance of premature death.97 This is exacerbated by poor access to evidence-informed services for the prevention and treatment of infections, particularly HIV, hepatitis C and tuberculosis.98

Eastern and South-Eastern Europe is the subregion with by far the highest prevalence of injecting drug use: 1.27 per cent of the population aged 15-64. The subregion accounts for almost one in four (24 per cent) of the total number of PWID worldwide; almost all PWID in the subregion reside in the Russian Federation and Ukraine. In Central Asia and Transcaucasia and in North America, the prevalence of injecting drug use is also high: 0.72 per cent of the population aged 15-64 in Central Asia and Transcaucasia; and 0.65 per cent in North America. Those three subregions combined account for 46 per cent of the total number of PWID worldwide. Although the prevalence of injecting drug use in East and South-East Asia is at a level below the global average, a large number of PWID (27 per cent of the total number of PWID in the world) reside in the subregion, given that it is the most populated subregion. Three countries (China, Russian Federation and United States) together account for nearly half of the total number of PWID worldwide.

Drug use is a major risk factor for the transmission of infectious diseases

Among people who inject drugs, one in seven is living with HIV and one in two is living with hepatitis C

PWID represent a key at-risk population for HIV and hepatitis infections, with almost a third of new HIV infections outside sub-Saharan Africa occurring among

CHAPTER I
Health impact of drug use

Compared with non-injecting drug users, PWID are approximately three times more likely to acquire HIV, as the sharing of contaminated needles and syringes is a major risk for the transmission of HIV and viral hepatitis. According to joint UNODC/WHO/UNAIDS/World Bank estimates for 2014, 14.0 per cent (or 1.6 million) of PWID are living with HIV, 52 per cent (or 6.0 million) of PWID are infected with hepatitis C and 9.0 per cent (or 1.1 million) are infected with hepatitis B.

99 Ibid.
FIG. 17 HIV prevalence among people who inject stimulants and among people who use stimulants but do not inject them

Note: Based on a comprehensive review of studies commissioned by UNODC. (For details on the studies, see the relevant table in the online Statistical Annex to the World Drug Report.) Where available, the upper and lower bounds of 95 per cent confidence intervals are shown.
CHAPTER I
Health impact of drug use

The use of stimulants (particularly methamphetamine and amphetamine) to enhance and prolong sexual activity is well documented, particularly among men who have sex with men (MSM). There is strong evidence of higher-risk sexual behaviours and higher HIV prevalence among MSM who use methamphetamine or amphetamine than among those who use other drugs. As many stimulants (particularly NPS that are stimulants) have a shorter duration of action, compared with users of opiates, users of stimulants report a high frequency of injecting, with compulsive re-injecting and a greater likelihood to report the sharing and reuse of needles and syringes that might be contaminated.

who inject stimulants (cocaine and amphetamines) have been found to have more sexual partners and more frequent intercourse with casual partners and regular partners than PWID who inject other drugs. Moreover, a systematic review found that the risk of acquiring HIV was 3.6 times greater among people who injected cocaine than among non-injecting users of cocaine, and 3.0 times greater among people who injected ATS than among non-injecting users of ATS.

The second main target under Goal 3, namely target 3.3, is to end, by 2030, the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases. Other Goals related to addressing HIV and AIDS include those on achieving gender equality (Goal 5); reducing inequality (Goal 10); promoting inclusive societies and providing access to all levels of education (Goal 4); promoting well-being for all at all ages (Goal 3); and ensuring availability of affordable essential medicines and access to treatment of substance use (Goal 3).

The General Assembly at its seventieth session adopted the outcome document of the United Nations summit for the adoption of the post-2015 development agenda, containing the 2030 Agenda for Sustainable Development and the Sustainable Development Goals. The 17 Goals address the different dimensions of sustainable development. Many of the Sustainable Development Goals and their targets are related to the intersection between drugs, health and well-being as are mentioned here. For a broader discussion on the Sustainable Development Goals and the world drug problem see chapter II of the present report.

Under Goal 3 ("Ensure healthy lives and promote well-being for all at all ages"), global leaders have, for the first time, addressed issues related to the prevention and treatment of substance use. Target 3.5 is to strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol. Achieving that target requires, inter alia, expanding the coverage and quality of a range of evidence-based and gender-responsive interventions for the prevention of drug use, as well as for the care, treatment and rehabilitation of drug use disorders. In this context, UNODC has developed the International Standards on Drug Use Prevention and the International Standards on the Treatment of Drug Use Disorders that have already been recognised by Member States as useful guides to improving their services in numerous Resolutions, as well as in the Outcome document of the special session of the General Assembly. Measuring access to treatment for substance use requires, at the national level, reliable estimates of the number of people in need of treatment for, or those suffering from, drug use disorders and a reliable estimate of the number of people provided with treatment interventions for the use of different drugs.

The pr evention target is to reduce the number of new HIV infections to fewer than 200,000 per year by 2020 (and to fewer than 200,000 per year by 2030);

1. The prevention target is to reduce the number of new HIV infections to fewer than 200,000 per year by 2020 (and to fewer than 200,000 per year by 2030);

2. The prevention target is to reduce the number of new HIV infections to fewer than 200,000 per year by 2020 (and to fewer than 200,000 per year by 2030);


As many stimulants (particularly NPS that are stimulants) have a shorter duration of action, compared with users of opiates, users of stimulants report a high frequency of injecting, with compulsive re-injecting and a greater likelihood to report the sharing and reuse of needles and syringes that might be contaminated.

101 Ibid.


105 Tavitian-Exley and others, “Influence of different drugs on HIV risk in people who inject” (see footnote 100).


It is difficult to quantify the contribution of stimulant use in increasing HIV infection rates but, compared with use of other drugs, the preponderance of evidence points towards a positive association between stimulant use, higher-risk sexual and injecting behaviours and HIV infections.\textsuperscript{109, 110}

Outbreaks of HIV among people who use drugs, especially PWID, are a particular concern because HIV can spread very rapidly among PWID when appropriate harm reduction services are not available, discontinued or scaled down.\textsuperscript{111} In 2011, such outbreaks occurred among PWID in Greece (Athens) and Romania, where a significant increase in the number of new HIV cases among PWID was reported to be attributable, in part, to the increased use of stimulants (NPS in Romania and mostly cocaine in Greece, as a replacement for opioids in both cases), which was associated with a higher frequency of injecting and an increase in the sharing of needles and syringes among new and young PWID.\textsuperscript{112, 113}

**Drug-related deaths remain unacceptably high**

**Number of drug-related deaths worldwide remains stable**

In 2014, there were an estimated 207,400 (range: 113,700-250,100) drug-related deaths\textsuperscript{114} worldwide, corresponding to 43.5 (range: 23.8-52.5) deaths per million people aged 15-64. Overdose deaths account for between approximately one third and one half of all drug-related deaths worldwide, and in most cases those overdose deaths involved opioids.\textsuperscript{115, 116}

The highest drug-related mortality rate continues to be in North America, which accounts for approximately one in four (25 per cent of) drug-related deaths worldwide. The high mortality rate in North America is attributable in part to better monitoring and reporting of drug-related deaths and to the comparatively higher rates of opioid use in that subregion. In the United States, nearly half a million people are estimated to have died from drug overdoses since 2004; the country experienced a record number of fatal drug overdoses in 2014, 61 per cent of which were associated with prescription opioids and heroin.\textsuperscript{117}

**Fentanyl-related overdose deaths reported in many countries**

Fentanyl,\textsuperscript{118} a synthetic opioid, has recently been implicated in a significant and increasing number of deaths in a number of countries. Recent concerns have been raised in a number of European countries, especially in Estonia, which has one of the highest drug-related mortality rates in Europe (127 drug-related deaths per million people aged 15-64 in 2013), and where overdoses are mostly associated with the use of fentanyl.\textsuperscript{119, 120} In Canada, during the six-year period 2009-2014 there were at least 655 deaths due to HIV acquired through injecting drug use; suicide; and unintentional deaths and trauma due to drug use.

\textsuperscript{110} Tavitian-Exley and others, “Influence of different drugs on HIV risk in people who inject” (see footnote 100).  
\textsuperscript{111} For the purpose of the present report, harm reduction is understood to refer to the set of the measures defined by WHO, UNODC and UNAIDS to prevent HIV and other blood-borne infections among people who inject drugs (also referred to in the Commission for Narcotic Drugs resolution 56/6) for the provision of comprehensive HIV prevention, treatment and care services among people who inject drugs’. See also the discussion in WHO “Community management of opioid overdose” 2014.  
\textsuperscript{112} EMCDDA, “HIV outbreak among injecting drug users in Greece” (Lisbon, November 2012).  
\textsuperscript{113} Andrei Botescu and others, “HIV/AIDS among injecting drug users in Romania: report of a recent outbreak and initial response policies” (Lisbon, EMCDDA, 2012).  
\textsuperscript{114} The definition of drug-related deaths varies between Member States but includes some or all of the following: fatal drug overdoses;  
Are we underestimating the number of drug-related deaths?

Accurate estimates of the extent and patterns of drug-related deaths are vital for monitoring the most extreme form of harm that can result from drug use and for evaluating the effectiveness of interventions put in place to reduce drug-related mortality.

The definition of drug-related deaths varies from country to country, but could include all, or at least some, of the following: fatal drug overdoses; deaths due to AIDS acquired through injecting drug use; intentional self-poisoning by exposure to psychotropic substances (suicide); and unintentional deaths and trauma (motor vehicle accidents and other forms of accidental death) due to drug use. However, many countries only report overdose deaths. This definition is framed from a health perspective, considering drug-related deaths in the context of the burden of disease. However, a broader perspective could also include deaths resulting from the functioning of illicit drug markets and could include, for example, deaths as a result of violence associated with the illicit supply of and trafficking in drugs.

Ascertaining the cause of death can be complicated in cases where drug use is suspected of playing a part or in the absence of information surrounding the circumstances of the death or the environment in which the death occurred. The process for determining the cause of death may vary from country to country and even within the same country. Depending on the discretion of the certifying physician and the available information about the deceased person’s prior medical history and/or circumstances of death, more comprehensive, investigative procedures, including post-mortem toxicological investigations, may or may not be initiated. Although procedures may be well established for identifying overdose deaths resulting from the use of drugs such as heroin, the process may become complex if multiple drugs are involved, as in many fatal overdose cases. Also, the role of NPS in fatal overdose cases may be more difficult to determine, given the unknown toxicology of many NPS, particularly when they are used in combination with other drugs (including alcohol), in which case the risk of overdose can be higher. Mortality registers often contain a significant number of deaths classified as unknown or ill-defined or cases in which the true underlying cause of death may be miscoded, depending on the coding practices and information available to the responsible physician. Thus, drug-related deaths are likely to be underreported.

Very few studies have attempted to estimate the level of underreporting of drug-related deaths. In France, for example, significant differences were apparent in official numbers from three different institutions with a very low rate of overlapping cases; there was underreporting of approximately a third of the total drug-related deaths. In a study conducted in Italy, using an approach that examined multiple causes of death (the analysis of all conditions reported on the death certificate), it was estimated that there were 60 per cent more drug-related deaths than determined from traditional reporting on a single underlying cause of death.

Deaths in which fentanyl was determined to be the cause or a contributing cause of death, the number of deaths increasing markedly in the four largest provinces. In the United States, there were more than 700 deaths related to fentanyl use between late 2013 and late 2014. One matter of concern is that heroin is often laced with fentanyl before being sold, and so heroin users have no knowledge of having consumed fentanyl. That situation could be exacerbated by the recent increase in heroin use in the United States.

Prisons are a high-risk environment for infectious diseases

Among vulnerable people who use drugs, particularly PWID, imprisonment is a common outcome. According to studies conducted in a large number of countries, between 56 and 90 per cent of PWID have been imprisoned at some stage. Initiation and use of drugs are also reported by many prisons and other closed settings.

According to the limited data made available to UNODC, recent use of drugs (drug use in the previous 12 months) is reported to be around 23 per cent among the prison population, with cannabis use at around 19 per cent and heroin or amphetamine use among approximately 5 per cent. Similarly, a large number of studies in countries throughout the world have found high levels of injecting drug use among both male and female prisoners.

122 2015 National Drug Threat Assessment Summary.
Despite the high-risk environment and the scientific evidence of the effectiveness of interventions for the treatment of drug use disorders, and the prevention and treatment of HIV, hepatitis C and tuberculosis, there are significant gaps in the provision of these services in most prisons throughout the world. Prisons and other closed settings often lack adequate health services, confidentiality and privacy; furthermore, mandatory (non-voluntary) HIV testing remains a common practice.130

The risk of HIV, hepatitis and tuberculosis infection in prisons continues to be a matter of significant concern. In some settings, the burden of HIV among prisoners may be up to 50 times higher than among the general population,126 the incidence of tuberculosis is, on average, 23 times higher than among the general population127 and an estimated two out of every three prisoners with a history of injecting drug use are living with hepatitis C.128

Despite the high-risk environment and the scientific evidence of the effectiveness of interventions for the treatment of drug use disorders, and the prevention and treatment of HIV, hepatitis C and tuberculosis, there are significant gaps in the provision of these services in most prisons throughout the world. Prisons and other closed settings often lack adequate health services, confidentiality and privacy; furthermore, mandatory (non-voluntary) HIV testing remains a common practice.130

Available evidence indicates that drug dependence treatment and harm reduction interventions can be effectively implemented within prisons without compromising security or increasing drug use.131 In a number of countries, however, there are political, legal and regulatory barriers to introducing or expanding those services in prisons. In 2014, opioid substitution therapy was available in prisons in only 43 countries, whereas 80 countries reported the availability of such therapy in the community. The availability of needle and syringe programmes in prisons was reported in only 8 countries, whereas 90 countries reported the availability of such programmes in the community. Most of the above-mentioned 8 countries are in Europe and Central Asia, and such interventions are not available in all prison settings.132

### TABLE 1 Ratio of drug-related mortality rates among ex-prisoners to all-cause mortality rates among the general population

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<tr>
<th>Country or area</th>
<th>Time since release from prison</th>
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<th>United States</th>
<th>Denmark</th>
<th>Switzerland</th>
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Source: WHO, Preventing Overdose Deaths in the Criminal Justice System (Copenhagen, 2014).

Note: The numbers presented are standardized mortality ratios. They express the ratio of deaths from drug-related causes observed among ex-prisoners compared to the number of deaths from all causes that would be expected among people of comparable age and gender in the general population.133

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The period shortly after release from prison is associated with a substantially increased risk of drug-related death (primarily fatal overdose), with a mortality rate much higher than from all causes of death among the general population.133 The first two weeks after release from prison is a period of particular vulnerability, with a risk of drug-related death 3-8 times higher than in the subsequent 10 weeks. Moreover, the drug-related mortality rate after release from prison has been found to be 50-100 times higher than the mortality rate of the general population. According to the very limited data available, female ex-prisoners appear to experience poorer outcomes than male ex-prisoners, and older ex-prisoners experience poorer outcomes than younger ex-prisoners. This may reflect different histories and patterns of drug use depending on the gender and age of ex-prisoners.

126 The Gap Report, 2014 (see footnote 98).
133 WHO, Preventing Overdose Deaths in the Criminal Justice System (Copenhagen, 2014).
The increased risk of drug-related death after release from prison is principally attributable to two causes: first, decreased tolerance to drugs, especially heroin, after a period of relative abstinence that occurs in prison, where drug use may be more infrequent and the purity of drugs lower than outside of prison; and second, the use of multiple drugs after release from prison, particularly the combination of depressants (such as benzodiazepines and alcohol) with heroin, which can considerably increase the risk of fatal overdose.\textsuperscript{135}

C. EXTENT OF DRUG SUPPLY

Over the period 2009-2014, the cultivation of cannabis plants was reported to UNODC by 129 countries, far more than the 49 countries (mostly in Asia and the Americas) that reported opium poppy cultivation and the 7 countries (in the Americas) that reported coca bush cultivation.\textsuperscript{136} According to the latest UNODC estimates, in terms of area, cannabis is also the most extensively grown drug crop,\textsuperscript{137} particularly if wild growth is included.\textsuperscript{138} The extent of, and trends in, cannabis cultivation and production are, however, difficult to assess, given that systematic measurements do not exist.

Despite diverging trends in opium poppy and coca bush cultivation, the production of opium and cocaine has returned to the levels of the late 1990s

Information relating to the area under illicit cultivation is more reliable in the case of coca bush and opium poppy cultivation than in the case of cannabis plant cultivation, as it is largely based on scientifically validated surveys. Although fluctuating, the total area under opium poppy cultivation in 2015 was higher than in 1998 (18 per cent), the year in which the General Assembly held its previous special session dedicated to the world drug problem; and the total area under opium poppy cultivation has increased sharply (by 51 per cent) since 2009 (the year of adoption of the Political Declaration and Plan of Action on International Cooperation towards an Integrated and Balanced Strategy to Counter the World Drug Problem) largely as a result of increased cultivation in Afghanistan. In contrast, the total area under coca bush cultivation has followed a downward trend, falling by 31 per cent since 1998 and by 19 per cent since 2009.

\textsuperscript{135} Preventing Overdose Deaths (see footnote 133).

\textsuperscript{136} Based on reports from countries on the cultivation, eradication and seizure of cannabis, opium poppy and coca plants, the main source of the seizures being domestic drug production.

\textsuperscript{137} World Drug Report 2009 (United Nations publication Sales No. E.09.XI.12).

Strong increase in trafficking in synthetic drugs at the global level

Although there were 234 substances under international control in 2014 (244 in January 2016), seizure data indicate that the bulk of the trafficking involved a far smaller number of substances. Cannabis in its various forms continued to be the most widely trafficked drug in 2014 (as cannabis was seized in 95 per cent of the reporting countries in 2014 and cannabis seizure cases accounted for over half of the 2.2 million drug seizure cases reported to UNODC that year); it was followed by ATS (16 per cent), opioids and coca-related substances (accounting for 12 per cent each).

Global quantities of cannabis, cocaine, heroin and morphine seized almost doubled over the period 1998-2008 but have remained largely stable since then. In contrast, ATS seizures have risen more than seven-fold since 1998, suggesting that growth in drug trafficking has been more in synthetic stimulants than in the usual plant-based drugs. Growth has been particularly strong in the case of methamphetamine seizures and, to a lesser extent, amphetamine seizures. Improvements in precursor control brought the quantities of intercepted “ecstasy” down from the 2008 level to a low in 2011, but recent innovations in the manufacture of “ecstasy” (in particular, the use of pre-precursor chemicals not under international control) can already be seen on the market, as suggested by a doubling of the amounts seized between 2011 and 2014.

Increases in trafficking have been even greater in the group of NPS in recent years. Accounting for 3 per cent of all drug seizure cases in 2014, seizures of NPS are still comparatively small (up from 1 per cent in 2009 and 0.1 per cent in 1998). In terms of the quantity seized, seizures of NPS (excluding plant-based NPS such as kratom (Mitragyna speciosa) rose 15-fold between 1998 and 2014. Ketamine and synthetic cannabinoids have been seized the most; the total quantity of ketamine seized worldwide increased from an annual average of 3 tons in the period 1998-2008 to 10 tons in the period 2009-2014.
CHAPTER I
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In the period 1998-2014, the number of women reported to have been arrested for drug-related offences increased in absolute terms (as did the number of countries providing to UNODC a breakdown of arrests by gender), whereas the proportion of women in drug-related cases, while fluctuating, followed a downward trend, particularly for offences related to drug trafficking.

According to information from 100 countries, during the period 2010-2014, women accounted for around 10 per cent of all cases in which people were brought into formal contact with the criminal justice system for drug-related offences. The proportion was slightly lower for the possession of drugs for personal use (9 per cent) and slightly higher for drug trafficking (11 per cent); however, those proportions are substantially lower than the proportion of women who use drugs (about a third of the total number of people who use drugs).

The proportion of women brought into formal contact with the criminal justice system in drug trafficking cases is clearly above the global average (12 per cent) in Oceania (19 per cent) and in the Americas (15 per cent) and below average in Africa (2 per cent). Data for Asia show a proportion above the global average in East and South-East Asia (13 per cent), while in other Asian subregions the proportion is below the global average (less than 1 per cent in the Near and Middle East and in South Asia). Data for Europe show a below-average proportion of women brought into formal contact with the criminal justice system (10 per cent), with the proportion being above average in Eastern Europe (12 per cent) and below average in Western and Central Europe (9 per cent) and in South-Eastern Europe (6 per cent).

Drug offences, cultivation and gender
Men are more involved than women in drug-related crime

In all countries, more men than women are brought into formal contact with the criminal justice system for possession of drugs for personal use and for trafficking in drugs. In the period 1998-2014, the number of women...
Women in opium poppy cultivation: attitudes, perceptions and practices

While women play only a limited role in drug trafficking in countries in the Near and Middle East (less than 1 per cent), they are involved in the illicit cultivation of drug crops, particularly opium poppy in Afghanistan. As part of the annual opium survey conducted by UNODC and the Government of Afghanistan, in 2015 focus group discussions were held for the first time with women in four northern provinces in order to learn more about their attitudes and participation in opium poppy cultivation and production.

The discussions revealed that women in Afghanistan took part in many of the labour-intensive processes in opium poppy production, such as weeding and clearing fields, as well as lancing and later (indoors) breaking opium poppy capsules, removing and cleaning seeds, preparing opium gum for sale and processing by-products such as oil and soap. Men were mainly involved in ploughing fields, cultivating and, at times, lancing capsules.

In most rural communities in Afghanistan, women were less empowered than men and had only a limited role in decision-making. Decisions about opium poppy cultivation were thus primarily taken by men, although it appeared that women were increasingly being consulted, including about the decision to cultivate opium poppy.

In the absence of access to adequate health-care facilities in rural areas, opium had been used for generations by women in northern Afghanistan as a remedy for the most common ailments among children, such as coughs, colic, aches and pains, restlessness and diarrhoea. Self-medication with opium continued to be a common practice for the treatment of ailments among adults, such as aches and pains, sleeplessness and chest pains, which were probably due to respiratory illnesses. Older women may have been more regular or dependent users of opium, but younger women were becoming increasingly aware that regular opium use could cause dependence and thus tended to rely more on “modern medicines”, when available, for the treatment of common illnesses.

The discussions also revealed that women in Afghanistan were generally aware that opium could produce dependence and that its use for non-medicinal purposes was forbidden by their religion. They were also concerned that the next generation could become dependent on opium, although resolving their economic problems continued to be their main concern. In the absence of economic opportunities or alternatives, women considered that income generated from opium poppy production could be used to pay household expenses, enabling them to buy essentials such as food, as well as furniture, clothes and jewellery, and it enabled families to repay their debts and to pay for their children’s education and marriages. The production of opium poppy not only brought cash income to house holds, but it was also a mainstay in rural areas, as poppy seeds were used to extract oil for cooking and poppy straw was used for fuel in the kitchen, as well as for preparing soap and making poppy tea.

Drug purchases via the “dark net” are gaining in importance

The purchasing of drugs via the Internet, particularly the “dark net”, may have increased in recent years. This trend raises concerns in terms of the potential of the “dark net” to attract new populations of users by facilitating access to drugs in a setting that, although illegal, allows users to avoid direct contact with criminals and law enforcement authorities. As the “dark net” cannot be accessed through traditional web searches, buyers and sellers access it through the “Onion Router” (TOR) to ensure that their identities remain concealed. Products are typically paid for in bitcoins or in other crypto-currencies and are most often delivered via postal services.

A number of successful law enforcement operations worldwide have taken place in recent years to shut down trading platforms on the “dark net”, such as “Silk Road” in October 2013 or “Silk Road 2.0” in November 2014, as part of Operation Onymous, coordinated by the European Police Office (Europol), which also led to the closure of other sites on the “dark net”, including 33 high-profile marketplaces. Law enforcement pressure also prompted some “voluntary” temporary shutdowns, such as “Agora” in August 2015. However, as one marketplace closes, the next most credible marketplace tends to absorb the bulk of the displaced business.139

A global survey140 of more than 100,000 Internet users (three quarters of whom had taken illegal drugs) in 50 countries in late 2014 suggested that the proportion of drug users purchasing drugs via the Internet had increased from 1.2 per cent in 2000 to 4.9 per cent in 2009, 16.4 per cent in 2013 and 25.3 per cent in 2014. The proportion of Internet users making use of the “dark net” for drug purchases had also increased, reaching 6.4 per cent (lifetime) in 2014, including 4.5 per cent (70 per cent of 6.4 per cent) who had purchased drugs over the “dark net” in the previous 12 months (ranging from less than 1 per cent to 18 per cent).

Among “recent” drug users, the proportion rose by more than 25 per cent from 2013 to 2014 (from 4.6 to 5.8 per cent). In the period 2012-2014, the proportion doubled in Australia (from 4.3 to 10.4 per cent) and in the United Kingdom (from 8.0 to 15.1 per cent), and in the period 2013-2014, the proportion also increased among “recent” users in the United States (from 7.7 per cent in 2013 to 9.6 per cent in 2014).

139 Based on the findings of an international conference on joint investigations to combat drug trafficking via the virtual market (“dark net”) in the European Union, Bad Erlach, Austria, 10-12 November 2015.

Survey respondents reported a number of advantages to purchasing drugs on the “dark net”. Some of those advantages were related to the drug products themselves, which were reported to be generally of better quality and more readily available. Other advantages included the fact that the purchaser’s interactions were virtual, thus decreasing the risk to personal safety during transactions, including through the absence of exposure to physical violence; in addition, there was a perceived decrease in the risk of being apprehended by law enforcement authorities.141 This may help explain why, in general, drug users seem ready to pay a premium for drugs purchased via the “dark net”142 and why people who have never previously used drugs may be tempted to purchase them online: the survey showed that around 4 per cent of “dark net” drug users had not used any drugs prior to accessing them through the “dark net”.143 At the same time, 30 per cent of people who purchased drugs via the “dark net” reported having consumed a wider range of drugs than they did before they began purchasing drugs via the “dark net”.

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** FIG. 25 ** Proportion of survey respondents who had purchased drugs on the “dark net”, by country and region, 2014

Data Source: Global Drug Survey 2015 (www.globaldrugsurvey.com).

Note: The figure shows the proportion of people participating in the Global Drug Survey who bought drugs via the “dark net” between November and December 2014. Based on the replies of fewer than 600 respondents. Regional results show the national (and subnational) results weighted by population.

** FIG. 26 ** Drugs purchased on the “dark net”, by type of drug, 2014

Data Source: Global Drug Survey 2015 (www.globaldrugsurvey.com).

Note: Proportion of survey respondents who bought each drug on the “dark net” among participants in the Global Drug Survey between November and December 2014.
**D. MARKET ANALYSIS BY DRUG TYPE**

**OPIATES**

**Key figures**

**Opiate market developments**

Special conditions led to a 38 per cent decline in global production of opium in 2015.

The main areas of opiate production are in three subregions. Countries in South-West Asia (mostly Afghanistan) supply markets in neighbouring countries and in countries in Europe, the Near and Middle East, Africa and South Asia, with small proportions going to East and South-East Asia, North America and Oceania. Countries in South-East Asia (mostly Myanmar and, to a lesser extent, the Lao People’s Democratic Republic) supply markets in East and South-East Asia and in Oceania, with smaller proportions going to South Asia. Countries in Latin America (mostly Mexico, Colombia and Guatemala), supply markets in countries in North America (except Canada, which is predominantly supplied by opiates originating in Afghanistan) and the more limited markets in South America. In addition, in a number of countries, important quantities of opium poppy are cultivated for the domestic market (for example, in India). Thus, opium is illicitly produced in nearly 50 countries worldwide.

In 2015, the total area under opium poppy cultivation worldwide decreased by 11 per cent from the level of the previous year, to around 281,000 hectares (ha); that decline is primarily a reflection of a drop in cultivation reported by Afghanistan (-19 per cent), although, at 183,000 ha, Afghanistan still accounted for almost two thirds of the total area under illicit opium cultivation. Myanmar accounted for 20 per cent (55,500 ha) of the total, Mexico accounted for 9 per cent and the Lao People’s Democratic Republic for 2 per cent.

Global opium production in 2015 fell by 38 per cent from the previous year, to some 4,770 tons (i.e. to the level of the late 1990s). The decrease was primarily the result of a decline in opium production in Afghanistan (-48 per cent), mainly attributable to poor yields in the country’s southern provinces.

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Note: Opioids include the non-medical use of prescription opioids and opiates (opiates include opium and heroin).
First results of the opium poppy cultivation survey in Mexico, 2014-2015

In the period 2014-2015, the Government of Mexico, with support from UNODC, conducted the first joint opium poppy survey in Mexico. The areas under opium poppy cultivation, estimated to have amounted to up to 28,100 ha, are mostly located in the mountainous areas of the western part of the country. It should be noted, however, that the new figures for Mexico, for methodological reasons, are not comparable with those published previously.

The project so far has not been able to produce estimates of opium production. For the purpose of the present report, yield estimates established from data provided by the United States for the years 2001, 2002 and 2003 were used to produce estimates of opium production. The figure for opium production will be adjusted once new yield data become available from the crop monitoring project and an appropriate methodology for opium production estimates has been developed.

Nonetheless, Afghanistan remains the world’s largest opium producer, accounting for some 70 per cent (3,300 tons) of global opium production; it is followed by Myanmar, accounting for 14 per cent (650 tons) of global production. Opium production in Latin America more than doubled over the period 1998-2014, reaching some 500 tons and accounting for almost 11 per cent of the estimated global opium production in 2015.

After deducting the estimated quantities of opium consumed from the 4,770 tons of opium produced in 2015, potential heroin manufacture from the 2015 global opium poppy harvest can be estimated at 327 tons of heroin (of export purity). As demand does not generally change rapidly and the data on heroin seizures suggest a somewhat steady supply (see the discussion in this section), it is likely that the supply of heroin to the market remained significantly higher than the latter. Following the 1998 special session of the General Assembly, data also indicate a significant increase in the global interception rate for opiates, which more than doubled between the periods 1990-1997 and 2009-2014.

Global opiate market appears to be stable despite important regional changes

UNODC estimates suggest that the global number of users of opiates (i.e. opium, morphine and heroin) has changed little in recent years and that opiate use continued to affect some 0.4 per cent of the global population aged 15-64, or the equivalent of some 17 million people, in 2014. Although there continue to be large data gaps that may mask changes, the prevalence of the use of opiates has not changed in more than a decade, and it continues to be relatively high in West Asia (0.9 per cent), Central Asia (0.8 per cent), Europe (0.56 per cent) and North America (0.5 per cent).

There are indications of a recent increase in heroin use in some markets in Western and Central Europe, suggesting that the long-term downward trend in heroin use may have come to an end. In fact, heroin use has been stable or declining in Western and Central Europe since the late 1990s. This can be seen, inter alia, in household survey data, even though they only cover a certain proportion of all heroin users. Recently, however, some increases in large-scale seizure cases and rising heroin purity indicate that
supply may have increased. In at least one major European heroin market (the United Kingdom), heroin-related deaths also increased markedly between 2012 and 2014. In addition, estimates of problem opiate users in France showed a marked increase in recent years. Moreover, heroin prevalence rates in Italy, based on household surveys, showed a significant increase between 2008 and 2014.

In North America, heroin use has been on the increase for some time; a development reflected in national household surveys and in the number of heroin-related deaths. Based on perceived trends reported to UNODC, the use of opioids has also increased in Africa.

Opiate use in Asia, however, is reported to have remained largely unchanged over the period 1998-2014, whereas opiate use in Oceania declined. The decline in opiate use in Oceania largely reflects changes in Australia, the largest opiate market in the region, where prevalence of past-year

Increasing heroin use among 15-year-old boys in Italy

There are signs that heroin use may be on the increase among young people in Italy. According to the latest youth survey on drug use (2015), the use of heroin among 15-year-old boys doubled to 2 per cent in 2015, although there was a slight decrease (from 1.3 per cent in 2014 to 1 per cent in 2015) in the rate among 15-19 year olds of both sexes. The Italian health authorities have also reported an increase in treatment admissions related to heroin use.

The use of cannabis and stimulants increased slightly, while the use of cocaine and hallucinogens decreased in 2015. Around 1.4 per cent of males and 0.6 per cent of females had injected drugs in the past year.

heroin use declined from a peak of 0.8 per cent in 1998 to 0.2 per cent in 2001 (following a “heroin drought” induced by intensified law enforcement activity) before falling further to 0.1 per cent by 2013, more than offsetting increases in the non-medical use of synthetic opioids.

West Asia and, to a lesser extent, Europe continue to dominate opiate seizures

In 2014, the largest quantities of opiates were seized in South-West Asia, followed by Europe. At the country level, the Islamic Republic of Iran reported the largest opiate seizures worldwide in 2014, accounting for 75 per cent of global opium seizures, 61 per cent of global morphine seizures and 17 per cent of global heroin seizures. The next largest heroin seizures were reported by Turkey (accounting for 16 per cent of global heroin seizures), China (12 per cent), Pakistan (9 per cent), Kenya (7 per cent), the United States (7 per cent), Afghanistan (5 per cent) and the Russian Federation (3 per cent).

Seizure data, though they reflect the priorities and resources of law enforcement, also suggest an increase in the smuggling of opiates from the “Golden Triangle”, in South-East Asia, to illicit markets in that subregion, as well as an increase in the smuggling of heroin from illicit opium poppy cultivation areas in Latin America to the United States since 2007. Seizures involving Afghan opiates account for some 80 per cent of global seizures of opiates. Partly as a consequence of decreasing opiate seizures in Afghanistan, increases in opiate seizures have been reported in recent years in the countries of the so-called “Balkan route” (through Iran (Islamic Republic of) and Turkey via South-Eastern Europe to Western and Central Europe), the so-called “northern route” (through Central Asia to the Russian Federation) and the so-called “southern route” (southwards to the Gulf region, South Asia and Africa). Nonetheless, seizure data suggest that the Balkan route, which accounts for almost half of all heroin and morphine seizures worldwide, continues to be the world’s most important opiate trafficking route.

The Balkan route is the most important conduit for heroin trafficking

A recent UNODC study on opiate trafficking on the Balkan route suggests that the majority of the opiates leaving Afghanistan over the period 2009-2012 were smuggled on the Balkan route (i.e. through Iran (Islamic Republic of) and Turkey via South-Eastern Europe to Western and Central Europe). Seizures of heroin and morphine on the Balkan route amounted to some 48 tons in 2014, up from 36 tons in 2012, but down from a peak of 66 tons in 2009. While the Balkan route is the main heroin trafficking route leading to Western and Central Europe, not all of the heroin smuggled to that subregion arrives via that trafficking route. The authorities of the United Kingdom, for example, reported that, although most of the heroin entering that country continues to be smuggled on the Balkan route towards the Netherlands and France before being shipped into the United Kingdom, significant amounts of heroin also enter the United Kingdom each year on direct flights from Pakistan. Similarly, Belgium and Italy reported that important quantities of heroin had been trafficked via the southern route in recent years.

The southern route has grown in importance

Changes in seizures, supported by intelligence reports, suggest that the smuggling of Afghan opiates via the southern route (i.e. leaving Pakistan or the Islamic Republic of Iran by sea for shipment to the Gulf region, South Asia and Africa)
particularly Eastern Africa), South Asia and, to a lesser extent, South-East Asia, Oceania and North America) have increased in recent years.\(^\text{149}\)

The main southern route countries are in Asia, the Gulf area and neighbouring countries in the Near and Middle East and in Africa. Average annual heroin and morphine seizures reported by southern route countries rose by more than 80 per cent, to 3.6 tons per year, between the periods 1998-2008 and 2009-2014. The increase was primarily due to a sixfold increase in seizures reported in Africa (mostly in East Africa). The amount of opiates seized on the southern route was smaller than that reported on the Balkan route but, at 9 tons of heroin and morphine, exceeded the amount seized on the northern route in 2014. Given the limited capacity of law enforcement in many of the countries on the southern route, the actual importance of trafficking on this route may be greater than suggested by the amount seized.

**Trafficking on the northern route has started to recover from the decline in the period 2004-2012**

The northern route leaves Afghanistan for neighbouring countries in Central Asia, the Russian Federation and other members of the Commonwealth of Independent States. Traditionally, the northern route was mainly supplied by opium produced in the north-eastern and northern provinces of Afghanistan, although over the past decade the route has also been supplied by opium produced in southern Afghanistan. Following strong increases in trafficking over the period 1998-2004, in line with major increases in opium production in northern parts of Afghanistan, seizures declined between 2004 and 2012, in parallel with declines in opium production, before starting to recover in the subsequent years, reaching 6.3 tons in 2014, having returned to the level reported in 2009.

**Trafficking in opiates from the Golden Triangle is on the increase**

Partly as a result of changes in opium production in Myanmar, seizures of opiates (mainly heroin) leaving the area known as the Golden Triangle have picked up since 2008, following decreases between 2001 and 2008. The quantities of seized heroin and morphine increased from a low of 5.7 tons in 2008 to 13 tons in 2014.

Not all of the opiates seized in South-East Asia and Oceania originated in Myanmar. In the responses to the annual report questionnaire submitted by countries in South-East Asia and Oceania, Afghanistan and Pakistan accounted for 27 per cent of all the countries mentioned as countries of origin or departure of seized opiates in the period 2009-2014, although that proportion fell to 11 per cent in 2014.

Data provided by China suggest that by 2010, the proportion of heroin smuggled into the country from South-East Asia may have fallen to around 70 per cent while the proportion of heroin from Afghanistan increased to nearly 30 per cent.\(^\text{150}\) By 2013, the proportion of heroin from

\(^{149}\) UNODC, *Afghan Opiate Trafficking through the Southern Route* (Vienna, June 2015).

\(^{150}\) China, National Narcotics Control Commission, *Annual Report on Drug Control in China 2011* and previous years; UNODC.
Afghanistan had fallen to 10 per cent, and by 2014, Afghanistan was no longer mentioned among the key source countries of shipments of opiates to China; the “new” main source countries for heroin shipments were Myanmar, followed by the Lao People’s Democratic Republic and Viet Nam. Based on the forensic analysis of seizures, a similar trend was reported by Australia. Traditionally, almost all of the heroin found in Australia originated in South-East Asia. Heroin originating in South-East Asia accounted for 79 per cent of the total in 2005, but that proportion fell to just 26 per cent in 2008 before recovering in subsequent years to 72 per cent of the total over the period January-June 2014.151

Heroin trafficking in the Americas continues to increase

Heroin and morphine seizures in the Americas rose from an average of 4 tons per year over the period 1998-2008 to 7 tons per year over the period 2009-2014 (8 tons in 2014). In parallel, opium production reported in Latin America doubled, from an average of 151 tons per year over the period 1998-2008 to 309 tons per year over the period 2009-2014.

Given the volatile nature of opium production, what is happening in the heroin market?

More than 70 per cent of all heroin and morphine seizures in the Americas over the period 2009-2014 were made in the United States, where such seizures more than doubled from an average of around 2 tons per year over the period 1998-2008 to 5 tons per year over the period 2009-2014 (6 tons in 2014). Heroin trafficking and use emerged in 2015 as the main national drug-related threat for law enforcement agencies in the United States (increasing in perception as the main threat from 8 per cent of all drug threats in 2007 to 33 per cent in 2015).152

Transnational Organized Crime in East Asia and the Pacific: A Threat Assessment (2013); and Afghan Opiate Trafficking.
be correct but per capita use changes in line with availability. The third hypothesis is that stockpiling of inventories smoothes year-on-year variations in production. While the first two hypotheses basically assume that the consumption of opiates reacts to year-on-year changes in supply, the third hypothesis suggests that the short-term adjustments are in the form of changes in inventories held along the supply chain.

Hypothesis 1. The number of opiate users changes regularly in line with the availability of opium

There are important margins of error around the estimates of opiate users, which do not exclude the possibility that some adjustments to short-term supply changes may take place but remain unnoticed in estimates of opiate users. UNODC estimates are based on a limited number of reporting countries, most of them in Europe, the Americas and Oceania, with very poor reporting in Africa and only limited reporting in Asia. This is a problem, as only indirect indicators (such as registered drug users or law enforcement data) are available, while there are no regularly monitored prevalence data for some of the potentially large opiate markets in countries in Asia (notably China and India). Prevalence rates for most emerging opiate markets in Africa do not exist, and estimates are based on extrapolations from only a few countries.

However, a distinction should be made between data limitations concerning the ability to peg the level correctly (which is an issue) and limitations concerning the ability to detect short-term trends in consumption. Increases in supply could prompt traffickers to expand the opiate market, selling opiates to new groups of users in new markets, although such a development would probably be reflected in opiate seizures. It is even more difficult to imagine, given the highly addictive nature of opiates, that millions of users would give up consuming opiates within a year if the supply were to be reduced — and that none of this would be noticed.

UNODC also received data on perceived trends from a far larger number of countries over the period 1998-2014. Transforming the answers into a simple index reveals a largely stable level of opium use over the period 1998-2014 and suggests that after some initial increases over the period 1998-2008, heroin use may have stabilized over the period 2009-2014. Moreover, these data do not indicate any sharp upward or downward year-on-year movement and are broadly in line with estimates of opiate use (and trends in heroin seizures).

Hypothesis 2. Opiate users react to changes in supply by increasing or decreasing per capita consumption levels

Opiate users may adjust their consumption patterns to the availability of opiates available for consumption. Increases in supply could prompt traffickers to expand the opiate market, selling opiates to new groups of users in new markets, although such a development would probably be reflected in opiate seizures. It is even more difficult to imagine, given the highly addictive nature of opiates, that millions of users would give up consuming opiates within a year if the supply were to be reduced — and that none of this would be noticed.

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Hypothesis 8. Opiate users react to changes in supply by increasing or decreasing per capita consumption levels

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UNODC also received data on perceived trends from a far larger number of countries over the period 1998-2014. Transforming the answers into a simple index reveals a largely stable level of opium use over the period 1998-2014 and suggests that after some initial increases over the period 1998-2008, heroin use may have stabilized over the period 2009-2014. Moreover, these data do not indicate any sharp upward or downward year-on-year movement and are broadly in line with estimates of opiate use (and trends in heroin seizures).
over the period 1998-2015, and by more than 50 per cent four times. Increases of such magnitude in supply would most likely have resulted in strong increases in opiate purity levels and, as a consequence, in increasing drug-related deaths in specific years, but there is no evidence of this. Even taking into consideration that the capacity of the human body to adjust may be rather strong, dramatic increases in opiate consumption would still lead to an increase in drug-related deaths.

Similarly, massive declines in per capita opiate consumption would have been noticed. On four occasions, the amount of opiates available for consumption fell by more than 30 per cent compared with the previous year. It could be argued that in many developed countries substitution treatment therapy could result in a shift from using illegal heroin to using legally available opioids. However, such short-term shifts into substitution treatment would probably have been recorded. Moreover, once they are in substitution treatment, the majority of clients do not quickly shift back to using heroin once heroin becomes available again. In addition, there have not been reports from key consumer countries of any drastic year-on-year changes in heroin prices or purity levels in recent years that could have prompted such reaction patterns. Similarly, heroin seizures, which should reflect such changes, followed a rather smooth trend over the period 1998-2014.

Hypothesis 3. Inventory levels buffer fluctuating supply from one-year shifts in opium production

Finally, there is the possibility that not all of the opium produced in a given year is actually consumed and that inventories change accordingly. Such inventories are common in all types of trade, with stored wholesale material used to top up irregular supply to help satisfy stable demand. In addition, opium is known to store well for several years and opium stocks may be accumulated as a financial reserve and for speculation purposes.\(^{154}\)

Several UNODC and World Bank studies have indicated the existence of opium inventories in Afghanistan, and a number of opium price changes in Afghanistan since 1998 can only be explained once such inventories have been considered.\(^{155}\) Their existence became most obvious in 2001, when an opium ban was enforced in Taliban-controlled territory, resulting in a massive decline in opium production in Afghanistan and a decline of 65 per cent in global opium production. Global consumption, however, did not decline by such a large percentage and the total quantity of heroin seized worldwide did not decrease. Even a year later, in 2002, heroin seizures declined by only 11 per cent before recovering again in 2003. All of this can only be explained by the previous build-up of large opium stocks in Afghanistan that were subsequently used to guarantee the supply of heroin to the consumer markets. Thus, heroin seizures do not change much from year to year, even though global opium production is highly volatile.

There is a rather strong correlation between the quantity of heroin seized and the number of opiate users (\(r = 0.82\) over the period 1998-2014), suggesting a common underlying factor (supply). There is also a positive correlation between the production of opium and the quantity of opium seized (\(r = 0.63\)). The correlation between opium production and heroin seizures, however, is weak (\(r = 0.45\)), although it improves once opium production is correlated with heroin seizures made the following year (\(r = 0.59\)), which tallies with reports that it often takes a year (or more) until opium, transformed into heroin, reaches the main consumer markets. There is, however, a strong correlation between a four-year average of opium production and the quantity of heroin seized a year later (\(r = 0.81\)).


Inventories need not be held by one individual or organization; they can be dispersed among a large number of players, including opium poppy growers, laboratory owners, small-, medium- and large-scale opium traffickers (both in and outside the opium-producing countries) or local warlords. There is no recent information about possible inventories about opium in Afghanistan. However, a UNODC and World Bank study in 2005 suggested that, when they had inventories, opium poppy growers (of whom there are several hundred thousand in Afghanistan) typically held in stock 2-10 kg of opium as a financial reserve, accumulated over several years. The study also suggested that some 40 per cent of opium purchases were kept as inventory for sale until the next harvest and that large-scale traffickers, purchasing 2 tons of opium per year, may have built up a total long-term stock of opium of at least 1 ton over the previous 4-5 years.  

**FIG. 40** Model of opiates available for consumption, opiate consumption and changes in inventories, 1998-2015

![Graph showing opiates available for consumption](image)

Source: Calculations based on UNODC opium surveys and responses to the annual report questionnaire.

Note: A conversion ratio of 10 kg of opium for 1 kg of morphine or heroin was assumed. Estimates for 2015 are preliminary; seizure data from 2014 were used as a proxy for seizures in 2015, and consumption estimates for 2014 were used as a proxy for consumption in 2015. For details of the calculation methods, see the online methodology section of the present report.

All of this suggests that there may be a constant supply of heroin reaching the market, irrespective of the opium harvest in a given year. Given the durability of opium, which lasts several years, it is possible that most inventories are in the form of opium, rather than morphine or heroin. Large individual seizures of opium, rather than of heroin or morphine, also point in that direction.

Differences in opium available for consumption, in the model represented in figure 40, suggest either a build-up or a depletion of inventories in specific years.

Holding such quantities in inventory would seem to be feasible because opium is so compact. Its volume and weight are relatively small compared with those of conventional goods. Global opium production amounted to, on average, some 5,800 tons per year over the period 2009-2015 (range: 4,730-7,720 tons). This is equivalent to an average of 233 containers (range: 189-309 containers), given that a 20-foot dry general-purpose container has a capacity of around 25 tons. As the largest modern container ships can hold more than 19,000 containers, storing all the opium produced in the world in a single year would require only 1.2 per cent of the capacity of one such ship (1.0-1.6 per cent in the period 2009-2015).

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156 *Afghanistan’s Drug Industry*, pp. 86-87 (see previous footnote).
COCAINEN

Key figures

Global cultivation
change from previous year

Global seizures
stable

Global production
change from previous year

Global number of users

Note: Cocaine seizures are mostly of cocaine hydrochloride (of varying purity), but also include other cocaine products (paste, base and “crack”).

Cocaine market developments

Strong decline in coca bush cultivation since 1998

Although global coca bush cultivation in 2014 increased by 10 per cent compared with the previous year, the total area under coca bush cultivation worldwide, 132,300 ha, was the second smallest since the late 1980s. Global coca bush cultivation in 2014 was 19 per cent lower than in 2009, 40 per cent lower than the peak level in 2000 and 31 per cent lower than in 1998.157

Of the three main countries cultivating coca bush, Colombia has shown the strongest decrease in the total area under coca bush cultivation (~58 per cent) since the peak of 2000; that decline was initially related to widespread aerial spraying, followed by manual eradication and, after 2007, by increased alternative development efforts. However, 2014 saw a strong increase (of 44 per cent) in the total area under coca bush cultivation in Colombia, price increase and expectations among farmers that they might benefit more from alternative development if they were growing coca bush during the peace negotiations.158 There are also indications that the new upward trend in coca bush cultivation in Colombia continued into 2015. In 2014, the total area under coca bush cultivation in Colombia amounted to 69,000 ha, accounting for 52 per cent of global coca bush cultivation.

Linked to the interruption of the so-called “air bridge”, which transported coca paste or base from growing areas in Peru to cocaine-processing laboratories in Colombia, and thus falling coca prices, coca bush cultivation in Peru declined in the 1990s. Coca bush cultivation in Peru, however, rose by 44 per cent between 2000 and 2011, as the use of the “air bridge” strategy was brought to an end and coca prices subsequently increased. Over the period 2011-2014, the total area under coca bush cultivation in Peru decreased once more (by 31 per cent). It is now, at 42,900 ha (accounting for 32 per cent of global coca bush cultivation), back to its 2000 level. The latest decrease can be linked to achievements in alternative development, as well as intensified eradication efforts.

157 The same patterns are found when the comparisons are based on an average of several years. The average annual area under coca bush cultivation fell by 12 per cent when comparing the periods 1990-1997 and 1998-2008 and by 19 per cent when comparing the periods 1998-2008 and 2009-2014.

In the Plurinational State of Bolivia, the total area under coca bush cultivation decreased in the late 1990s as a result of increased government interventions, including in the form of alternative development (Plan Dignidad), which was able to count on strong external assistance. However, the total area under cultivation doubled between 2000 and 2010 before falling again (by 34 per cent) in the period 2010-2014. The latest decline was linked to alternative development efforts (done with very limited external assistance)\textsuperscript{159} as well as strong social pressure placed on coca bush growers by the authorities and unions to limit coca bush cultivation to 1 cato (0.16 ha) per family. The total area under coca bush cultivation in the country in 2014 (20,400 ha, or 15 per cent of the world total) was less than half the total area under such cultivation in the period 1990-1997, but still 40 per cent larger than in 2000.

Global production of cocaine (expressed at a purity of 100 per cent) can be estimated for 2014 at 746 tons (using the “old” conversion ratio) and 943 tons (using the “new” conversion ratio); those values are slightly higher than in the previous year but still 24-27 per cent lower than the peak in 2007, and thus back to the levels reported in the late 1990s. There are, however, indications that the overall upward trend observed in 2014 continued into 2015.

Data suggest that the global cocaine interception rate, based on cocaine production estimates and quantities of cocaine seized, reached a level of between 43 and 68 per cent in 2014.

Most of the increases in the global cocaine interception rate occurred after 1998, when the General Assembly held its twentieth special session, dedicated to countering the world drug problem together. The global cocaine interception rate almost doubled between the periods 1990-1997 and 2009-2014.

Cocaine continues to be trafficked primarily from South America to North America and Western and Central Europe

A total of 153 countries reported cocaine seizures over the period 2009-2014. Most of the cocaine trafficking, however, continues to be from the Andean subregion to North America and Europe. The bulk of the cocaine seizures in 2014 occurred in the Americas, which accounted for 90% of the total.
per cent of global cocaine seizures (in particular, in South America (60 per cent)). Cocaine seizures in Western and Central Europe accounted for 9 per cent of global cocaine seizures.

Stabilization of cocaine trafficking in South America

The total quantity of cocaine seized more than doubled in South America over the period 1998-2014 (reaching 392 tons in 2014), although recent data suggest a levelling off. In the period 2009-2014, Colombia accounted for 56 per cent of all the cocaine seizures in South America (and more than a third of global cocaine seizures); it was followed by Ecuador (accounting for 10 per cent of total cocaine seizures in South America), Brazil (about 7 per cent), the Plurinational State of Bolivia (about 7 per cent), Peru (about 7 per cent) and the Bolivarian Republic of Venezuela (6 per cent). The increase in cocaine seizures between the periods 1998-2008 and 2009-2014 was particularly pronounced in Ecuador, where the increase was linked to intensified law enforcement activity. In Brazil, the increase in the quantity of cocaine seized was attributable to a combination of improved law enforcement efforts, the growing domestic market for cocaine and increasing cocaine shipments to overseas markets.

North American cocaine largely stable after a decline in recent years

North America has been the world’s largest cocaine market for years. Given the falling cocaine production in Colombia and the increased violence linked to the drug cartels in Mexico,\textsuperscript{160} the supply of cocaine to Canada and the United States has declined. That has raised the purity-adjusted price of cocaine and prompted a decline in consumption. In the United States, the prevalence of past-year cocaine use among the general population fell by 32 per cent between 2006 and 2014, while cocaine-related deaths decreased by 34 per cent between 2006 and 2013 (the latest year for which data are available), treatment admissions related to cocaine use fell by 54 per cent between 2006 and 2012 (the latest year for which data are available)\textsuperscript{161} and a decrease was also reported in cocaine-positive urine tests among the general workforce, by 66 per cent over the period 2006-2014. Cocaine seizures in North America fell by some 50 per cent, to 100 tons, in the same period.

The largest cocaine seizures in North America over the period 2009-2014 were reported by the United States (accounting for 90 per cent of the seizures in North America), Mexico (8 per cent) and Canada (2 per cent). The United States accounted for 15 per cent of global cocaine seizures in North America (60 per cent). Cocaine seizures in Western and Central Europe accounted for 9 per cent of global cocaine seizures.

North America and dark web markets

In the period 2009-2014, the amount of cocaine seized in North America was about 400 tons (accounting for 90 per cent of the seizures in North America). That has been attributed to a combination of improved law enforcement efforts, the growing domestic market for cocaine and increasing cocaine shipments to overseas markets.

According to the Cocaine Signature Program of DEA\textsuperscript{162} more than 90 per cent of the cocaine trafficked to North America originates in Colombia. Cocaine is often smugg-
uled by boat or semi-submersible directly to Mexico or via Central America to Mexico and then by land to the United States and Canada. Organized criminal groups based in Mexico continue to dominate the transportation of cocaine across the border into the United States, as well as the large-scale transportation of cocaine in the United States, supplying local organized criminal groups. Although the volume of cocaine has been declining, United States estimates for 2014 suggest that 87% per cent of the cocaine continues to be transported through the Central American-Mexican corridor, while around 13% per cent of the cocaine reaching the United States over the period 2009-2014.

The prevalence of cocaine use in the European Union member States appears to have declined from a peak in 2007 and is now rather stable, at a level of about 1 per cent of the population aged 15-64. However, this masks trends and patterns at the subregional and national levels; in particular, prevalence of cocaine use tends to be above average in several Western European countries and lower in the rest of Europe, and several countries with high prevalence of cocaine use showed a decrease while some smaller countries with low prevalence showed an increase.

**European cocaine market is now stagnating**

In line with reports of massive increases in the European cocaine market, cocaine seizures in Europe quadrupled between 1998 and 2006, reaching some 120 tons, before falling to 62 tons in 2014. Member States of the European Union accounted for 98% per cent of the total amount of cocaine intercepted in Europe over the period 2009-2014.

The prevalence of cocaine use in the European Union member States appears to have declined from a peak in 2007 and is now rather stable, at a level of about 1 per cent of the population aged 15-64. However, this masks trends and patterns at the subregional and national levels; in particular, prevalence of cocaine use tends to be above average in several Western European countries and lower in the rest of Europe, and several countries with high prevalence of cocaine use showed a decrease while some smaller countries with low prevalence showed an increase.

**FIG. 45 :** Quantities of cocaine seized in Europe and prevalence of past-year cocaine use in European Union member States, 1998-2014

Source: Responses to the annual report questionnaire and data from EMCDDA.

163 Ibid., pp. 55-63.

**FIG. 46 :** Benzoylcegonine (a cocaine metabolite) found in wastewater in 67 European cities: averages and ranges, 2011-2014

Source: Sewage Analysis CORe group Europe (SCORE).

Note: (a) The cities were in the following countries: Belgium, Bosnia and Herzegovina, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Serbia, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. The analysis in each city was based on the amounts of benzoylcegonine identified in the wastewater over a 7-day period and was weighted by the population of the wastewater catchment area. (b) The population-weighted average of 11 cities reporting each year in the wastewater catchment area were located in Belgium, Croatia, France, Italy, Netherlands, Norway and Spain were located.

Analysis of benzoylcegonine, a cocaine metabolite, in waste-water, based on information from 67 cities located in 20 countries in Western, Central and South-Eastern Europe, indicates marked differences across cities in terms of cocaine consumption and trends, but also indicates overall stable cocaine consumption levels over the period 2011-2014.164

Of the main coca-producing countries, the main country of origin or departure for cocaine shipments to Europe continues to be Colombia (mentioned in 42 per cent of responses by European countries in the annual report questionnaire over the period 2009-2014), followed Peru (31 per cent) and the Plurinational State of Bolivia. The importance of Colombian cocaine in Europe, however, has been declining compared with the situation during the period 1998-2008.

The most frequently mentioned non-European countries of departure for cocaine shipments over the period 2009-2014 were Brazil, followed by Colombia, Ecuador, the Dominican Republic, Argentina and Costa Rica. Countries in Africa (mostly in West Africa) were mentioned as
Cocaine trafficking via Africa may be regaining importance

Cocaine seizures in Africa increased from 0.8 ton in 1998 to 5.5 tons in 2007, reflecting the rapidly growing importance of West Africa as a transit area. In 2014, cocaine seizures in Africa fell to 1.9 tons. Given the limited law enforcement capacity, the decline in seizures in 2014 does not necessarily reflect a decline in cocaine trafficking in Africa, though the decline went in parallel with fewer reports from Europe indicating that Africa had been used as a transit area. In the meantime, the situation may have changed again: over the period December 2014-March 2016, at least 22 tons of cocaine were seized en route from South America via West Africa to Europe, although most of those seizures took place outside Africa.165

Over the period 2009-2014, the proportion of the total cocaine seizures in Africa accounted for by West Africa rose to 78 per cent; North Africa accounted for 11 per cent of the cocaine seizures made in Africa. The largest quantity of cocaine seized was reported by Cabo Verde, followed by the Gambia, Nigeria and Ghana.

Africa is often supplied with cocaine departing from Brazil (accounting for 51 per cent of all mentions of South American countries in responses to the annual report questionnaire by African countries over the period 2009-2014), Colombia (18 per cent), Peru (13 per cent) and Chile (9 per cent). The African country most frequently mentioned (by other African countries) as countries of departure or transit countries for shipments of cocaine within Africa was Nigeria, followed by Ghana, Mali and Guinea.

The main countries of final destination for cocaine trafficked to Africa are in Europe (accounting for 56 per cent of all mentions; notably Italy, Spain, France, the United Kingdom and the Netherlands), Africa (26 per cent), North America (notably the United States (12 per cent)) and Asia (3 per cent, notably China and Malaysia). Most of the cocaine shipments transiting Africa left the region by air. In recent years, of the cocaine shipments leaving non-European transit countries in 10 per cent of responses to the annual report questionnaire over the period 2009-2014. The main points of entry in Europe were the countries of the Iberian peninsula, notably Spain, followed by the Netherlands and Belgium.

Signs of increased smuggling of cocaine to Asia

Cocaine seizures in Asia tripled from an average of 0.4 ton over the period 1998-2008 to 1.5 tons per year over the period 2009-2014, in line with indications that cocaine consumption among the upper classes in several of the more developed Asian countries has started to rise.

Most of the cocaine seizures in Asia over the period 2009-2014 were made in East and South-East Asia (59 per cent) and in the Middle East (39 per cent). In 2014, however, the share of cocaine seizures in the Middle East rose to 49 per cent.

The most frequently mentioned Latin American countries of origin, departure and transit for cocaine shipments to Asia in the period 2009-2014 were Brazil, followed by Colombia, Peru, the Plurinational State of Bolivia, Argentina and Mexico. The African countries used as trans-shipment areas were mainly Nigeria and South Africa, and the countries of departure and transit countries in Asia were mostly in the Middle East (United Arab Emirates, followed by Jordan and Lebanon) and in South Asia and South-East Asia (Thailand, followed by Malaysia, Philippines and India). The most frequently mentioned final destination in Asia was Israel, followed by China.

Rapid growth in the cocaine market in Oceania over the past decade

Cocaine seizures in Oceania more than doubled, from an annual average of 0.5 ton over the period 1998-2008 to 1.2 tons over the period 2009-2014, with Australia accounting for 99 per cent of total cocaine seizures in the region from 1998 to 2014. The increase is in line with reports of rapidly growing prevalence of cocaine use: the prevalence of past-year cocaine use among the general population (aged 14 and older) in Australia doubled from 1 per cent in 2004 to 2.1 per cent in 2010 and remained stable at this level in 2013.

Is the global cocaine market shrinking?

Estimated global coca bush cultivation fell by more than 30 per cent over the period 1998-2014 — by 40 per cent after 2000, when it reached its peak. The decline was far less pronounced in the case of estimated cocaine production, reflecting improvements in yields and in laboratory efficiency in the Andean subregion. Cocaine production decreased by 10 per cent between 1998 and 2014, according to calculations based on the “old” conversion ratio (available for both years), but comparison of the estimates based on the “new” conversion ratio for 2014 with the 1998 estimate (based on the assumption that the “old”

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165 The UNODC Regional Office for West and Central Africa reported the following in February 2016: in two operations close to Cabo Verde in 2015, the Spanish authorities seized some 3 tons of cocaine; in March 2015, the Bolivian authorities arrested two West Africans and seized 5.9 tons of cocaine en route to countries in West Africa (mainly Ghana and Burkina Faso); at the beginning of 2016, more than 1.4 tons of cocaine were seized in Mauritania; in January 2016, the Bolivian authorities reported the seizure of 8 tons of cocaine (concealed among 80 tons of barium sulphate), destined for West Africa (Côte d’Ivoire), that had been shipped via Argentina and Uruguay; and in 2015 shipments of less than a ton of cocaine – mostly departing from Brazil and organized by Nigerian criminal groups – were seized in Benin (almost 0.3 ton), the Gambia (0.2 ton) and Guinea (81 kg).
conversion ratio may have still been correct in 1998) indicates a small increase in cocaine production (some 14 per cent between 1998 and 2014).

The deduction of purity-adjusted seizures from cocaine production shows a reduction in cocaine available for consumption over time, irrespective of whether estimates are based on the “old” or the “new” cocaine conversion ratio.

At the same time, global prevalence of past-year cocaine use among the population aged 15-64 remained largely stable over the period 1998-2014, fluctuating between 0.3 and 0.4 per cent, while the number of cocaine users increased (by 30 per cent) from some 14 million in 1998 to 18.3 million in 2014. The increase in the number of cocaine users is attributable to population growth.

The fact that the quantities of cocaine available for consumption declined over the period 1998-2014 while there was an increase in the number of cocaine users (30 per cent) over the same period (the number of users was largely stable over the period 2007-2014) seems somewhat contradictory. Three different hypotheses may help to explain this development.

Hypothesis 1. No increase in the number of cocaine users

One hypothesis could be that the number of cocaine users did not actually increase over the period 1998-2014 and that the number may have even declined between 2007 and 2014. The margins of error around the prevalence estimates are large, mainly reflecting the lack of reliable information for Africa and Asia; thus, the possibility that there was no increase in the number of cocaine users over the period 1998-2014 cannot be totally excluded. However, this hypothesis is not supported by data on perceived drug use reported by Member States, which indicate a clear upward trend in cocaine use (including in Africa and Asia), particularly between 1998 and 2008, followed by a period of stabilization or slight decline since 2009.

Hypothesis 2. Cocaine use per capita decreased

One hypothesis could be that cocaine use per capita decreased between 1998 and 2014. For example, this hypothesis might be supported by data showing a reduction in the number of users per 1,000 inhabitants, although the margins of error around such estimates are large. However, the data do not support this hypothesis.

Hypothesis 3. Cocaine use per capita remained stable

One hypothesis could be that cocaine use per capita remained stable between 1998 and 2014. This hypothesis might be supported by data showing that the number of users per 1,000 inhabitants remained largely stable over the period 1998-2014. However, the data do not support this hypothesis.
Hypothesis 2. Decline in per capita consumption among cocaine users (shifting from mature to new markets)

Another hypothesis is that the cocaine users’ per capita consumption may have decreased, with a number of indicators seeming to be consistent with this hypothesis.

There seems to have been a shift in the composition of the cocaine user population, towards an increase in the number of occasional users relative to the number of high-frequency or dependent users as a consequence of a geographical shift.

Based on the amount of cocaine available for consumption and the number of cocaine users, table 2 suggests that the mean amount consumed per cocaine user may have increased over the period 1998-2007, from 37 to 41 grams per user, before decreasing to 29 grams per user by 2014.\textsuperscript{166}

Such changes in per capita consumption may have occurred, as cocaine use has declined in established markets, where per capita consumption was high, and increased in new markets, where per capita consumption is still low, as the cocaine epidemic in the new markets is still at an early stage.

The number of cocaine users showed a marked decline in North America and less significant decreases in Europe over the period 2007-2014. Increases in cocaine use, by contrast, could be found in emerging markets in South America, notably between 2009 and 2014, as well as in Oceania and, most probably, in Africa and Asia (although the quantitative evidence is weak for these two regions).

A UNODC analysis on the retail and wholesale value of the illicit drug market, based on data for the period 2002-2003,\textsuperscript{167} suggested that per capita consumption of cocaine in North America (44 grams per user) was above the global average (37 grams per user). In the other regions, where per capita consumption was below the global average, cocaine use had been increasing. This suggests that heavy cocaine consumption was concentrated in North America, which was indirectly confirmed by a comparatively high proportion of people using cocaine in the United States being treated for cocaine use and a higher proportion of people using cocaine dying from cocaine use. This is of importance as — in parallel — indicators for North America showed that not only recreational use of cocaine but also heavy use had fallen strongly over the past decade. Estimates for the United States suggested that the number of “chronic cocaine users”, defined as users who consumed cocaine four or more days in the past month, had fallen by 22 per cent over the period 2006-2010\textsuperscript{168} (i.e. almost as much as the overall number of past-year cocaine users during that period) and there were no indications of any reversal of that development in subsequent years.\textsuperscript{169}

Heavy cocaine users, although they account for only a small proportion of the total number of users, are responsible for the bulk of cocaine consumed. Earlier analysis of the United States cocaine market suggested that cocaine use typically followed a Pareto distribution, with one quar-

\textsuperscript{166} Such levels are similar to the findings of previous UNODC research. A study on the value of the illicit drug market, based on data from the period 2002-2003, arrived at an average per capita consumption level of 37 grams of pure cocaine per user at the global level (World Drug Report 2005, Volume 1: Analysis (United Nations publication, Sales No. E.05.XI.10), table 3, p. 131). UNODC has suggested a decline of per capita consumption levels to 30 grams per user at the global level (World Drug Report 2010 (United Nations publication, Sales No. E.10.XI.13), table 8, p. 71).


\textsuperscript{169} United States, SAMHSA, Center for Behavioral Health Statistics and Quality, Results from the 2014 National Survey on Drug Use and Health: Detailed Tables (Rockville, Maryland, 2015), table 7.2A.
ter of cocaine users being responsible for two thirds of cocaine consumption.\textsuperscript{170} A recent update\textsuperscript{171} indicated that more than weekly consumers of cocaine (18 per cent of all cocaine users in 2010) accounted for two thirds of total cocaine consumption in the United States in 2010. Reducing the number of heavy cocaine users can thus effectively reduce the cocaine market. A recent study in the United States showed that cocaine consumption and spending on cocaine fell by 50 per cent between 2000 and 2010 (mostly between 2006 and 2010). The reduction in spending among a small group of high-frequency cocaine users (“more than weekly” users) accounted for around 75 per cent of the aggregate reduction in spending and thus in cocaine consumption over the period 2000-2010.\textsuperscript{172}

The change in the United States is likely to have affected the size of the global cocaine market, and thus the global per capita consumption level.

\textbf{Hypothesis 3. Supply-side estimates are incorrect}

The possibility that cocaine production estimates may have been incorrect cannot be excluded. There are, indeed, knowledge gaps when it comes to cocaine production estimates and this has long been recognized by UNODC. While there can be discussions about the “correct” estimates of total amounts of cocaine produced, it seems unlikely that there was any strong increase in cocaine production over the period 1998-2014. First, it is unlikely that any new coca-producing countries, apart from those in the Andean subregion, have emerged in the past two decades; and if they had, such a development would not have remained completely unnoticed. Secondly, the total area under coca bush cultivation in the Andean subregion has decreased in size (by over 30 per cent), as shown by scientifically validated remote-sensing surveys. Even though there have been changes in yields and increases in laboratory efficiency, it is unlikely that total cocaine production increased by over 30 per cent (corresponding to the increase in the number of cocaine users).

\textbf{A shrinking global cocaine market should not lead to complacency}

Having analysed all three hypotheses, the most likely is that the global cocaine market has indeed been shrinking, prompted by a decline both in cocaine available for consumption, mainly linked to a decrease in cocaine production in the Andean subregion, and in cocaine consumption in North America and, to some extent, in Europe. Assuming that, as suggested by estimates of the prevalence of cocaine use, the number of cocaine users has not declined, less cocaine is consumed on an average per capita basis today than in previous years.

The net result of this, in the short term, should be positive in terms of reducing drug-related crime and the negative health impact, as heavy cocaine users account for most of the harm arising from cocaine use. However, with a larger number of people worldwide experimenting with cocaine, particularly in developing countries, a certain proportion of them may eventually develop into heavy cocaine users, as can already be seen by the patterns emerging in some countries. As many of the countries in which cocaine consumption is now emerging do not have the health and social infrastructure to deal with such problems, a shrinking global cocaine market should definitely not lead to complacency. Moreover, the overall downward trend in global cocaine production may have come to an end, exacerbating the vulnerability of numerous developing countries.

\textsuperscript{171} \textit{What America’s Users Spend on Illegal Drugs} (see footnote 168).
\textsuperscript{172} Ibid., p. 34.
Cannabis market developments

Cannabis continues to be the most widely cultivated, produced, trafficked and consumed drug worldwide

Cannabis plant cultivation — either through direct indicators (cultivation or eradication of cannabis plants) or indirect indicators (seizures of cannabis plants, domestic cannabis production being indicated as the source of seizures, etc.) — was reported on the territory of 129 countries over the period 2009-2014. Given the absence of systematic measurements, however, the extent and trends in cannabis cultivation and production are difficult to assess. Most indirect indicators come from law enforcement authorities and, to a certain extent, reflect their priorities and activities and not simply the existence of cannabis cultivation and production. Since 1998, the total area of eradicated cannabis plants (in hectares), though it has fluctuated, has actually decreased, as have seizures of cannabis plants. These trends contrast with seizures of cannabis herb and cannabis resin, which, after a twofold increase over the period 1998-2004, have remained largely stable.

Reports from Member States on source countries for cannabis resin during the period 2009-2014 suggest that the world’s largest producer of cannabis resin continues to be Morocco, followed by Afghanistan and, to a lesser extent, Lebanon, India and Pakistan. Using as a basis cannabis seizures (which reflect law enforcement activity, as well as cannabis production), the size of local cannabis markets (derived from the number of users) and information on the sources of the cannabis consumed, it can be assumed that most of the world’s production of cannabis herb takes place in North America. In North America, cannabis herb is mainly produced in Mexico and the United States, for consumption in the subregion, while hydroponic cultivation of cannabis plants seems to be concentrated in Canada and the United States. Reports by Member States over the period 2009-2014 indicate that Albania, Colombia, Jamaica, the Netherlands and Paraguay are important source countries of the cannabis herb sold in international markets.

FIG. 52: Quantities of cannabis herb seized, by region, 1998-2014

Source: Responses to the annual report questionnaire and government reports.

The Americas, followed by Africa, remain the main markets for cannabis herb

In 2014, the Americas accounted for about three quarters of all the cannabis herb seized worldwide, Africa accounted for 14 per cent and Europe accounted for 6 per cent. At the subregional level, the largest amount of cannabis herb was seized in North America (accounting for 37 per cent of global seizures of cannabis herb in 2014), South America (24 per cent) and the Caribbean (13 per cent). Despite an increase in cannabis use, the quantity of cannabis herb intercepted in North America, after reaching a peak in 2010, has been declining, reflecting the fact that a decrease...
in cannabis production has been reported in Mexico and that cannabis interdiction may have become less of a priority in the United States since the decriminalization and legalization of recreational use of cannabis in some of the states in that country. Nonetheless, the quantity of cannabis herb seized in other parts of the world, particularly in South America, the Caribbean and Africa, is actually on the increase.

Europe, North Africa and the Near and Middle East remain the main markets for cannabis resin

The subregion in which the largest amount of cannabis resin was seized in 2014 was again Western and Central Europe, accounting for 40 per cent of the global seizures of cannabis resin (Spain alone accounted for 26 per cent of the world total); 32 per cent of the world total was accounted for by countries in North Africa (mainly Morocco and Algeria) and 25 per cent was accounted for by countries in the Near and Middle East (mainly Pakistan, followed by the Islamic Republic of Iran and Afghanistan). The proportion of global quantities of seized cannabis resin accounted for by Europe declined from 77 per cent of the world total in 1998 to 48 per cent in 2009 and 43 per cent in 2014, which reflects the decrease in the share of cannabis resin in the European cannabis market, where cannabis herb from domestic production has gained in popularity.

As in previous years, cannabis resin from Morocco was mainly smuggled to Europe and other countries in North Africa, while cannabis resin produced in Afghanistan continued to be smuggled to neighbouring countries, particularly Pakistan and the Islamic Republic of Iran. In the Near East, cannabis resin produced in Lebanon is used to supply other markets in the subregion.

Despite major changes in some regions, global cannabis consumption has remained relatively stable in recent years

About 3.8 per cent of the global population used cannabis in 2014. A proportion that has been somewhat stable since 1998, this means that cannabis was used by an estimated 183 million people (range: from 128 million to 234 million people) in 2014. A figure about 27 per cent higher than in 1998, this reflects the growth in the global population over the period 1998-2014. Given the large margin of error, caution needs to be applied when considering this figure; however, analysis of the perception of changes in use, as reported by Member States, shows a similar pattern, indicating that the use of cannabis increased until 2009, only to grow less rapidly thereafter.

Oceania is the only region in which a marked decline in cannabis use, from comparatively high levels, has been noted since 1998, which is mainly a reflection of a reduction in cannabis consumption in Australia. In Europe, following a twofold increase from the early 1990s onwards, a temporary decline in cannabis use was seen after 2009, until cannabis use increased again in 2013 and 2014, returning to the level reported in 2009.¹⁷⁴

Since 2009, cannabis consumption has been rising in the Americas. Although the United States continues to be the largest market for cannabis in the Americas, cannabis use

**FIG. 54** Global trends in the number of past-year users of cannabis and the cannabis use perception index, 1998-2014


Note: The uncertainty intervals were calculated by UNODC for the period 2007-2014; for data prior to 2007, the three-year average of the uncertainty intervals found over the period 2007-2009 was used as a proxy. For more details of perception indices, see the online methodology section of the present report.

¹⁷⁴ The Eurobarometer survey also shows a slight increase in the use of cannabis between 2011 and 2014 among young people in the European Union (past-month use increased from 6.2 to 7.0 per cent over that period (Gallup Organization, Youth Attitudes on Drugs: Analytical Report, Flash Eurobarometer series No. 330 (European Commission, July 2011); and European Commission, Young People and Drugs, Flash Eurobarometer series No. 401 (August 2014)).
While each of the jurisdictions legalizing cannabis had previously approved medical cannabis laws, only Colorado, Oregon and Washington, D.C., regulated commercial medical cannabis businesses. Colorado restricted initial applications for recreational cannabis licences to businesses already licensed to sell medical cannabis, and the first recreational stores opened on 1 January 2014. Oregon temporarily allowed the sale of recreational cannabis through existing medical dispensaries beginning in October 2015, though licensed recreational stores are not expected to open until late 2016. The state of Washington had an extensive medical cannabis industry, including many brick-and-mortar dispensaries that operated openly, but without regulation. Alaska will not have recreational cannabis sales until licensed stores open, which is expected by late 2016. In order to develop and enforce regulations for the legal cannabis industry, each state has appointed a regulatory agency. The resulting regulatory details vary depending on the jurisdiction, including limits on the quantities that can be possessed or purchased, and market structure (for the regulatory details in each jurisdiction, see table on page xxv in the annex of the present report).

**Uruguay**

Uruguay announced in mid-2012 that it would permit the production and distribution of cannabis for recreational use by adult residents (persons aged 18 and older). Law 19.172 was enacted in December 2013, and regulations for the new industry were issued in May 2014. The law and its supporting regulations permit the sale through pharmacies and non-medical use of up to 40 grams of cannabis per month for individuals registered with the Institute for the Regulation and Control of Cannabis (IRCCA).

The circumstances of legalization in Uruguay were quite different from the developments in the United States in that the legislature itself initiated the law, although with limited popular support (only a third of Uruguayans). There was no prior regulation for the use of cannabis for medical purposes (although the possession of cannabis was not a criminal offence), nor was there significant illicit cannabis production in Uruguay.

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176 Ibid.


178 Becky Bohrer, “Alaska regulators are 1st to OK marijuana use at pot shops”, *Big Story* (Juneau, Alaska), 20 November 2015.

179 Pardo, “Cannabis policy reforms in the Americas” (see footnote 177).

180 Maria F. Boidi and others, “Marijuana legalization in Uruguay and beyond” (Miami, United States, Florida International University, Latin American and Caribbean Centre, Latin American Marijuana Research Initiative, 2015).


182 Uruguay, Junta Nacional de Drogas, “Regulación controlada del mercado de marihuana: una alternativa al control penal y a la criminalización de los usuarios”. Available at www.infodrogas.gub.uy.
Uruguay has created three legal channels for obtaining cannabis: home cultivation; access to social clubs; and retail pharmacies. Individuals are allowed to access only one mode of supply, which they must declare upon registering with the cannabis registry.

Nearly two years after the enactment of the law, critical parts of the distribution system have yet to be put in place. In October 2015, only two private firms were issued licences to cultivate cannabis, and to date no cannabis has been sold in pharmacies. Officials estimate that cannabis from the first harvest will not be ready for sale until mid-2016. By February 2016, about 4,300 people had registered to grow cannabis at home, and 21 cannabis clubs had been licensed. Recent surveys reveal that 40 per cent of the cannabis users in the country are hesitant to register with the system to obtain cannabis, while the rest have indicated that they intend to register and obtain the drug through pharmacies.

Outcomes

Although three and a half years have elapsed since the first regulations on legal cannabis went into effect in Colorado and Washington, the outcomes of the legalization of cannabis in those jurisdictions are still not fully understood and may not be for some time. Some may play out in the longer term, especially as the regulations evolve and the markets mature. In the United States, it will be particularly difficult to assess the impact of cannabis legalization, as many states have made incremental changes to their cannabis laws over the past few years that may have affected outcome trends prior to the legalization of recreational cannabis. Currently, the best data on the outcomes of cannabis legalization come from Colorado and Washington, the states that adopted cannabis legislation early. That cannot be said of the other jurisdictions in the United States (Alaska, Oregon and Washington, D.C.) or of Uruguay, which have yet to fully establish their retail systems.

Cannabis use

In the United States, the National Survey on Drug Use and Health indicated that the prevalence of past-month cannabis use among those aged 12 and older increased from around 6 per cent in the mid-2000s to 8 per cent in the period 2013-2014. However, in the jurisdictions that legalized recreational cannabis, where the prevalence of past-month cannabis use has historically been higher, past-month prevalence increased more rapidly than past-month prevalence at the national level during this period. Avail-
able data suggest that the increase in the prevalence of past-month cannabis use is driven by increased use among young adults (persons aged 18-25), which is more pronounced in Colorado, where the prevalence of past-month cannabis use increased from around 27 per cent in 2011 to 31 per cent in 2014. In Uruguay, the prevalence of cannabis use is much lower, but household surveys suggest that there was an increasing trend even before the legalization of cannabis use. Trends in cannabis use may change as the demand curve evolves in response to changes in price, availability and social norms.

**Medical cannabis markets after legalization in the United States**

It is unclear whether the legalization of cannabis for recreational use will have any discernible effect on the size of the medical cannabis market. The original purpose of medical cannabis laws was to provide access to cannabis for those with a qualifying medical need. Since the legalization of recreational cannabis use, individuals can now obtain cannabis without having a medical recommendation and without submitting their personal data to be entered into a state-run database. However, the recreational cannabis markets in most jurisdictions are currently higher priced (after taxes) and often have fewer retail outlets than the existing medical cannabis market. For registered or qualifying patients, the introduction of regulated recreational cannabis markets may not present an additional incentive to forgo the benefits of their medical status.185

After the legalization of the non-medical use of cannabis, the number of patients in Colorado’s mandatory medical cannabis patient registry remained fairly stable, although the number decreased in the last quarter of 2015. Furthermore, monthly medical cannabis sales have not exhibited a downward trend in the two years since legalization. Given the evolving markets and one-year duration of medical cannabis identification cards, the impact of legalization on the medical cannabis market may take much longer to become apparent in jurisdictions with both medical and recreational cannabis markets.

In Colorado, and currently in Oregon, cannabis stores have been allowed to operate simultaneously as recreational and medical cannabis stores, but in the long run it is unclear whether those systems will be separate or intertwined or whether one system will fold into the other, as in the State of Washington.

**Products and potency**

Cannabis potency in the United States has been increasing over the past three decades, particularly in jurisdictions that have allowed medical dispensaries.186 Compared with the national average of 11 per cent (based on data from the period 2002-2008),187 the average THC content of recreational cannabis herb sold in the states of Washington and Colorado is nearly 17 per cent, with some samples reaching up to 30 per cent. Data on cannabis potency are scarce in Uruguay, as authorities in that country only recently began to analyse seized cannabis, but the Government has discussed limiting to 15 per cent the THC content of cannabis products sold in pharmacies. According to the authorities, this limit has been set with a view to reducing health risks caused by cannabis use.

Innovation in the commercial markets has led to the increased availability of a wide range of cannabis products, especially concentrated cannabis extract and cannabis-infused edibles, which pose additional public health concerns. In 2014, such products accounted for an estimated 35 per cent of retail sales of recreational cannabis in Colorado.189 The high potency of extract-based concentrates such as oil, “wax” or “shatter” can have a THC content of up to 80-90 per cent; “dabbing” or vaporizing these products involves a rapid intake of large amounts of THC, making it difficult for even experienced users to determine an appropriate dosage, potentially leading to over-intoxi-

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188 Inés Acosta and Emilio Godoy, *Marihuana, de las sombras a los laboratorios*, Inter Press Service, 24 September 2013.

189 Adam Orens and others, “Marijuana equivalency in portion and dosage: an assessment of physical and pharmacokinetic relationships in marijuana production and consumption in Colorado” (Boulder, Colorado, Marijuana Policy Group, University of Colorado Boulder, Leeds School of Business, 2015).
cation. With edible products, the slower onset and longer duration of intoxication could increase the risk of over-intoxication, especially for new or inexperienced users.\(^\text{190}\)

A common approach to regulating such products has been to implement stringent packaging and labelling requirements. The four states in the United States require cannabis-infused edibles to be packaged into demarcated individual servings according to the quantity of THC: Washington and Colorado set the serving size at 10 mg of THC; and in Alaska and Oregon, draft regulations proposed a maximum of 5 mg.\(^\text{191}\) In addition, Washington requires all cannabis-infused products to undergo, prior to approval, a process to determine if they are appealing to children,\(^\text{192}\) and Oregon is considering a similar rule.\(^\text{193}\)

**Health consequences**

The proliferation of concentrated cannabis extract and cannabis-infused edibles inlicit markets has generated concerns of accidental ingestion or over-intoxication, especially among children and inexperienced users, as those products may often resemble familiar sweets.\(^\text{194}\) Since the legalization of recreational cannabis in the states of Colorado and Washington, incidents of accidental cannabis ingestion among young children have been increasing. In Colorado, the number of cases involving exposure to THC-infused edibles in young children increased nearly fivefold, from 19 cases in 2013 to 95 cases in 2014, and the number of cannabis exposure calls to the Washington Poison Center involving persons under 20 years old has doubled since the period 2010-2011.\(^\text{195}\) It is unclear to what degree the legalization of recreational cannabis has had an effect on such cases, as cannabis-infused edibles and concentrated cannabis extract existed to some extent in loosely regulated medical cannabis markets for years prior to the legalization of recreational cannabis.

Legalization of the use of recreational cannabis may have also increased the number of accidents or injuries associated with cannabis use or intoxication. In 2014, within one year of the legalization of recreational cannabis use, there was a 29 per cent increase in the number of cannabis-related emergency room visits in Colorado and a 38 per cent increase in the number of cannabis-related hospitalizations.\(^\text{196}\)

Data on treatment of cannabis use disorders are mixed: in Colorado the number of admissions for such treatment remained stable from 2011 to 2014, while in Washington and in the country as a whole, that number has been decreasing since 2009. The decline in the number of admissions for treatment of cannabis use in the United States, however, may be linked to changes in the referral process used by the criminal justice system (see the discussion in this chapter on the treatment of cannabis use in the section entitled “Extent of drug use”). There are currently no data available on admissions for treatment of cannabis use disorders in Uruguay.

**Public safety**

The increased availability of cannabis for recreational use is likely to increase the number of users driving while under the influence of cannabis. Studies suggest that cannabis is less hazardous than alcohol in terms of driving impairment, but much more dangerous when used in combination.\(^\text{197, 198, 199}\) Data from the states of Colorado

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\(^\text{191}\) United States, Oregon, Office of the Secretary of State, Oregon Administrative Rules (Salem, Oregon Health Authority, Public Health Division, 2015), chap. 333, division 7.


\(^\text{195}\) United States, Rocky Mountain High Intensity Drug Trafficking Area, Legalization of Marijuana in Colorado: The Impact, vol. 3 (September 2015).

\(^\text{196}\) Ibid.


Cannabis supply, higher taxation and regulatory burden. Even medical and illicit cannabis markets, due in part to limited availability, are projected to experience a temporary price increase. In the short term, cannabis prices are likely to remain 40% higher than in 2014, driven by increased supply and demand. However, this may have resulted from increased law enforcement scrutiny.

**Cannabis markets**

Despite the legalization of recreational cannabis use, the illicit cannabis market has not been entirely displaced in the states of Colorado and Washington. In Washington, the medical, recreational and illicit cannabis markets each account for approximately one third of the state’s cannabis sales, 200 while in Colorado the illicit cannabis market still supplied an estimated 40% of the state’s total demand for cannabis in 2014.

In the short term, cannabis prices are likely to remain higher on the recreational cannabis market than on the medical and illicit cannabis markets, due in part to limited supply, higher taxation and regulatory burden. Even though commercialization had already occurred to some degree in the medical cannabis markets, the maturation of licit cannabis markets has already driven down retail prices substantially as competition increases and businesses achieve economies of scale. 201 Prices have fallen in Washington since 2014, 202 and in Colorado the average price of an eighth of an ounce of cannabis (3.5 grams, the most commonly purchased quantity) fell dramatically from nearly $60 in mid-2014 to $25-40 in November 2015. 203 Uruguay has not yet set a price but it is projected to be set at between $1.20 and $1.30 per gram of cannabis.

Each jurisdiction that has legalized cannabis use has developed a unique tax scheme for legal cannabis (see table on page xxv in the annex of the present report). The recreational cannabis markets in Colorado and Washington have grown considerably since such schemes were put in place. In Colorado, recreational cannabis market profits reached nearly $600 million in 2015, compared with $313 million in 2014. The state collected $56 million in recreational cannabis tax revenues in 2014 and over $114 million in 2015. While these figures are large, they represent only a very small portion of the state’s total revenues, which totalled nearly $11 billion in the fiscal year 2014. In Colorado, the first $40 million of excise tax revenues are

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earmarked for public schools, as required by law. Additional revenues are distributed primarily to the Marijuana Enforcement Division and to public health programmes such as substance abuse intervention and prevention programmes and educational campaigns.206

In Washington, in the fiscal year 2015 (July 2014–June 2015), sales of legal cannabis totalled $256 million. Just eight months into the fiscal year 2016, sales have already more than doubled, reaching nearly $580 million. Washington collected $65 million in tax receipts in the fiscal year 2015 (accounting for 0.3 per cent of the state’s total revenues) and over $100 million during the first eight months of the fiscal year 2016.207, 208 All revenues collected from the production and sale of recreational cannabis go into Washington’s general fund, with the exception of allocations for certain programmes: $5 million to the Washington State Liquor and Cannabis Board to regulate the industry; $500,000 to the Washington State Healthy Youth Survey; $200,000 to fund cost-benefit analyses of the effects of cannabis legalization on the economy, public health and public safety; and $20,000 to the University of Washington Alcohol and Drug Abuse Initiative to publish medically and scientifically accurate information on cannabis.

In Oregon, data on initial sales or tax revenues are not yet available, although the Oregon Liquor Control Commission has indicated that recreational cannabis sales tax revenue after regulatory costs will be distributed as follows: 40 per cent to the common school fund; 20 per cent to mental health, alcoholism and drug use treatment services; 15 per cent to state police departments; and 5 per cent to the Oregon Health Authority for alcohol and drug use prevention.

In Uruguay, taxation on cannabis sale has been deferred, although IRCAA may impose a tax in future. While Colorado and Washington illustrate that tax revenues from cannabis legalization can be substantial, it is still not clear how the total costs of designing, implementing and regulating a legal cannabis market will measure against the current costs of cannabis prohibition. One important consideration for legalization is whether the costs of enforcing prohibition exceed the budgetary costs of regulation. In a recent study, it was estimated that for 2014 the State of Vermont spent approximately $1 million enforcing criminal laws against cannabis compared with an estimate of “low to middle single-digit millions” of dollars to establish and maintain a regulatory system.209 However, those costs need to be weighed against revenues, which cover the ongoing costs of regulations and additional externalities, such as increased treatment and prevention costs, which are often not included in the budgets of regulatory agencies.

Criminal justice

The number of arrests and court cases associated with cannabis-related offences have declined substantially in the states that have legalized cannabis. It should be pointed out, however, that this trend reflects the number of offences recorded in the criminal justice system, and that prior to legalization cannabis-related offences may not necessarily have led to prosecution or sentencing. Data on other cannabis-related police interactions, such as citations or verbal warnings for public consumption, are not readily available. Uruguay does not disaggregate its criminal justice figures by drug-related offences, although overall annual drug-related detentions have remained more or less stable in the past decade.\textsuperscript{210} It is yet to be seen whether or how legalization affects other types of crime or arrests.

Licitly and illicitly produced cannabis in jurisdictions that have legalized recreational cannabis use can be used to supply the illicit cannabis markets of neighbouring jurisdictions, although the extent to which smuggling has increased as a result of cannabis legalization is difficult to evaluate. However, in December 2014, the states of Nebraska and Oklahoma requested that the United States Supreme Court reverse Colorado’s decision to legalize cannabis, complaining that the new law in Colorado had generated an increase in cannabis trafficking in neighbouring jurisdictions.\textsuperscript{211} Likewise, officials in Argentina and Brazil voiced concern following the legalization of cannabis use in Uruguay.\textsuperscript{212} Interdiction of cannabis originating in Colorado increased from 2011 to 2014,\textsuperscript{213} although this may have been a result of increased law enforcement searches. Early statements from police officials in Uruguay indicate that cannabis trafficking has remained unchanged and that organized criminal groups may have benefited in the initial period before establishment of the retail pharmacy system.\textsuperscript{214}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{cannabis-related-arrests-charges-offences-united-states-selected-areas-2009-2015}
\caption{Cannabis-related arrests, charges and offences in the United States, including selected areas, 2009-2015}
\end{figure}

\begin{itemize}
\item \textbf{Colorado:} court cases involving the possession, consumption, distribution or cultivation of cannabis
\item \textbf{Washington, D.C.:} arrests for the possession of cannabis
\item \textbf{Oregon:} arrests for the possession, sale, use, growing or production of cannabis
\item \textbf{Washington:} misdemeanours and offences involving the possession of cannabis
\item \textbf{United States:} percentage of drug arrests for the possession of cannabis
\end{itemize}

Source: Colorado Judicial Branch; Washington State, Administrative Office of the Courts; Metropolitan Police Department of the District of Columbia; and Oregon Annual Uniform Crime Reports.

\textsuperscript{210} Uruguay, Junta Nacional de Drogas, Observatorio Uruguayo de Drogas, “Indicadores de control de la oferta” (May 2012).
\textsuperscript{211} Caulkins and others, \textit{Considering Marijuana Legalization}, p. 4 (see footnote 209).
\textsuperscript{212} “Preocupa a la región el proyecto de legalización de la marihuana”, \textit{El País} (Montevideo), 9 December 2013.
\textsuperscript{213} Legalization of Marijuana in Colorado (see footnote 195).
\textsuperscript{214} “Policía: a pesar de regular, no varía comercio clandestino de marihuana”, \textit{El País} (Montevideo), 28 January 2016.
SYNTHETIC DRUGS: AMPHETAMINE-TYPE STIMULANTS AND NEW PSYCHOACTIVE SUBSTANCES

Key figures

Global seizures of amphetamine-type stimulants reach a new peak

Global ATS seizures almost doubled from 72 tons in 2009 to 144 tons in 2011. After three years of relative stability, ATS seizures reached a new peak of 173 tons in 2014. For the past few years, methamphetamine seizures have accounted for the largest share of global ATS seizures. Since 2009, global amphetamine seizures have fluctuated annually between about 20 and 46 tons. “Ecstasy” seizures more than doubled in 2014, reaching 9 tons, compared with 4-5 tons per year in the period 2009-2013.

Methamphetamine continues to dominate the markets for amphetamine-type stimulants in North America, East and South-East Asia and Oceania

Although methamphetamine is a feature of ATS markets worldwide, methamphetamine is particularly dominant in East and South-East Asia and North America. Since 2009, North America and East and South-East Asia together have accounted for most of the methamphetamine seized worldwide. North America has consistently

Amphetamine-type stimulants: market developments

Amphetamine-type stimulants (ATS) are synthetic drugs that, in principle, can be manufactured anywhere. Unlike heroin and cocaine, they do not depend on the extraction of active constituents from plants that have to be cultivated and require certain conditions to grow. Small-scale ATS manufacture using simple “recipes” in so-called “kitchen labs”, to be sold and consumed locally, exists, but large-scale ATS manufacture in clandestine laboratories with sophisticated manufacturing equipment that makes use of a range of precursor chemicals and synthesis routes also plays an important role. Any analysis of the ATS market is complicated by the fact that information on ATS manufacture is limited and this does not allow for estimates of the volume of global ATS manufacture. Data on ATS use in some of the main markets, such as East and South-East Asia, are also very limited, and the situation is further complicated by the appearance of NPS, which are sometimes sold under the names of traditional ATS.

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reported the largest amount of methamphetamine seized each year. Between 2009 and 2014, quantities of methamphetamine seized in East and South-East Asia almost quadrupled.

In ATS markets in East and South-East Asia, methamphetamine is available in the form of both crystalline methamphetamine and methamphetamine tablets. Methamphetamine tablets, commonly known in the subregion as “yaba”, are small tablets, typically of low purity and available in various shapes and colours. Methamphetamine tablets are mainly manufactured in the Mekong area in East and South-East Asia, and seizure reports indicate that such tablets are mostly intended for markets in that subregion. Crystalline methamphetamine continues to be manufactured on a large scale in East and South-East Asia and is also trafficked from other subregions.215

In East and South-East Asia, there is a large and growing market for both methamphetamine tablets and crystalline methamphetamine. In 2014, crystalline methamphetamine was the primary drug of concern in Brunei Darussalam, Cambodia, Indonesia, Japan, the Philippines and the Republic of Korea, while methamphetamine tablets were the main drug of concern in the Lao People’s Democratic Republic and Thailand. Moreover, in that same year, experts perceived an increase in the use of crystalline methamphetamine in Cambodia, China, Japan, Malaysia, the Philippines and Viet Nam and increased use of methamphetamine tablets in Cambodia, China, Malaysia, Myanmar and Viet Nam. Data on treatment for drug use in East and South-East Asia show that methamphetamine use has become a growing concern. In 2014, people receiving treatment for methamphetamine use accounted for the largest share of people treated for drug use in Brunei Darussalam, Cambodia, the Lao People’s Democratic Republic, the Philippines, Singapore and Thailand.216 Although these data indicate the importance of both forms of methamphetamine, treatment data are not representative of the overall prevalence of methamphetamine use and demand for treatment for methamphetamine use in East and South-East Asia.

In Oceania, both Australia and New Zealand have recorded sharp increases in methamphetamine seizures since 2012. In Australia, methamphetamine is illicitly manufactured. In addition, Australia saw the arrival of large-scale shipments of crystalline methamphetamine in sea cargo. A government report has highlighted the growing number of methamphetamine users in Australia, increased frequency of use of the drug among certain user groups, an increase in methamphetamine purity and a decline in purity-adjusted prices, all of which could aggravate the negative impact of methamphetamine use on the health of individuals and on society.217

While demand for ATS has for many years been mostly met by manufacture in the same subregion, there have been recent reports of new trafficking flows connecting previously independent subregions, particularly with regard to methamphetamine.218 Between 2011 and 2014, methamphetamine was mostly reported to have been smuggled from West Africa, North America, West Asia and East and South-East Asia. Whereas South-East Asia and Oceania are predominantly recipients of the meth-

215 UNODC, The Challenge of Synthetic Drugs in East and South-East Asia: Trends and Patterns of Amphetamine-type Stimulants and New Psychoactive Substances (Vienna, 2015).

216 According to responses to the annual report questionnaire sent by the Philippines for 2014 and expert perceptions of the use of main drugs of concern reflected in the Drug Abuse Information Network for Asia and the Pacific.

217 Australia, Department of the Prime Minister and Cabinet, Final Report of the National Ice Taskforce 2015 (Canberra, 2015).

Interregional trafficking flows of methamphetamine, 2011-2014

Source: UNODC elaboration based on responses to annual report questionnaire, 2011-2013.

Note: The arrows do not imply the involvement of any specific country in the regions mentioned nor do they represent the level of importance of any methamphetamine trafficking flow. The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. The final boundary between the Sudan and South Sudan has not yet been determined.

Amphetamine trafficked worldwide, the Middle East and large parts of Europe primarily function as transit areas for methamphetamine trafficking. All regions with illicit methamphetamine markets also have illicit methamphetamine manufacture.

Amphetamine: an intraregional mechanism of supply

Seizure reports worldwide indicate that amphetamine, unlike methamphetamine, is largely trafficked and supplied on an intraregional basis and that there are only rare linkages between regional amphetamine markets. This is especially evidenced in Europe and the Middle East, where countries continue to report large amounts of seized amphetamine.

Amphetamine seizures reported in the Middle East in recent years point to trafficking dynamics that are mainly contained within the region. In 2013 and 2014, most of the amphetamine seized in the Middle East was considered to have originated in Lebanon and the Syrian Arab Republic. Over the same period, authorities of some countries in the Middle East reporting the seizure of amphetamine consignments found that the consignments had been destined for other countries within the region, such as Jordan and Saudi Arabia. Moreover, Israel, Jordan, Lebanon and the Syrian Arab Republic were perceived to be the main transit countries for amphetamine consignments seized in the Middle East in 2013 and 2014.

In particular, large amounts of amphetamine tablets labelled with the brand name “Captagon” were reported to have been seized in the Middle East between March 2014 and November 2015. While mostly intraregional trafficking in “Captagon” tablets has been reported in the Middle East, large amounts have also been reportedly trafficked from Lebanon and the Syrian Arab Republic to countries outside the region, such as the Sudan and Turkey.

Although Lebanon was the only country in the Middle East that reported the discovery of clandestine amphetamine laboratories between 2009 and 2014, the availability of precursor chemicals and the existence of certain areas of limited government control in some countries in the subregion are risk factors for potential amphetamine manufacture.

Variations in “ecstasy” purity and composition

In recent years, there have been indications of an increasingly diversified “ecstasy” market featuring three different product types: “ecstasy” tablets containing little or no 3,4-methylenedioxymethamphetamine (MDMA); “ecstasy” tablets with an unusually high dose of MDMA; and “ecstasy” sold in powder form containing MDMA of high purity. These compositions of “ecstasy” tablets have

Captagon was originally the trade name for a pharmaceutical preparation containing fenetylline, a synthetic stimulant. In the past few years, most tablets seized as “Captagon” essentially contained amphetamine, typically in combination with caffeine and sometimes with other adulterants (World Drug Report 2010, p. 114).
been observed in the illicit markets for synthetic drugs in Europe, in particular, and in East and South-East Asia and Oceania, where there is generally a large presence of “ecstasy”.

The presence of different “ecstasy” products in the market is the result of different circumstances. When controls over the main precursor chemical used in the manufacture of MDMA were heightened, other substances were often used as substitutes for MDMA. In 2013, seizures of “ecstasy” tablets containing little or no MDMA and consisting mainly of a blend of non-controlled substances that, in some cases, included NPS were reported in East and South-East Asia (in Brunei Darussalam; Hong Kong, China (including NPS); Indonesia (including NPS); Macao, China; Malaysia; Republic of Korea; Singapore (including NPS); and Thailand) and in Oceania (in New Zealand (including NPS)). In Europe, several countries issued health risk alert warnings in 2014 when reports of fatalities were linked to the use of tablets sold as “ecstasy” that contained para-methoxymethamphetamine (PMMA), sometimes in combination with MDMA.220

In recent years, the availability of “ecstasy” tablets containing a high dose of MDMA appears to have increased, particularly in Europe. While fatalities caused by “ecstasy” are generally low, consumption of high doses can lead to death as a result of direct toxicity or following hyperthermia and dehydration.221 According to EMCDDA, there are indications that illicit MDMA manufacture is concentrated in Belgium and the Netherlands, where clandestine laboratories used for the large-scale manufacture of MDMA have been dismantled.222 “Ecstasy” tablets with a high MDMA content are being sold across Europe; they have distinctive shapes and logos to differentiate them from other “ecstasy” tablets.223

In addition to the growing availability of “ecstasy” tablets with a high MDMA content, a market niche appears to have emerged for powder or crystalline MDMA. In Aus-

220 UNODC early warning advisory on new psychoactive substances.

February 2015 – United Kingdom: high dose PMMA sold as “ecstasy” possibly still available” Available at www.unodc.org/.

221 Terminology and Information on Drugs (United Nations publication, Sales No. E.16.XI.8).


223 Ibid.
dependence, as well as adverse physical effects, particularly

According to WHO, among recreational users of ketamine, 225 increased rates of high-risk injecting behaviour in association with ketamine use have been reported by specific user groups.226

New psychoactive substances: market developments

The global market for new psychoactive substances (NPS) continues to expand. The emergence and persistence patterns of these substances show significant differences between countries and regions. Marketed in many different ways and forms, NPS can be observed among many different user groups. The effects of NPS use on the human body are not yet fully understood — safety data regarding toxicity are often not available and long-term side effects are not known. The range of drugs available on the market has probably never been wider. This situation poses additional challenges to prevention, treatment, control and identification efforts.

Wider range of new psychoactive substances reported

Between 2008 and 2015, a total of 644 NPS had been reported by 102 countries and territories to the UNODC early warning advisory on NPS. The emergence of NPS was reported for the first time in 2015 in Kyrgyzstan and Mauritius. In 2015, the early warning advisory also registered the emergence of NPS in previous years in Belarus, Serbia, South Africa and Tajikistan. The majority of countries and territories that reported the emergence of NPS up to December 2015 were from Europe (41), followed by Asia (30), Africa (16), the Americas (13) and Oceania (2).

The NPS market continues to be characterized by a large number of new substances being reported. Although data collection for 2015 is still in progress, 75 new substances have been reported to UNODC for the first time, compared with a total of only 66 in 2014. Between 2012 and 2014, most substances reported for the first time belonged to the group of synthetic cannabinoids. The data reported for 2015 so far show a different pattern: first, 20 synthetic cathinones (a group of substances with stimulant effects similar to cocaine or methamphetamine) were reported for the first time — almost as many as synthetic cannabinoids (21); and second, 21 “other substances” (substances not belonging to any of the major groups identified in previous years) were reported for the first time, including synthetic opioids (e.g. fentanyl derivatives) and sedatives (e.g. benzodiazepines).

![FIG. 67: Quantities of ketamine seized worldwide, 2009-2014](image.png)

Source: Responses to the annual report questionnaire.

224 Multiple responses were possible (Natasha Sindicich and Lucy Burns, An Overview of the 2014 Ecstasy and Related Drugs Reporting System (Sydney, University of New South Wales, National Drug and Alcohol Research Centre, October 2015)).


New psychoactive substances: stability and change

A growing number of NPS are reported every year by a large number of countries and territories throughout the world. NPS that have an established presence in the market include ketamine (reported by 62 countries and territories), khat (reported by 56), JWH-018 (reported by 50), methedrone (reported by 49) and methylone (reported by 47). Other NPS are transient in nature and are only reported by a small number of countries and territories for a couple of years.

Approximately 19 per cent of the countries and territories reporting NPS have identified more than 100 different substances since 2008. At the same time, more than a quarter of all countries and territories reporting the emergence of NPS have reported only one substance, which may be attributable to limited technical capacity for identifying NPS.

Some NPS seem to have a stable presence in the drug market. A large proportion of the 451 substances registered in the UNODC early warning advisory on NPS in 2014 had already been reported in previous years. Twenty-three of those substances reported in 2014 had been reported for the first time in 2008 and had been reported every year since then; those substances include the phenethylamine 4-fluoroamphetamine, the synthetic cannabinoid JWH-018 and the synthetic cathinone methedrone. Many other NPS that appeared in subsequent years were also reported each year until 2014. Thus, there is an element of stability in the NPS market. Nevertheless, 66 new substances were reported to the UNODC early warning advisory for the first time in 2014.

Several other NPS have been reported by a small number of countries for a period of just one or two years. Between 2008 and 2014, a total of 569 NPS were reported to be


Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. The final boundary between the Sudan and South Sudan has not yet been determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).
on the market; however, by 2012, 26 of those substances were no longer reported to be available on the market and by 2013, 69 substances were no longer reported to be available. For instance, N-benzyl-1-phenylethylamine was reported by six countries in Europe and Oceania between 2009 and 2012, but since then no further reports on that substance have been submitted to UNODC, suggesting that the substance is no longer available.

Many newly reported NPS are actually derivatives of previously reported substances whose molecular structure has been slightly modified. One such example is the series of 2,5-dimethoxy ring-substituted phenethylamines (2C series). Modelled on 4-bromo-2,5-dimethoxyphethylamine (2C-B), a substance controlled under the Convention on Psychotropic Substances of 1971, 20 NPS belonging to the 2C series were reported worldwide until 2014. However, about half of them did not remain on the market and were only reported for a small number of years. These included 2C-T, which was reported only in 2011 by Canada, and 2C-G and 2C-N, which were reported in 2011 and 2012 by Canada and Poland. Other substances belonging to the 2C series seem to be more persistent, such as 2C-T-2 and 2C-T-7, which were reported from 2009 to 2014 by 14 countries in the Americas, Europe and Oceania.

Other substances, such as those belonging to the synthetic cannabinoid CP series, have shown large variations in market availability since 2008. For example, the CP-47,497-C8 homologue was first reported by one country in Asia (Japan) in 2008; after several fluctuations, the reporting of that synthetic cannabinoid reached its peak in 2013, with 13 countries in the Americas, Asia and Europe having reported its presence.

There are elements that influence the NPS market, such as user preference, legal responses and law enforcement efforts to seize substances before a significant user base becomes established. UNODC monitoring of NPS since 2008 has shown a rather dynamic supply situation, characterized by persistence (substances that emerge, spread and stay for several years) and change (substances that appear for a short time or only locally).

**Significant seizures of new psychoactive substances**

Significant quantities of synthetic NPS\(^{228}\) have been seized over the past few years, reaching 34 tons in 2014. The global market for NPS continues to be dominated by synthetic cannabinoids, with North America, in particular the United States, accounting for the largest quantities seized worldwide. Of the 32 tons of synthetic cannabinoids seized worldwide in 2014, they were seized in the United States alone. Europe also recorded significant seizures of synthetic cannabinoids: 5.4 tons of synthetic cannabinoids were seized in 2014 (mainly in Cyprus and Turkey), compared with 1.2 tons in 2013. Of all the drug groups, synthetic cannabinoids accounted for the largest seizures in Cyprus in 2012 (8.3 tons) and 2014 (4.4 tons); in most cases, the seized synthetic cannabinoid was AM-2201.\(^{230}\)

Global seizures of synthetic cathinones have been steadily increasing since they were first reported in 2010. Those seizures tripled between 2013 and 2014, reaching 1.3 tons. Most synthetic cathinones were seized in Eastern Europe (692 kg were seized in the Russian Federation), in Western and Central Europe (312 kg were seized in England and Wales) and in East and South-East Asia (226 kg were seized in Hong Kong, China). In 2014, the Russian Federation also reported significant seizures of aminoindanes (438 kg).

**FIG. 70** Quantities of synthetic cathinones seized, by region, 2010-2014

Source: Responses to the annual report questionnaire.

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\(^{228}\) Seizures of synthetic NPS refer to synthetic NPS and do not include seizures of plant-based substances and ketamine.

\(^{229}\) Seizures are usually associated with control measures; therefore, an increase in seizures of NPS may reflect the fact that a larger number of substances were placed under national control.

\(^{230}\) AM-2201 has been placed under international control since 2015.
The risk of mixtures of new psychoactive substances sold in various compositions

Seizure reports indicate that NPS are frequently sold in various compositions in a combination of different compounds, including internationally controlled drugs, pharmaceutical products and adulterants. Over the past few years, various countries in Europe and South-East Asia have reported seizures of "ecstasy" tablets containing mainly a blend of non-controlled substances, including NPS, and little or no MDMA. However, recent seizure reports show that packaged NPS products contained mixtures of a variety of NPS compounds. Mixtures can arise intentionally (for example, if the producer believes that some blends will have greater effects for the user than any of the substances in isolation) or unintentionally (for example, if the producer lacks the skill or the facilities to produce a consistently pure product).

In 2013, European countries reported more than 110 NPS products containing a combination of up to seven different NPS compounds sold as one product. Synthetic cannabinoids were found to be present in more than 55 per cent of those NPS products, and synthetic cathinones were present in more than 25 per cent.231

In addition to NPS mixtures containing substances belonging to the same NPS group, in 2013, four European countries reported 10 different NPS products that included combinations of substances from different chemical NPS groups. The most frequently identified combination of NPS groups found in such products included phenethylamines combined with synthetic cathinones. Generally, synthetic cathinones were most frequently identified in NPS products combining different NPS groups and were usually observed in combination with ketamine and other phencyclidine-type substances, phenethylamines and tryptamines.232

It should be noted that polydrug use is not limited to NPS use. People who use drugs often choose to take multiple substances concurrently, including mixing street drugs with alcohol and/or prescription drugs. But the sheer number of potential combinations of NPS and, most importantly, the fact that NPS users are often unaware of what they are actually consuming can complicate the situation with NPS. The use of NPS products containing a variety of psychoactive substances that may or may not be known to the user potentially exposes the user to additional serious health risks, as little or no scientific information is available to determine the psychoactive effects that these combinations may have.

Understanding the use of new psychoactive substances

In the past few years, a growing number of NPS have been sold on illicit drug markets. Available NPS may or may

FIG. 71 Examples of seized products of new psychoactive substances containing combinations of substances

<table>
<thead>
<tr>
<th>PRODUCT 1</th>
<th>PRODUCT 2</th>
<th>PRODUCT 3</th>
<th>PRODUCT 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPS group of the main substance: Synthetic cannabinoids</td>
<td>NPS group of the main substance: Phenethylamines</td>
<td>NPS group of the main substance: Phenethylamines</td>
<td>NPS group of the main substance: Synthetic cathinones</td>
</tr>
<tr>
<td>AM-2201</td>
<td>25B-NBOMe</td>
<td>4-MA</td>
<td>Pentedrone</td>
</tr>
<tr>
<td>XLR-11</td>
<td>2SC-NBOMe</td>
<td>Amphetamine</td>
<td>Cocaine</td>
</tr>
<tr>
<td>Cannabis</td>
<td>2C-C</td>
<td>2C-B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRODUCT 5</th>
<th>PRODUCT 6</th>
<th>PRODUCT 7</th>
<th>PRODUCT 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPS group of the main substance: Synthetic cannabinoids</td>
<td>NPS group of the main substance: Synthetic cannabinoids</td>
<td>NPS group of the main substance: Piperazines</td>
<td>NPS group of the main substance: Synthetic cathinones</td>
</tr>
<tr>
<td>AM-2201</td>
<td>5-MeO-DALT</td>
<td>TFMPP</td>
<td>3-MMC</td>
</tr>
<tr>
<td></td>
<td>pFPP</td>
<td>Lipodacaine</td>
<td>3,4-DMCC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>alpha-PVP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MPA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Caffeine</td>
</tr>
<tr>
<td>JWH-122</td>
<td>JWH-210</td>
<td>JWH-250</td>
<td>MDPV</td>
</tr>
<tr>
<td>JWH-122</td>
<td>JWH-210</td>
<td>JWH-250</td>
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<tr>
<td>JWH-122</td>
<td>JWH-210</td>
<td>JWH-250</td>
<td></td>
</tr>
<tr>
<td>JWH-122</td>
<td>JWH-210</td>
<td>JWH-250</td>
<td></td>
</tr>
</tbody>
</table>

Source: UNODC survey on new psychoactive substances, 2014.

Note: The main substance found in each product is listed first.

231 UNODC survey on new psychoactive substances, 2014.

232 Ibid.
not have effects and profiles similar to those of the substances under international control that they are designed to mimic.\textsuperscript{233} A large number of NPS are designed to mimic the effects of controlled drugs such as cannabis, cocaine, heroin, LSD, MDMA (“ecstasy”) or methamphetamine. Analysis of the pharmacological effects of NPS reported up to December 2015\textsuperscript{234} revealed that the majority of those substances were synthetic cannabinoid receptor agonists, stimulants and classic hallucinogens.

Data on the prevalence of NPS use indicate diverse trends. Among the reasons for this are the limited data available for comparing the prevalence of NPS use over time, limited survey tools for capturing NPS use and limited knowledge of NPS users about the substances they use. In the United States, there are indications of an increase in NPS use among certain user groups between 2009 and 2013; the prevalence of lifetime use of a “novel psychoactive substance” among the population aged 12-34 was 1.2 per cent in 2013.\textsuperscript{235} There are signs of declining use of synthetic cannabinoids among secondary school students in the United States. The prevalence of past-year use of synthetic cannabinoids among twelfth-grade students decreased from 11.4 per cent in 2011 to 5.2 per cent in 2015.\textsuperscript{236} This is associated with an increase, over the same period, in the perceived risk of taking synthetic cannabinoids among the same group. The use of NPS with stimulant effects (reported as “bath salts”) among twelfth graders remained stable at 1 per cent in 2015. The prevalence of the use of synthetic cannabinoids among eighth, tenth and twelfth graders has declined to the lowest levels since the collection of such data began. However, the large amount of synthetic cannabinoids seized between 2012 and 2014 (more than 93 tons) and the large number of calls to poison centres for problems related to the use of synthetic cannabinoids (3,682 in 2014 and 7,779 in 2015)\textsuperscript{237} indicate the continued presence and use of this NPS group in the United States.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{fig72}
\caption{Proportion of new psychoactive substances by pharmacological effect, December 2015}
\end{figure}

\begin{itemize}
\item Synthetic cannabinoid receptor agonists, 35%
\item Classic hallucinogens, 18%
\item Dissociatives, 3%
\item Stimulants, 35%
\item Sedatives/Hypnotics, 2%
\item Opioids, 2%
\item Not yet assigned, 5%
\end{itemize}


According to the Crime Survey for England and Wales,\textsuperscript{238} over the period 2014-2015, 279,000 adults (0.9 per cent of the population aged 16-59) reported the use of NPS. Among young adults (ages 16-24), the prevalence of NPS use was much higher (2.8 per cent), the majority of the users being young men. Herbal smoking mixtures were the most commonly used form of NPS, with 61 per cent of the population aged 16-59 reporting their use. According to Public Health England,\textsuperscript{239} the number of individuals “presenting to treatment” for a “club drug” or NPS more than doubled, from 2,727 to 5,532, between the financial years 2009-2010 and 2014-2015. The largest increase was recorded for mephedrone — from 953 in the period 2010-2011 to 2,024 in the period 2014-2015. Compared with the previous period, the prevalence of past-year use of mephedrone in England and Wales in the financial years 2014-2015 remained stable at 1.9 per cent for young adults and 0.5 per cent for adults, which is similar to the prevalence of past-year use of amphetamines (0.6 per cent) and higher than that of LSD (0.4 per cent) or heroin (0.1 per cent).\textsuperscript{240}

\begin{itemize}
\end{itemize}

\textsuperscript{233} For more information, see UNODC, \textit{The Challenge of New Psychoactive Substances} (Vienna, March 2013).
\textsuperscript{234} The analysis covered the pharmacological effects of 621 synthetic NPS registered in the early warning advisory up to December 2015. Plant-based substances were excluded from the analysis, as they usually contain a large number of different substances, some of which may not even be known or may have effects and interactions that are not fully understood. The pharmacological effects of the remaining substances could not be determined with certainty on the basis of the available scientific data.
\textsuperscript{235} Some authors have reported an increase in NPS use among persons aged 12-34 years in the United States between 2009 and 2013 but also highlighted the risk of underreporting NPS use (see, for example, Joseph J. Palamar and others, “Self-reported use of novel psychoactive substances in a US nationally representative survey: prevalence, correlates, and a call for new survey methods to prevent underreporting”, \textit{Drug and Alcohol Dependence}, vol. 156, pp. 112-119).
In 2014, Chile reported for the first time data on the prevalence of past-year use of synthetic cannabinoids: 0.56 per cent, among adults (ages 15-64), which is similar to the prevalence of the use of hallucinogens (0.55 per cent) and opioids (0.58 per cent).

In several countries, the surge in NPS use in prisons has been reported with a corresponding rise in violence and hospital admissions. There are indications that synthetic cannabinoids, in particular, have emerged as a major problem. The substances abused by prisoners in England and Wales were reported to be primarily cannabis (13 per cent), synthetic cannabinoids (10 per cent), heroin (7 per cent) and other NPS (5 per cent). Although synthetic cannabinoids were identified as a concern in 37 per cent of the male prisons inspected in the financial year 2013-2014, this proportion increased to 64 per cent in the financial year 2014-2015. According to reports, many prison staff and prisoners reported high levels of synthetic cannabinoid use, which was associated with mental and physical health problems, as well as altered behaviour of prisoners. In New Zealand, about 47 per cent of detainees used synthetic cannabinoids in 2014. While the past-year prevalence of the use of synthetic cannabinoids in 2014 remained unchanged compared with 2013, the past-year frequency of the use of synthetic cannabinoids increased, from 67 days in 2013 to 110 days in 2014. A third (30 per cent) of the detainees who had used synthetic cannabinoids in the past twelve months reported perceived dependence in 2014, up from 17 per cent in 2013. Other NPS reported by detainees to be used included MDPV and ketamine.

The injecting use of NPS, particularly synthetic cathinones, continues to be reported among specific high-risk user groups and was associated with an elevated or even increasing rate of HIV infection. These include young people, subgroups of MSM, people who have previously injected other drugs and people who have switched from snorting to injecting. In a study conducted in Hungary, 92 of 167 PWID tested HIV-positive, the most common drug injected being pentedrone (48 per cent). In Ireland, an unexpected increase in cases of acute HIV infection among PWID in 2015 was associated with the injecting use of the synthetic cathinone \textit{alpha-pyrolidinopentiophene} (\textit{alpha-PVP}) among so-called “chaotic” PWID. Injecting was reported to occur multiple times a day, with users often reusing syringes and sharing filters. According to Public Health England, within five years of the first appearance of mephedrone around 1 in 10 PWID reported the injection of mephedrone. Increased mephedrone use was also reported by subgroups of MSM who injected the substance for use in a sexual context (“chemsex”), often sharing injecting equipment and engaging in unprotected sex. These findings indicate an increase in the number of people who inject synthetic cathinones in Europe, an increase in high-risk behaviour and a higher risk of acquiring blood-borne viruses such as HIV and hepatitis C.

\begin{itemize}
\item 241 Chile, Ministerio del Interior y Seguridad Pública, “Décimo Primer Estudio Nacional de Drogas en Población General: Resultados Principales” (Santiago de Chile, Observatorio Chileno de Drogas, July 2014).
\item 242 United Kingdom, Her Majesty’s Inspectorate of Prisons, Changing Patterns of Substance Misuse in Adult Prisons and Service Responses (London, 2015).
\item 246 Chris Wilkins and others, New Zealand Arrestee Drug Use Monitoring 2010-2014 (Auckland, SHORE and Whakiri Research Centre, Massey University, 2015).
\item 247 MDPV has been under international control since 2015.
\end{itemize}