

ANALYSIS OF DRUG MARKETS

Opiates, cocaine, cannabis,
synthetic drugs

WORLD ∞
DRUG
REPORT 201

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PREFACE

Both the range of drugs and drug markets are expanding and diversifying as never before. The findings of this year's *World Drug Report* make clear that the international community needs to step up its responses to cope with these challenges.

We are facing a potential supply-driven expansion of drug markets, with production of opium and manufacture of cocaine at the highest levels ever recorded. Markets for cocaine and methamphetamine are extending beyond their usual regions and, while drug trafficking online using the darknet continues to represent only a fraction of drug trafficking as a whole, it continues to grow rapidly, despite successes in shutting down popular trading platforms.

Non-medical use of prescription drugs has reached epidemic proportions in parts of the world. The opioid crisis in North America is rightly getting attention, and the international community has taken action. In March 2018, the Commission on Narcotic Drugs scheduled six analogues of fentanyl, including carfentanil, which are contributing to the deadly toll. This builds on the decision by the Commission at its sixtieth session, in 2017, to place two precursor chemicals used in the manufacture of fentanyl and an analogue under international control.

However, as this *World Drug Report* shows, the problems go far beyond the headlines. We need to raise the alarm about addiction to tramadol, rates of which are soaring in parts of Africa. Non-medical use of this opioid painkiller, which is not under international control, is also expanding in Asia. The impact on vulnerable populations is cause for serious concern, putting pressure on already strained health-care systems.

At the same time, more new psychoactive substances are being synthesized and more are available than ever, with increasing reports of associated harm and fatalities.

Drug treatment and health services continue to fall short: the number of people suffering from drug use disorders who are receiving treatment has remained low, just one in six. Some 450,000 people died in 2015 as a result of drug use. Of those deaths, 167,750 were a direct result of drug use disorders, in most cases involving opioids.

These threats to health and well-being, as well as to security, safety and sustainable development, demand an urgent response.

The outcome document of the special session of the General Assembly on the world drug problem held in 2016 contains more than 100 recommendations on promoting evidence-based prevention, care and other measures to address both supply and demand.

We need to do more to advance this consensus, increasing support to countries that need it most and improving international cooperation and law enforcement capacities to dismantle organized criminal groups and stop drug trafficking.

The United Nations Office on Drugs and Crime (UNODC) continues to work closely with its United Nations partners to assist countries in implementing the recommendations contained in the outcome document of the special session, in line with the international drug control conventions, human rights instruments and the 2030 Agenda for Sustainable Development.

In close cooperation with the World Health Organization, we are supporting the implementation of the *International Standards on Drug Use Prevention* and the international standards for the treatment of drug use disorders, as well as the guidelines on treatment and care for people with drug use disorders in contact with the criminal justice system.


The World Drug Report 2018 highlights the importance of gender- and age-sensitive drug policies, exploring the particular needs and challenges of women and young people. Moreover, it looks into

increased drug use among older people, a development requiring specific treatment and care.

UNODC is also working on the ground to promote balanced, comprehensive approaches. The Office has further enhanced its integrated support to Afghanistan and neighbouring regions to tackle record levels of opiate production and related security risks. We are supporting the Government of Colombia and the peace process with the Revolutionary Armed Forces of Colombia (FARC) through alternative development to provide licit livelihoods free from coca cultivation.

Furthermore, our Office continues to support efforts to improve the availability of controlled substances for medical and scientific purposes, while preventing misuse and diversion – a critical challenge if we want to help countries in Africa and other regions come to grips with the tramadol crisis.

Next year, the Commission on Narcotic Drugs will host a high-level ministerial segment on the 2019 target date of the 2009 Political Declaration and Plan of Action on International Cooperation towards an Integrated and Balanced Strategy to Counter the World Drug Problem. Preparations are under way. I urge the international community to take this opportunity to reinforce cooperation and agree upon effective solutions.



Yury Fedotov
Executive Director
United Nations Office on Drugs and Crime



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The boundaries and names shown and the designations used on maps do not imply official endorsement or acceptance by the United Nations. A 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. Disputed boundaries (China/India) are represented by cross-hatch owing to the difficulty of showing sufficient detail.

The designations employed and the presentation of the material in the *World Drug Report* do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities or concerning the delimitation of its frontiers or boundaries.

Countries and areas are referred to by the names that were in official use at the time the relevant data were collected.

All references to Kosovo in the *World Drug Report*, if any, should be understood to be in compliance with Security Council resolution 1244 (1999).

Since there is some scientific and legal ambiguity about the distinctions between “drug use”, “drug misuse” and “drug abuse”, the neutral terms “drug use” and “drug consumption” are used in the *World Drug Report*. The term “misuse” is used only to denote the non-medical use of prescription drugs.

All uses of the word “drug” in the *World Drug Report* refer to substances controlled under the international drug control conventions.

All analysis contained in the *World Drug Report* is based on the official data submitted by Member States to the United Nations Office on Drugs and Crime through the annual report questionnaire unless indicated otherwise.

The data on population used in the *World Drug Report* are taken from: *World Population Prospects: The 2017 Revision* (United Nations, Department of Economic and Social Affairs, Population Division).

References to dollars (\$) are to United States dollars, unless otherwise stated.

References to tons are to metric tons, unless otherwise stated.

The following abbreviations have been used in the present booklet:

- ATS** amphetamine-type stimulants
- EMCDDA** European Monitoring Centre for Drugs and Drug Addiction
- Europol** European Union Agency for Law Enforcement Cooperation
- 4-FA** 4-fluoroamphetamine
- MDMA** 3,4-methylenedioxyamphetamine
- 3-MMC** 3-methylmethcathinone
- NPS** new psychoactive substances
- PWID** people who inject drugs
- UNODC** United Nations Office on Drugs and Crime
- WHO** World Health Organization
- SAMHSA** Substance Abuse and Mental Health Administration



KEY FINDINGS

Afghan opium poppy cultivation drives record opiate production

Total global opium production jumped by 65 per cent from 2016 to 2017, to 10,500 tons, easily the highest estimate recorded by UNODC since it started estimating global opium production at the beginning of the twenty-first century.

A marked increase in opium poppy cultivation and a gradual increase in opium poppy yields in Afghanistan resulted in opium production in the country reaching 9,000 tons in 2017, an increase of 87 per cent from the previous year. Among the drivers of that increase were political instability, lack of government control and reduced economic opportunities for rural communities, which may have left the rural population vulnerable to the influence of groups involved in the drug trade.

The surge in opium poppy cultivation in Afghanistan meant that the total area under opium poppy cultivation worldwide increased by 37 per cent from 2016 to 2017, to almost 420,000 ha. More than 75 per cent of that area is in Afghanistan.

Overall seizures of opiates rose by almost 50 per cent from 2015 to 2016. The quantity of heroin seized globally reached a record high of 91 tons in 2016. Most opiates were seized near the manufacturing hubs in Afghanistan.

Towards a multifaceted global opioid crisis

The non-medical use of pharmaceutical opioids is of increasing concern for both law enforcement authorities and public health professionals. Different pharmaceutical opioids are misused in different regions. In North America, illicitly sourced fentanyl, mixed with heroin or other drugs, is driving the unprecedented number of overdose deaths. In Europe, the main opioid of concern remains heroin, but the non-medical use of methadone, buprenorphine and fentanyl has also been reported. In countries in West and North Africa and the Near

and Middle East, the non-medical use of tramadol, a pharmaceutical opioid that is not under international control, is emerging as a substance of concern.

Non-medical use and trafficking of tramadol are becoming the main drug threat in parts of Africa

The focus of attention for global seizures of pharmaceutical opioids is now firmly on countries in West and Central Africa and North Africa, which accounted for 87 per cent of the global total in 2016. Countries in Asia, which had previously accounted for more than half of global seizures, reported just 7 per cent of the global total in 2016.

The rise in seizures of pharmaceutical opioids in Africa is mostly due to the worldwide popularity of tramadol, an opioid used to treat moderate and moderate-to-severe pain that is widely trafficked for non-medical use in the region. Tramadol is smuggled to various markets in West and Central Africa and North Africa, from where some of it is trafficked onwards to countries in the Near and Middle East. Countries in those subregions have reported the rapid expansion of the non-medical use of tramadol, in particular among some vulnerable populations. The drug is not yet under international control and is perceived by recreational users as a way of boosting energy and improving mood. However, tramadol can produce physical dependence, with WHO studies showing that this dependence may occur when it is used daily for more than a few weeks.

While some tramadol is diverted from licit channels, most of the tramadol seized worldwide in the period 2012–2016 appears to have originated in clandestine laboratories in Asia.

Non-medical use of pharmaceutical opioids reaches epidemic proportions in North America

In 2015 and 2016, for the first time in half a century, life expectancy in the United States of America

declined for two consecutive years. A key factor was the increase in unintentional injuries, which includes overdose deaths.

In 2016, 63,632 people died from a drug overdose in the United States, the highest number on record and a 21 per cent increase from the previous year. This was largely due to a rise in deaths associated with pharmaceutical opioids, including fentanyl and fentanyl analogues. This group of opioids, excluding methadone, was implicated in 19,413 deaths in the country, more than double the number in 2015. Evidence suggests that Canada is also affected, with a large number of overdose deaths involving fentanyl and its analogues in 2016.

Illicit fentanyl and its analogues are reportedly mixed into heroin and other drugs, such as cocaine and MDMA, or “ecstasy”, or sold as counterfeit prescription opioids. Users are often unaware of the contents of the substance they are taking, which inevitably leads to a great number of fatal overdoses.

Outside North America, the impact of fentanyl and its analogues is relatively low. In Europe, for example, opiates such as heroin and morphine continue to predominate, although some deaths involving fentanyl analogues have started to emerge in the region. A notable exception is Estonia, where fentanyl has long been regarded as the most frequently misused opioid. The downward trend in opiate use since the late 1990s observed in Western and Central Europe appears to have come to an end in 2013. In that subregion as whole, 12 countries reported stable trends in heroin use in 2016, two reported a decline and three an increase.

A notable increase has been seen in cocaine manufacture

Global cocaine manufacture in 2016 reached its highest level ever: an estimated 1,410 tons. After falling during the period 2005–2013, global cocaine manufacture rose by 56 per cent during the period 2013–2016. The increase from 2015 to 2016 was 25 per cent.

Most of the world’s cocaine comes from Colombia, which boosted its manufacture by more than one third from 2015 to 2016, to some 866 tons. The total area under coca cultivation worldwide in 2016 was 213,000 ha, almost 69 per cent of which was in Colombia.

The dramatic resurgence of coca bush cultivation in Colombia — which had almost halved from 2000 to 2013 — came about for a number of reasons related to market dynamics, the strategies of trafficking organizations and expectations in some communities of receiving compensation for replacing coca bush cultivation, as well as a reduction in alternative development interventions and in eradication. In 2006, more than 213,000 ha were eradicated. Ten years later, the figure was less than 18,000 ha.

The result has been a perceived decrease in the risk of coca cultivation and a dramatic scaling-up of manufacture. Colombia has seen massive rises in both the number of cocaine laboratories dismantled and the amount of cocaine seized.

Africa and Asia have emerged as cocaine trafficking and consumption hubs

Most indicators from North America suggest that cocaine use rose between 2013 and 2016. In 2013, there were fewer than 5,000 cocaine-related deaths in the United States, but by 2016 the figure was more than 10,000. Although many of those deaths also involved synthetic opioids and cannot be attributed exclusively to higher levels of cocaine consumption, the increase is nonetheless a strong indicator of increasing levels of harmful cocaine use.

The biggest growth in cocaine seizures in 2016 took place in Asia and Africa, reflecting the ongoing spread of cocaine trafficking and consumption to emerging markets. Although starting from a much lower level than North America, the quantity of cocaine seized in Asia tripled from 2015 to 2016; in South Asia, it increased tenfold. The quantity of cocaine seized in Africa doubled in 2016, with countries in North Africa seeing a sixfold increase and accounting for 69 per cent of all the cocaine seized in the region in 2016. This was in contrast to previous years, when cocaine tended to be seized mainly in West and Central Africa.

Cannabis remains the world’s most commonly used drug

Cannabis was the most commonly used drug in 2016, with 192 million people using it at least once in the past year. The global number of cannabis users continues to rise and appears to have increased

by roughly 16 per cent in the decade ending 2016, which is in line with the increase in the world population.

The quantities of cannabis herb seized globally declined by 27 per cent, to 4,386 tons, in 2016. The decline was particularly marked in North America, where the availability of medical cannabis in many jurisdictions and the legalization of cannabis for recreational use in several states of the United States may have played a role.

Latest developments in recreational cannabis regulations

Since 2017, the non-medical use of cannabis has been allowed in eight state-level jurisdictions in the United States, in addition to the District of Columbia. Colorado was one of the first states to adopt measures to allow the non-medical use of cannabis in the United States. Cannabis use has increased significantly among the population aged 18–25 years or older in Colorado since legalization, while it has remained relatively stable among those aged 17–18 years. However, there has been a significant increase in cannabis-related emergency room visits, hospital admissions and traffic deaths, as well as instances of people driving under the influence of cannabis in the State of Colorado.

In Uruguay, up to 480 grams per person per year of cannabis can now be obtained through pharmacies, cannabis clubs or individual cultivation. Cannabis regulation in the country allows for the possession of cannabis products with a tetrahydrocannabinol content of up to 9 per cent and a minimum cannabidiol content of 3 per cent. In mid-2017, the registration of those who choose to obtain cannabis for non-medical use through pharmacies began, as did the sale of the drug through a network of 16 pharmacies.

Major markets for methamphetamine continue to grow

East and South-East Asia and North America remain the two main subregions for methamphetamine trafficking worldwide. In North America, the availability of methamphetamine was reported to have increased between 2013 and 2016, and, in 2016, the drug was reported to be the second greatest drug threat in the United States after heroin. Based on

qualitative assessments, increases in consumption, manufacturing capacity and in the amounts seized point to a growing market for methamphetamine in East and South-East Asia and Oceania, where the use of crystalline methamphetamine in particular has become a key concern.

Trafficking in amphetamine expands beyond established markets

For many years, amphetamine dominated synthetic drug markets in the Near and Middle East and Western and Central Europe, but recent increases in the quantities seized in North Africa and North America point to growing activity in other subregions. While the reasons for the spike in the quantity of amphetamine seized in North Africa are not entirely clear, it may be related to the trafficking of amphetamine destined for the large market in the neighbouring subregion of the Near and Middle East.

The synthetic drug market grows in complexity and diversity

In recent years, hundreds of NPS have emerged, adding to the established synthetic drug market for ATS. Grouped by their main pharmacological effect, the largest portion of NPS reported since UNODC began monitoring are stimulants, followed by cannabinoid receptor agonists and classic hallucinogens. A total of 803 NPS were reported in the period 2009–2017. The global NPS market remains widely diversified, but except for a few substances, NPS do not seem to have established themselves on drug markets or replaced traditional drugs on a larger scale.

Use of new psychoactive substances leads to an increase in related harm

Although the overall quantity of NPS seized fell in 2016, an increasing number of countries have been reporting NPS seizures and concerns have been growing over the harm caused by the use of NPS. In several countries, an increasing number of NPS with opioid effects emerging on the market have been associated with fatalities. The injecting use of stimulant NPS also remains a concern, in particular because of reported associated high-risk injecting practices. NPS use in prison and among people on probation remains an issue of concern in some countries in Europe, North America and Oceania.

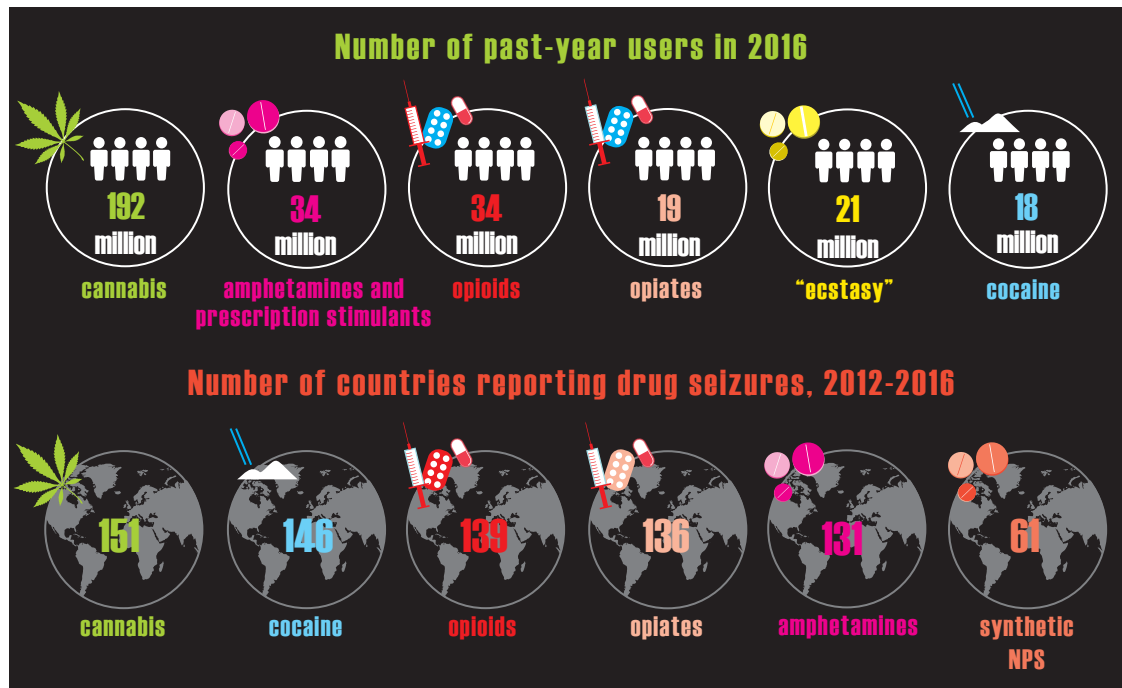
Kratom is emerging as a popular plant-based new psychoactive substance

Kratom products are derived from the leaf of the kratom tree, which is used in South-East Asia as a traditional remedy for minor ailments and for non-medical purposes. Few countries have placed kratom under national legal control, making it relatively easy to buy. There are now numerous products around the world advertised as containing kratom, which usually come mixed with other substances. Some opioid users in the United States have reported using kratom products for the self-management of withdrawal symptoms. Some 500 tons of kratom were seized during 2016, triple the amount of the previous year, suggesting a boom in its popularity.

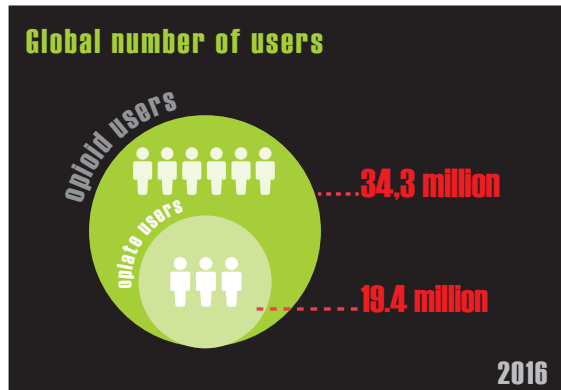
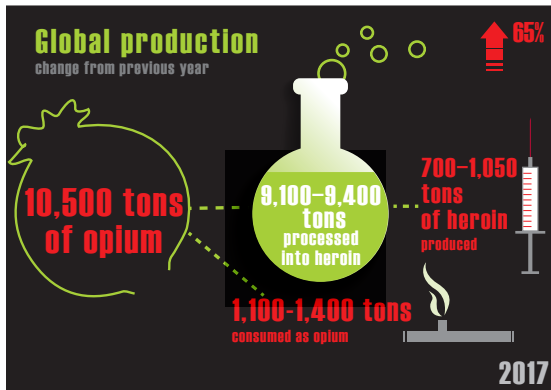
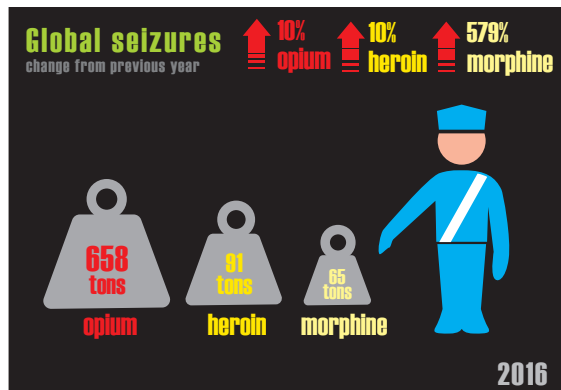
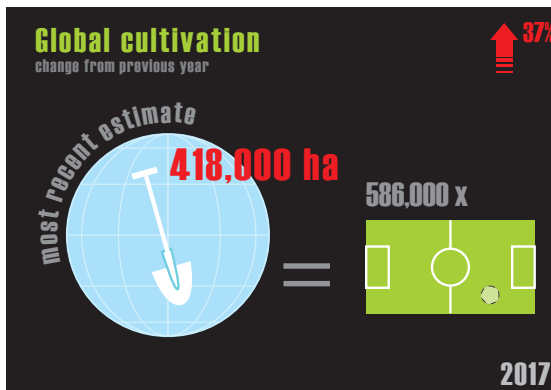
INTRODUCTION

This booklet constitutes the third chapter of the *World Drug Report 2018*. This booklet presents a global analysis of the markets for opioids, cocaine, cannabis and synthetic drugs, including ATS and NPS. The market section examines recent developments in seizures made along major trafficking routes and in destination countries, as well as significant developments in the consumption of

plant-based drugs and synthetic drugs in all regions. The section on cannabis focuses on the evidence that has become available in the State of Colorado since it was among the first adopters of measures to allow non-medical use of cannabis in the United States. The section also provides a brief update on the status of implementation of the cannabis regulation in Uruguay.



A. OPIOIDS



Note: All data refer to 2016 except cultivation and production, which refer to 2017 (preliminary).

The global area under opium poppy cultivation increased by more than a third in 2017, while global opium production increased by almost two thirds

The total area under opium poppy cultivation worldwide is estimated to have increased by some 37 per cent to almost 420,000 ha from 2016 to 2017, primarily reflecting an increase in the cultivation of opium poppy in Afghanistan. With 328,000 ha under opium poppy cultivation, Afghanistan accounted for more than three quarters of the estimated global area under illicit opium poppy cultivation in 2017, a record level.

By contrast, opium poppy cultivation in Myanmar, the country with the world’s second largest area under opium poppy cultivation (accounting for 10 per cent of the global estimated area in 2017), declined over the period 2015–2017 by some 25 per cent to 41,000 ha, the lowest level since 2010.

Global opium production increased by 65 per cent to 10,500 tons in 2017, the highest level since UNODC started estimating global opium production on an annual basis at the beginning of the twenty-first century.¹ The surge in global production primarily reflects an 87 per cent increase in opium production in Afghanistan to a record high of 9,000 tons, equivalent to 86 per cent of estimated global

1 Opium production estimates have existed since the proceedings of the Shanghai Opium Commission in 1909. Such estimates were, however, based on different methodologies (such as payment of taxes and other levies by opium farmers) and thus may not be fully comparable with the data presented since UNODC started estimating global opium production in 2000 (largely based on remote sensing and scientific yield surveys). The previous estimates included 16,600 tons of opium calculated for the year 1934, based on official reports by the League of Nations (UNODC, “A century of international drug control” (2009)), and 41,600 tons of opium for the period 1906/07, based on data reported by the International Opium Commission (*Report of the International Opium Commission, Shanghai, China, February 1 to February 26, 1909*). For more details, see the online methodological annex of this report.

Record increase in opium poppy cultivation in Afghanistan: future challenges

The record level of opium poppy cultivation in Afghanistan in 2017 is likely to create multiple challenges for the country, neighbouring countries and the many other countries of transit and destination for Afghan opiates. Afghanistan is one of the least developed countries in the world, and the impact of illicit drug cultivation and production on economic, environmental and social development continues to be multifaceted. Increased levels of opium poppy cultivation, opium production and illicit trafficking of opiates will exacerbate the harmful effects of the existing large-scale production of opiates and are likely to fuel further instability and insurgency and increase funding to terrorist groups in Afghanistan. The expanding illicit economy, which in many provinces has permeated rural societies and made many communities dependent on income from opium poppy cultivation, will further constrain the development of the licit economy and potentially fuel corruption.

Moreover, the transformation of opium into heroin is likely to bring increased trafficking of precursor substances, which will potentially be diverted from licit international markets and smuggled into Afghanistan to supply manufacturers of heroin. More high-quality, low-cost heroin will reach consumer markets across the world, with increased consumption and related harms being the likely consequence. Only a small share of the revenues generated by the cultivation and trafficking of Afghan opiates reaches Afghan drug trafficking groups. Many more billions of dollars are made from trafficking opiates into major consumer markets, mainly in Europe and Asia. Addressing the opiate problem in Afghanistan is therefore a shared responsibility.

Source: UNODC and the Ministry of Counter-Narcotics of Afghanistan, *Afghanistan Opium Survey 2017: Cultivation and Production* (Vienna, 2017), p. 7.

opium production in 2017. The increase in production in Afghanistan was not only due to an increase in the area under poppy cultivation but also to improving opium yields. There is no single reason for the massive increase in opium poppy cultivation in Afghanistan in 2017 as the drivers are multiple, complex and geographically diverse, and many elements continue to influence farmers' decisions regarding opium poppy cultivation. A combination of events may have exacerbated rule-of-law challenges, such as political instability, corruption, a lack of government control and security. The shift in strategy by the Afghan Government — focusing its efforts on countering anti-government elements in densely populated areas — may have made the rural population more vulnerable to the influence of anti-government elements. A reduction in the engagement of the international aid community may also have hindered socioeconomic development opportunities in rural areas.²

As a result of the massive increase in opium production in 2017, opium prices fell in Afghanistan by 47 per cent from December 2016 to December 2017. However, the price of high-quality Afghan heroin decreased by just 7 per cent over the same period, which may be an indication that heroin

manufacture to date has increased far less than opium production.³

Of the 10,500 tons of opium produced worldwide in 2017, it is estimated that some 1,100–1,400 tons remained unprocessed for consumption as opium, while the rest was processed into heroin, resulting in an estimate of between 700 and 1,050 tons of heroin manufactured worldwide (expressed at export purity), 550–900 tons of which were manufactured in Afghanistan.

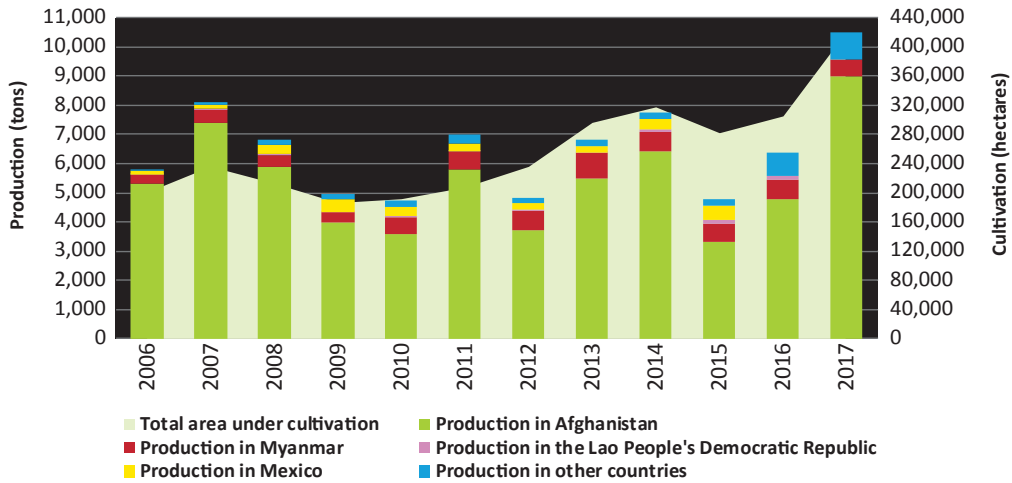
In contrast to the situation in Afghanistan, opium production in Myanmar decreased over the period 2015–2017 by some 14 per cent to an estimated 550 tons, equivalent to 5 per cent of the global opium production estimate. Despite this decline, the opium price fell by almost 30 per cent to \$153 per kg in Myanmar in 2017,⁴ and the quantity of opiates seized also decreased, suggesting a decrease in demand for opiates produced in Myanmar. This may be linked to the massive expansion in the supply

2 Afghanistan, Ministry of Counter-Narcotics and UNODC, *Afghanistan Opium Survey 2017* (Vienna, 2017).

3 Higher quality heroin prices were, in February 2018, still only 7 per cent lower than a year earlier. (Afghanistan, Ministry of Counter-Narcotics and UNODC, "Afghanistan drug price monitoring monthly report" (February, 2018)).

4 Also, only limited data on opium prices could be collected by the opium survey field team in Myanmar in 2017, which may potentially impact on the findings (Myanmar, Central Committee for Drug Abuse Control and UNODC, *Myanmar Opium Survey 2017*, p. 16.).

FIG. 1 | Opium poppy cultivation and production of opium, 2006–2017^a



Source: UNODC, calculations are based on UNODC illicit crop monitoring surveys and the responses to the annual report questionnaire.

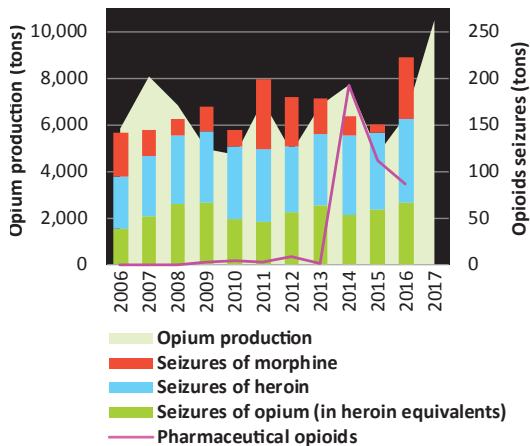
^a Data for 2017 are still preliminary. Mexico is not included in 2016/2017 due to the lack of data.

of even lower priced Afghan opiates in 2017.⁵ If confirmed, this would constitute a new phenomenon as there is no prior evidence of changes in Afghan opium production impacting on opium prices in South-East Asia, or vice versa, as the two markets have mainly existed in isolation from each other.

Another factor in the decline in the heroin price could be a decrease in the demand for opiates resulting from a switch to the use of ATS and other synthetic drugs in the subregion.

While Canada is mainly supplied with heroin from South-West Asia,⁶ countries in Latin America (mostly Mexico and, to a far lesser extent, Colombia and Guatemala) account for most of the heroin supply to the United States while also supplying the still small heroin markets of South America. However, there are no opium production estimates for Mexico for the years 2016 and 2017, as the methodology for such estimates is currently under review.

FIG. 2 | Global opium production and quantities of opioids seized, 2006–2017



Source: UNODC, responses to the annual report questionnaire; and government sources.

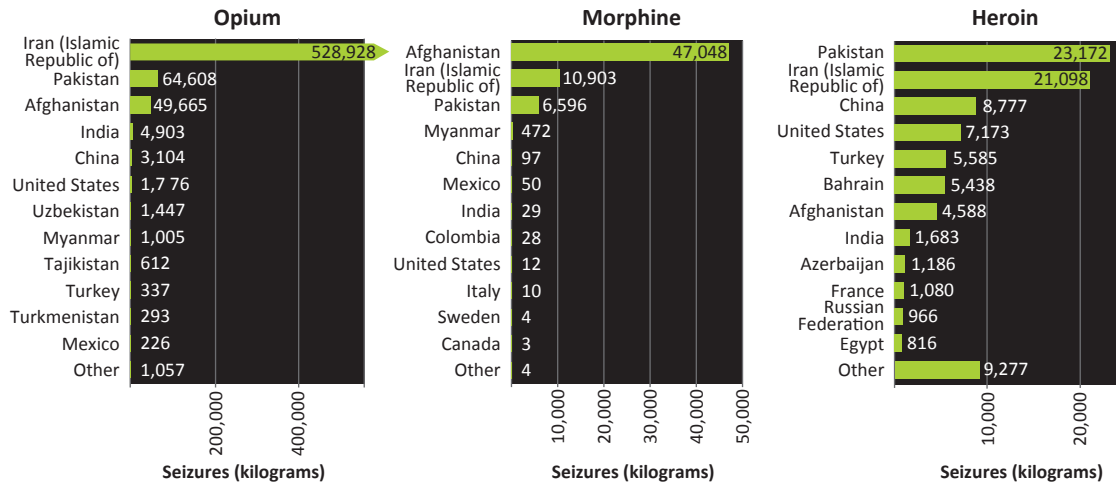
Note: A ratio of 10:1 was used to convert opium into heroin equivalents.

Opiate seizures increased to record levels in 2016 and continue to be concentrated in Asia

The total quantity of heroin seized globally reached a record high in 2016, while the quantities of opium and morphine seized reached the second highest level ever reported. The largest quantities of opiates seized were of opium (658 tons), followed by seizures of heroin (91 tons) and morphine (65 tons). Overall seizures of opiates, expressed in heroin equivalents, increased by almost 50 per cent from 2015 to 2016, of which the quantity of heroin seized exceeded that of opium and morphine.

5 Myanmar, Central Committee for Drug Abuse Control and UNODC, *Myanmar Opium Survey 2017*, p. 16.

6 UNODC, responses to the annual report questionnaire.

FIG. 3 | Countries reporting largest quantities of opiates seized, 2016

Source: UNODC, responses to the annual report questionnaire; and government sources.

As most seizures of opiates are made in, or close to, the main opium production areas, Asia, which is responsible for more than 90 per cent of global illicit opium production, accounted for 86 per cent of the total quantity of heroin and morphine seized in 2016. This is primarily a reflection of the increasing concentration of opium production in Afghanistan and the consequent increase in seizures by neighbouring countries.

Similarly to the distribution of heroin and morphine seizures, overall, 90 per cent of the total quantity of opiates (including opium), expressed in heroin equivalent, was seized in Asia, the vast majority in the Near and Middle East/South-West Asia (83 per

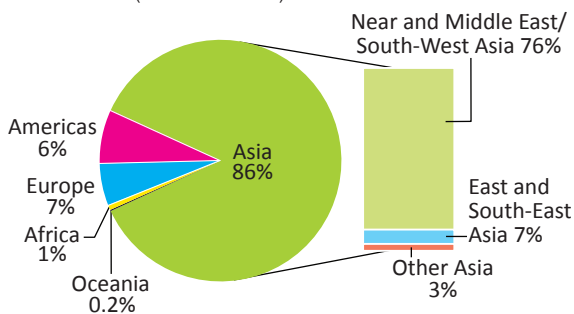
cent), while 6 per cent was seized in East and South-East Asia.

Quantities of heroin and morphine seized are on the increase in South-West Asia but on the decrease in South-East Asia, Europe and the Americas

The quantity of heroin and morphine intercepted in Asia more than doubled from 2015 to 2016 to reach 135 tons. This reflected increases in the Near and Middle East/South-West Asia of more than 150 per cent (mostly in countries neighbouring Afghanistan), a consequence of marked increases in Afghan opiate production. By contrast, the quantities of heroin and morphine seized in East and South-East Asia decreased by 6 per cent in that period, which can be linked to the decline in opiate production in Myanmar and thriving ATS trafficking in the subregion.

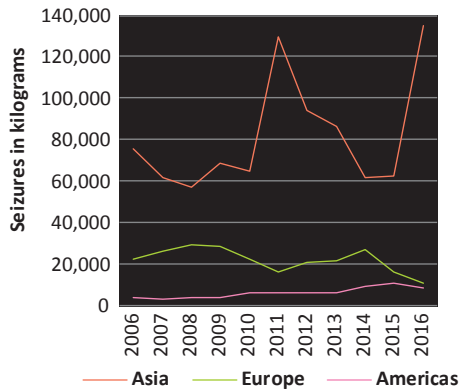
In Europe, the quantity of heroin and morphine seized fell by 32 per cent, to 11 tons, from 2015 to 2016, the smallest quantity seized since 1997, reflecting a decrease of 11 per cent in West and Central Europe, a decrease of 31 per cent in South-Eastern Europe, and a decrease of 67 per cent in Eastern Europe.

In 2016, the quantity of heroin and morphine seized in the Americas decreased, for the first time in years, by 22 per cent, mostly in North America (-25 per cent). Nevertheless, almost 90 per cent of all heroin

FIG. 4 | Distribution of global quantities of heroin and morphine seized in 2016 (N= 156 tons)

Source: UNODC, responses to the annual report questionnaire; and government sources.

FIG. 5 Quantities of heroin and morphine seized, in kilograms, for selected regions, 2006–2016



Source: UNODC, responses to the annual report questionnaire; and other government sources.

and morphine intercepted in the Americas was seized in North America, which is home to both the main heroin manufacturing country in the Americas (Mexico) and the main consumption country (United States). The decline in the quantity of heroin seized in North America has taken place in the context of the rapidly growing market for synthetic opioids, such as fentanyl and its analogues smuggled into the United States, as reflected in the doubling of the quantity of “pharmaceutical opioids” seized in North America in 2016. Overall, 25 per cent of fentanyl seizures in the United States also contained heroin in 2016 and were often sold as heroin.⁷

The quantity of heroin seized in Africa increased by 46 per cent from 2015 to 2016, but was still 85 per cent lower than at its peak in 2014.

The Balkan route continues to dominate the trafficking of opiates originating in Afghanistan

The world’s principal heroin trafficking route continues to be the so-called Balkan route, along which opiates are trafficked from Afghanistan to the Islamic Republic of Iran, Turkey, the Balkan countries and then on to various destinations in West and Central Europe. Excluding seizures made in Afghanistan, countries along the Balkan route accounted for 37

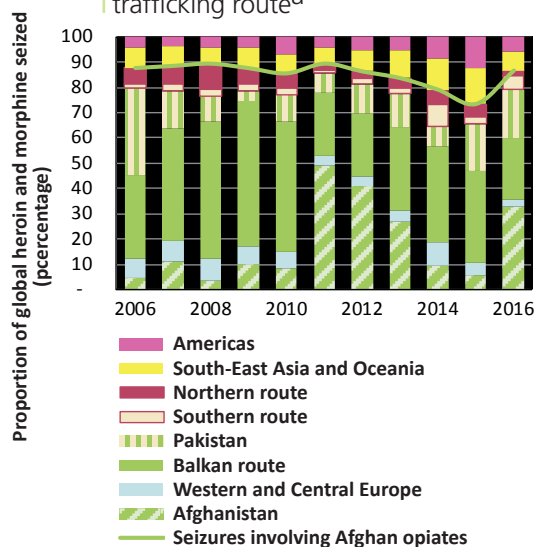
per cent of the total quantity of heroin and morphine seized worldwide in 2016, with a further 4 per cent seized by countries in Western and Central Europe. Most of the heroin and morphine seized on the Balkan route was seized in the Islamic Republic of Iran (32.0 tons), while smaller quantities were seized in Turkey (5.6 tons), the Balkan countries (0.8 tons) and the countries of Western and Central Europe (3.9 tons). Opiates are trafficked either along the eastern branch of the Balkan route from Turkey to Bulgaria and then onwards to Romania and Hungary, or along the western branch of the Balkan route from Bulgaria to various western Balkan countries, and from there to countries in Western and Central Europe.

The analysis of all countries of origin, departure and transit of seized heroin and morphine reported by West and Central European countries in the annual report questionnaire over the period 2012–2016 revealed that 80 per cent of all heroin-related mentions were linked to countries along the Balkan route. A further 6 per cent were linked to Pakistan. While some heroin is trafficked directly from Pakistan by air or sea to Europe, large opiate shipments are also trafficked from Pakistan to the Islamic Republic of Iran for onward trafficking along the Balkan route. The Islamic Republic of Iran reported that 80 per cent of the morphine and 85 per cent of the heroin it seized in 2016 had been trafficked into the country via Pakistan, with the rest being smuggled directly from Afghanistan. It should be highlighted, though, that significant amounts of Afghan opiates remain in the region for local consumption.

Much smaller amounts of heroin are trafficked along a sub-branch of the Balkan route that goes from the Islamic Republic of Iran to the countries of the southern Caucasus (mainly Azerbaijan and Georgia) for shipment across the Black Sea to Ukraine and then by land, partly through the Republic of Moldova, to Romania for onward trafficking along the eastern branch of the Balkan route to Western Europe. According to seizure data, opiate trafficking along this sub-branch of the Balkan route increased considerably for several years, with seizures of heroin and morphine rising from 121 kg in 2006 to 1.3 tons in 2016. However, 2016 seizure data for this route indicate diverging trends: heroin and morphine seizures increased sharply in Azerbaijan and

⁷ United States, Department of Justice, Drug Enforcement Administration, *2017 National Drug Threat Assessment* (October 2017).

FIG. 6 Percentage distribution of quantities of heroin and morphine seized, by main trafficking route^a



Source : UNODC, responses to the annual report questionnaire.

^a *Balkan route: the Islamic Republic of Iran—South-Eastern Europe—Western and Central Europe; the southern route: South Asia—Gulf countries and other countries in the Near and Middle East—Africa; northern route: Central Asia and Transcaucasia—Eastern Europe.*

Georgia in 2016 but declined sharply in Ukraine and Romania, which could be an indication of a greater opiate supply through the countries of the Caucasus that goes undetected, or it could be an indication that increased law enforcement operations in the countries of the Caucasus have prevented much of the onward trafficking to Ukraine and Romania. Most of the heroin seized in Romania in 2016 had transited Turkey and Bulgaria, in contrast to the situation reported in 2015, when most heroin transited Ukraine.

Quantities of heroin trafficked directly to Western and Central Europe via the southern route may be on the decrease

Some Afghan opiates are trafficked to Europe through the so-called southern route, which goes from Afghanistan to Pakistan (and partly to the Islamic Republic of Iran) for subsequent shipment to the Gulf countries and East Africa and onward trafficking to Europe, either directly by air or via Southern or West Africa by air or sea. Alternatively, drugs are trafficked along the southern route to India and other countries in South Asia for subsequent

shipment to Europe or North America (mostly Canada). Overall, 9 per cent of mentions of countries of origin, departure and transit of opiate seizures by reporting European countries were linked to opiate trafficking along the southern route over the period 2012–2016. In 2016, two European countries reported trafficking of heroin via the southern route: Belgium (10 kg, via Kenya) and Italy (65 kg, via the United Arab Emirates and via Qatar).

Heroin supply to the Russian Federation continues to transit Central Asia and Transcaucasia

Trafficking to the Russian Federation is carried out predominantly along the northern route via the countries of Central Asia, or via the countries of the Caucasus, to destination markets in the Russian Federation and, to a very small extent, for trafficking onwards to Belarus and Lithuania.⁸ In 2016, the main transit countries for heroin seized in the Russian Federation continued to be countries in Central Asia and Transcaucasia (notably Tajikistan, Kazakhstan and Azerbaijan), while Pakistan, which had been mentioned as a transit country in 2015, was no longer a major country of transit.

Despite indications of a decrease in heroin trafficking in East and South-East Asia, the subregion remains the main source of heroin to Oceania

Opiates produced in South-East Asia (mostly Myanmar) are trafficked to other markets in that subregion (mostly China and Thailand) and to Oceania (mostly Australia). Seizures made in those countries decreased by 15 per cent in 2016. In Australia, nearly all heroin quantities intercepted at the border in 2015 originated in South-East Asia (98 per cent over the period January–June 2015), but trafficking of heroin may be declining as suggested by seizures at the border which, in terms of both quantities and cases, decreased from 2014/15 to 2015/16.⁹

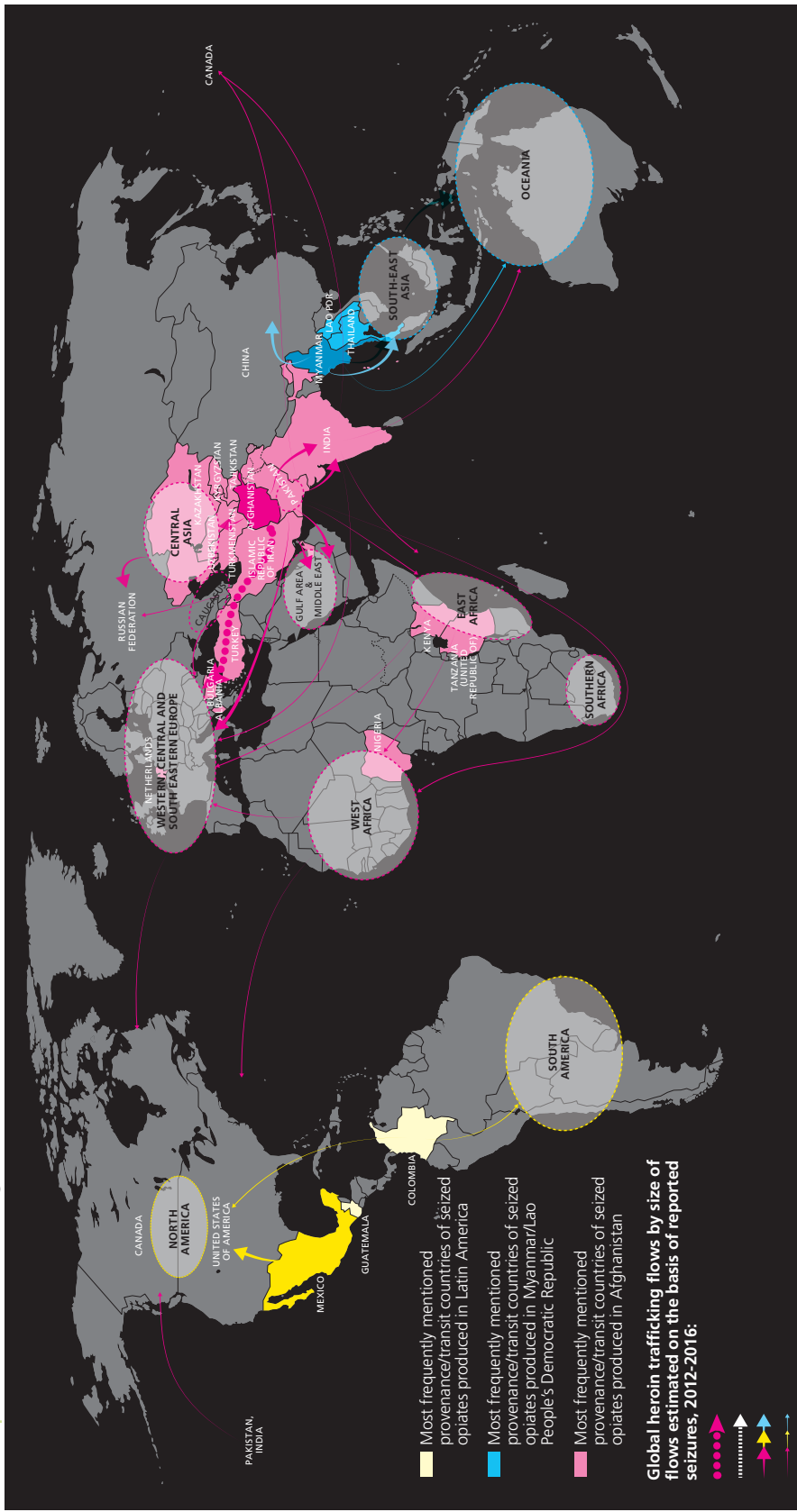
Heroin trafficking in the Americas is on the decrease, while the trafficking of synthetic opioids is on the increase

Most heroin (and morphine) trafficked in the Americas is smuggled from Mexico to the United States,

⁸ UNODC, annual report questionnaire data.

⁹ Australian Criminal Intelligence Commission, *Illicit Drug Data Report 2015-16* (Canberra, 2017).

MAP 1 | Main heroin trafficking flows, 2012–2016



Sources: UNODC, responses to the annual report questionnaire and individual drug seizure database.

Notes: The size of the trafficking flow lines is based on the amount of heroin seized in a subregion and the number of mentions of countries from where the heroin has departed (including reports of "origin" and "transit") to a specific subregion over the period 2012–2016. A darker shade indicates that the country represents more than 50 per cent of heroin production in the region. The trafficking flows are determined on the basis of country of origin/departure, transit and destination of seized drugs as reported by Member States in the annual report questionnaire and individual drug seizure database. As such, they need to be considered as broadly indicative of existing trafficking routes while several secondary flows may not be reflected. Flow arrows represent the direction of trafficking; origins of the arrows indicate either the area of manufacture or the one of last provenance, end points of arrows indicate either the area of consumption or the one of next destination of trafficking.

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 determined. A dispute exists between the Republic of Sudan and the Republic of 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).

with far smaller quantities smuggled from Colombia and Guatemala. Analysis of heroin samples in the United States over the past decade shows the increasing predominance of Mexico (90 per cent of samples analysed in 2015) as a source country of the drug, while the importance of countries in South America (3 per cent) has declined markedly. South-West Asia accounted for around 1 per cent of the samples analysed in 2015.¹⁰

Based on quantities seized, heroin trafficking in the Americas, particularly trafficking to North America, showed a clear upward trend until 2015, ending with a marked decline in 2016. This seems to have gone in parallel with an expansion in the trafficking of synthetic opioids in the region, as some organized crime groups from Mexico and, to a lesser extent, from the Dominican Republic that are involved in heroin trafficking expanded their activities to the trafficking of synthetic opioids, notably fentanyl.¹¹

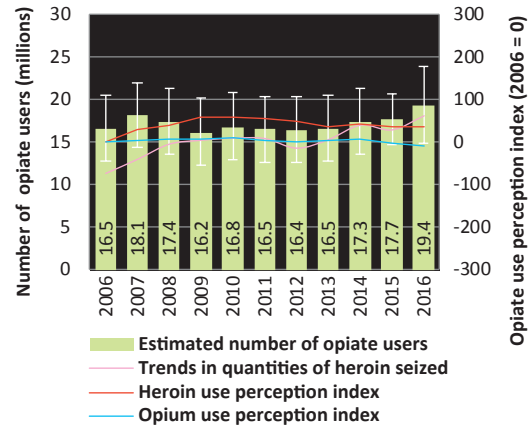
The global opiate market is on the increase again

The latest data on the number of annual opiate users suggest that there has been an expansion of the global opiate market, with 19.4 million users in 2016, or 0.4 per cent of the population aged 15–64 years. More than half of the estimated number of annual opiate users reside in Asia (58 per cent), almost one fifth in Europe (17 per cent), and one seventh in the Americas (15 per cent). The highest opiate prevalence rates were reported in the Near and Middle East/South-West Asia (1.6 per cent), North America (0.8 per cent) and Europe (0.6 per cent). While both quantities of heroin seized and the prevalence of opiate use are on the increase at global level, the heroin use perception index, based on assessments by national experts, has remained relatively unchanged in the past few years.

Signs of increases in the opiate market in West and Central Europe

The downward trend in opiate use since the late 1990s observed in Western and Central Europe appears to have come to an end in 2013. Since then

FIG. 7 Estimated number of opiate users, trends in quantities of heroin seized and heroin and opium use perception indexes (2006=100)



Source: UNODC, elaboration based on annual report questionnaire data.

the prevalence of opiate use has been increasing, with the increase being particularly marked in 2016. The 2016 increase was primarily the result of higher opiate use estimates reported by Poland, reflecting not only rising prevalence rates for heroin use (from 0.1 per cent of the population aged 15–64 in 2014 to 1.1 per cent in 2016) but also high levels of “kompot” use (1.7 per cent).¹² Also known as “Polish heroin”, “kompot” is a liquid preparation made from poppy straw, which is intended for injecting. In West and Central Europe as a whole, 12 countries reported stable trends in heroin use in 2016, two reported a decline and three an increase (up from one in 2015).

In parallel, there have been reports of rising drug-related deaths in various European countries in recent years, often linked to the use of opiates, although the ageing of drug-using cohorts may also have played a role. In England and Wales, for example, opioid-related deaths rose by more than 58 per cent over the period 2012–2016 to 2,593 cases, with heroin- and morphine-related deaths doubling over that period.¹³ In Germany, where opiates are respon-

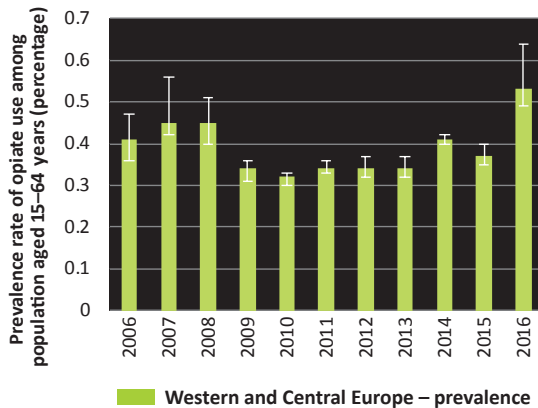
10 United States, Department of Justice, Drug Enforcement Administration, *2017 National Drug Threat Assessment* (October 2017), p. 48.

11 Drug Enforcement Administration, *2017 National Drug Threat Assessment*.

12 UNODC, data from replies to UNODC annual report questionnaire.

13 United Kingdom of Great Britain and Northern Ireland, Office for National Statistics, “Deaths related to drug poisoning in England and Wales: 2016 registrations”, *Statistical Bulletin* (Newport, 2 August 2017).

FIG. 8 Prevalence of opiate use in Western and Central Europe, 2006–2016



Source: UNODC, elaboration based on annual report questionnaire data.

sible for the bulk of all drug-related deaths, the number rose from 944 deaths in 2012 to 1,333 deaths in 2016.¹⁴

By contrast, heroin seizures have not increased in Western and Central Europe in recent years and actually decreased in 2016. The conflicting trends between demand indicators and seizures could be the result of different dynamics; for example, an increased supply of high-purity opiates (explained by larger production in Afghanistan) could go undetected yet drive a rise in demand and related health consequences.

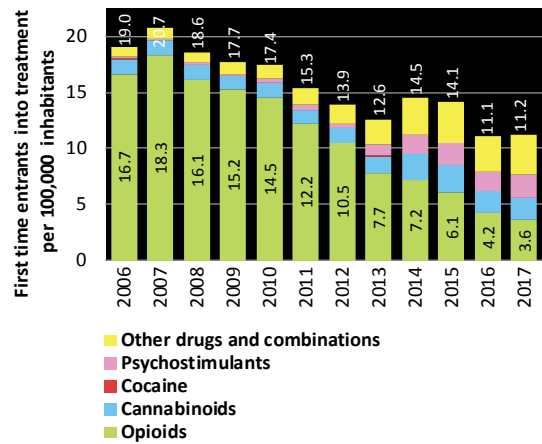
The opiate market in Eastern Europe continues to shrink

In Eastern Europe, the heroin perception use index remained largely stable from 2006 to 2016, while heroin seizures have been declining along the northern route, the main trafficking route from Afghanistan to Eastern Europe, suggesting a shrinking of the opiate market in the subregion.

In the Russian Federation, the most important opiate market in Eastern Europe, the drug market has started to change, and other drugs, particularly synthetic drugs, have started to dominate. The number of first time entrants into treatment for opioid use (mostly heroin use) declined by more than three quarters over the period 2006–2017, with a reduction in the proportion of drug treatment for

14 Germany, Bundeskriminalamt, *Rauschgiftkriminalität: Bundeslagebild 2016* (and editions of the previous years).

FIG. 9 First time entrants into drug-related treatment per 100,000 inhabitants in the Russian Federation, by drug type, 2006–2017*



Source: “Basic Functioning Indicators of the Narcological Service of the Russian Federation”. Set of statistical handbooks for 2008–2017, released by NRC on Addictions – branch of V.Serbsky NMRCPN.

*Data for 2017 are still preliminary.

opioids over time. Drug-related deaths in the Russian Federation, which are mostly linked to the use of opioids, fell from 9,354 cases in 2006 to 5,249 cases in 2016, the lowest level in a decade.¹⁵

Mixed signals from the opiate market in North America

In the Americas, expert perceptions suggest an increase in heroin use in recent years. The largest heroin market in the Americas is the United States, accounting for almost 80 per cent of all opiate users in the region and 86 per cent of all opiate users in North America. National household surveys and heroin-related deaths suggest that heroin use has been increasing for some time in the United States. While the estimated number of heroin users rose by 14 per cent in 2016 (from the previous year), the annual prevalence rate of heroin use doubled between 2010 and 2016. The increase in heroin-related deaths was primarily linked to heroin being combined with fentanyl.¹⁶

15 “Basic Functioning Indicators of the Narcological Service of the Russian Federation”. Set of statistical handbooks for 2008–2017, released by NRC on Addictions – branch of V.Serbsky NMRCPN.

16 Centers for Disease Control and Prevention, Heroin overdose data, 2018. Available at www.cdc.gov/drugoverdose/data/heroin.html.

On the other hand, workforce testing results showed a small decrease in heroin use in 2016, from 0.28 per cent in 2015 to 0.25 per cent of the federally mandated workforce and the general workforce of the United States that were tested.¹⁷ The annual prevalence of heroin use among young adults remained relatively stable in 2016 (0.4 per cent in 2016 compared with 0.5 per cent in 2015),¹⁸ while the annual prevalence of heroin use among eighth, tenth and twelfth grade students in the United States continued to decrease in 2016 (from 0.8 per cent in 2010 to 0.3 per cent in 2016) and remained at the lower level in 2017.¹⁹

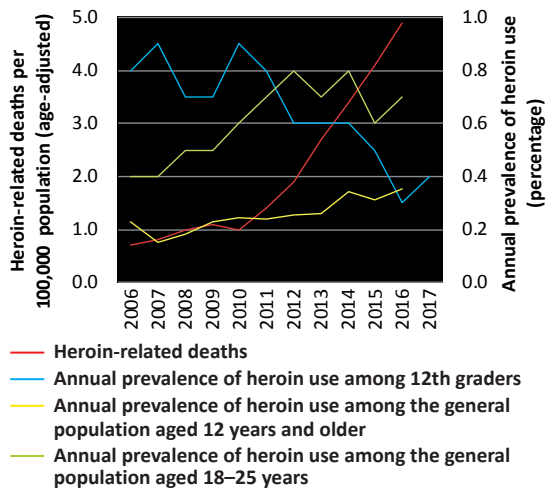
Heroin use appears to be on the increase in Africa

Information on the prevalence of opiate use in Africa and in Asia is still very limited, making it difficult to identify solid trends. Based on expert perceptions reported to UNODC, heroin use in Africa appears to have increased more than in other regions over the period 2006–2016, likely reflecting the increasing “spillover” effect of heroin trafficking from South-West Asia along the southern route. Increases in the use of heroin in East Africa were reported in 2015 by Kenya and the United Republic of Tanzania and in 2016 by Madagascar; in southern Africa by Mozambique in 2015; and in West and Central Africa by Côte d’Ivoire in 2016. In 2016, several large African countries reported a stabilization in heroin use — notably all of the North African countries, Nigeria in West and Central Africa, South Africa and Zambia in Southern Africa, and Kenya in East Africa. In the rest of Africa, expert perceptions point to a decline in heroin use in the region following several years of ongoing increases.

In Asia, data on expert perceptions suggest a decline in heroin use since 2011, particularly since 2014.

- 17 This is based on some 9 million drug tests made of workers of the federally mandated workforce and the general workforce in the United States in 2015 and 2016 (Quest Diagnostics Drug Testing Index, full year 2016 tables (May, 2017) and results of the previous year).
- 18 John Schulenberg and others, *Monitoring the Future National Survey Results on Drug Use, 1975-2016: 2016—College Students and Adults Ages 19-55*, vol. 2 (Ann Arbor, Michigan, University of Michigan, 2017), p. 49.
- 19 National Institute of Drug Abuse, *Monitoring the Future survey, 2017 data from in-school surveys of 8th, 10th and 12th grade students*.

FIG. 10 Heroin prevalence rate in student and household surveys, and heroin-related deaths in the United States, 2006–2016



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2016 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, September 2017); and Centers for Disease Control and Prevention, Multiple cause of death database, December 2016; and “Drug overdose deaths in the United States, 1999–2016”, *NCHS Data Brief* (December 2017).

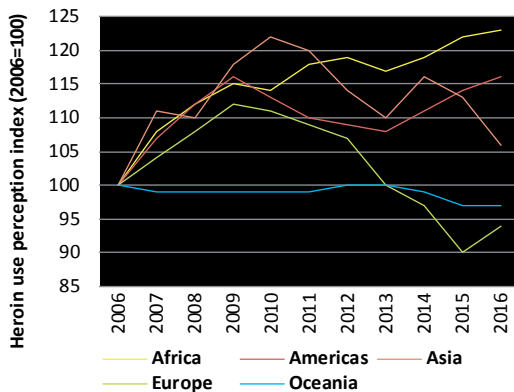
Declines in heroin use in 2016 were mainly reported in countries in East and South-East Asia, notably China (Hong Kong Special Administrative Region), Indonesia, the Republic of Korea and Thailand. By contrast, several countries in the Near and Middle East/South-West Asia reported increases in 2016, notably Iran (Islamic Republic of), Iraq, Qatar and the United Arab Emirates (and, in 2015, Pakistan). These increases could be linked to increasing levels of heroin trafficking from Afghanistan to those countries. However, other countries, including Israel, Jordan and Saudi Arabia, where stimulants play a larger role, saw heroin use stabilize.

Most countries in Central Asia do not yet seem to have been affected by the increase in Afghan heroin manufacture; experts perceived declines in heroin use in 2016 in Uzbekistan, Kyrgyzstan and Kazakhstan. This is in line with reports of decreasing quantities of heroin seized along the northern route in Central Asia in recent years.

Heroin use in Oceania remains limited

In Oceania, expert perceptions suggest a slight decline in heroin use in the past five years. Annual

FIG. 11 Trends in heroin use perception index, by region (2006 = 100)



Source: UNODC, responses to the annual report questionnaire.

prevalence data for Australia, which accounts for the majority of heroin users in Oceania, showed a decline in heroin use from a peak of 0.8 per cent of the population aged 14 years and older in 1998 to 0.2 per cent in 2001 and 0.1 per cent in 2013, before increasing to 0.2 per cent in 2016.²⁰ This pattern is confirmed by a number of other indicators that showed a massive decline in heroin supply and use in 2001 and no significant recovery thereafter.²¹ Wastewater analysis in 2017 confirmed low levels of overall heroin consumption in Australia, possibly a consequence of comparatively very high heroin prices (AUD 335²² or \$263 per gram in 2017).

Elsewhere in the region, heroin use in New Zealand was reported to be low and stable, with opioid prevalence being lower, as in most other countries, than

20 Australian Institute of Health and Welfare, *National Drug Strategy Household Survey 2016* (Canberra, 2017).

21 Australian Institute of Criminology, "Australian heroin drought affects heroin market", *Crime Facts Info*, No. 12 (20 November, 2001); Louisa Egenhardt, Carolyn Day and Wayne Hall, *The Causes, Course and Consequences of the Heroin Shortage in Australia*, Monograph Series, No. 3 (Sydney, University of New South Wales, National Drug and Alcohol Research Centre, 2004); Louisa Degenhardt and others, "Evaluating explanations of the Australian 'heroin shortage'", *Addiction*, vol. 100 (2005), pp. 459–469; Anne Dray and others, "Policing Australia's 'heroin drought': using an agent-based model to simulate alternative outcomes", *Journal of Experimental Criminology*, vol. 4, No. 3 (2008), pp. 267–287.

22 A. Karlsson and L. Burns, *Australian Drug Trends 2017: Findings from the Illicit Drug Reporting System (IDRS)*, Australian Drug Trend Series, No. 181 (Sydney, University of New South Wales, National Drug and Alcohol Research Centre, 2018), p. 39.

the prevalence of use of cannabis, ATS and synthetic cannabinoids. Among the various opioids, the prevalence of heroin use in New Zealand ranked third after pharmaceutical opioids and after opium.

The market for non-medical use of pharmaceutical opioids is expanding

Despite the paucity of data in many subregions, the trafficking of and the non-medical use of pharmaceutical opioids seem to be of increasing concern for both law enforcement agencies and public health professionals in many countries, although the extent and type of pharmaceutical opioids used for non-medical purposes may differ. In North America, for example, hydrocodone, oxycodone, codeine and tramadol are the main pharmaceutical opioids that are used for non-medical purposes, while methadone, buprenorphine and fentanyl are the main pharmaceutical opioids misused (based on drug treatment services data)²³ reported in Europe. In countries in West Africa, North Africa and the Near and Middle East, tramadol is the main substance used by people reporting non-medical use of pharmaceutical opioids.

Seizures of pharmaceutical opioids have reached similar levels to those of heroin

In 2016, the global quantity of pharmaceutical opioids seized was 87 tons, roughly the same as the quantity of heroin seized that year. The largest quantities of pharmaceutical opioids seized in 2016 were, once again, of tramadol (68 tons), followed by codeine (18 tons), oxycodone (1 ton) and fentanyl (0.4 tons). The quantities of pharmaceutical opioids seized, other than tramadol, methadone and hydro-morphone, increased in 2016. The increases were particularly pronounced in the case of codeine and oxycodone, which rose more than thirtyfold from the previous year, as well as in the case of fentanyl and its analogues (carfentanyl, a tenfold increase; and fentanyl, a fourfold increase) and of buprenorphine (a sevenfold increase).

Africa continues to dominate global seizures of pharmaceutical opioids

In 2016, the largest quantities of pharmaceutical opioids were seized, for the second year in a row, by

23 EMCDDA, *European Drug Report 2017: Trends and Developments*.

African countries (mostly in West and Central Africa, and North Africa), accounting for 87 per cent of the global total. Asia accounted for just 7 per cent of the global total of pharmaceutical opioids seized in 2016 (mostly East and South-East Asia).

The pharmaceutical opioids seized in Africa consisted mainly of tramadol, followed by codeine. In Asia, seizures of pharmaceutical opioids were dominated by codeine, followed by tramadol, while in Europe they were dominated by tramadol, followed by methadone and codeine. Large tramadol seizures in Europe were made in Malta and Greece, of tramadol that originated in India and was destined for markets in North Africa. Seizures of pharmaceutical opioids in the Americas were dominated by oxycodone, followed by codeine and fentanyl.

Comparisons of seizures of pharmaceutical opioids by weight can mask the fact that very different numbers of doses can be obtained from 1 gram of different opioids. Expressed in terms of doses seized, rather than of weight seized, seizures of pharmaceutical opioids in the Americas were clearly dominated by fentanyl and its analogues in 2016, followed by oxycodone. Even at the global level, calculations based on doses recommended for medical use²⁴ by first-time users suffering from pain suggest that most doses of pharmaceutical opioids seized in 2016 were of fentanyl, followed by codeine.²⁵

Fentanyl and its analogues remain a major concern in the United States

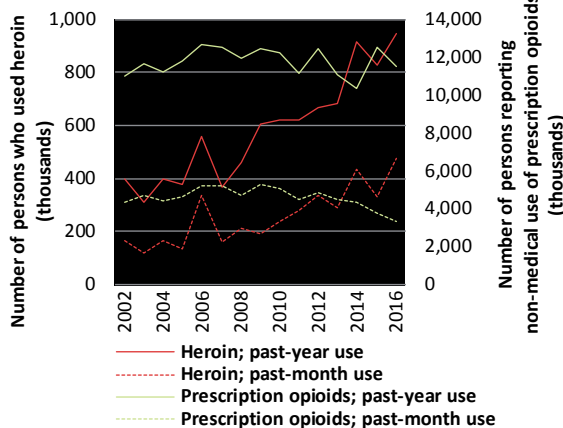
In the United States in 2016, nearly 4 per cent of the population aged 12 years and older reported non-medical past-year use of prescription opioids,²⁶ which was most prevalent among those aged 18–25 years. Compared with heroin use, which has been increasing each year since 2007, the non-medical use of prescription opioids has shown a stable trend

24 The British National Formulary recommends doses of 50 mg of tramadol, 30 mg of oxycodone, 5 mg of codeine or 0.1 mg of fentanyl to patients suffering from pain who had not taken pain medication before. (British National Formulary, vol. 74 (September 2017–March 2018)).

25 Detailed calculations are provided in the online methodological annex.

26 United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2016 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, September 2017).

FIG. 12 Trends in the use of heroin and prescription opioids in the United States, 2002–2016



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2016 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, September 2017).

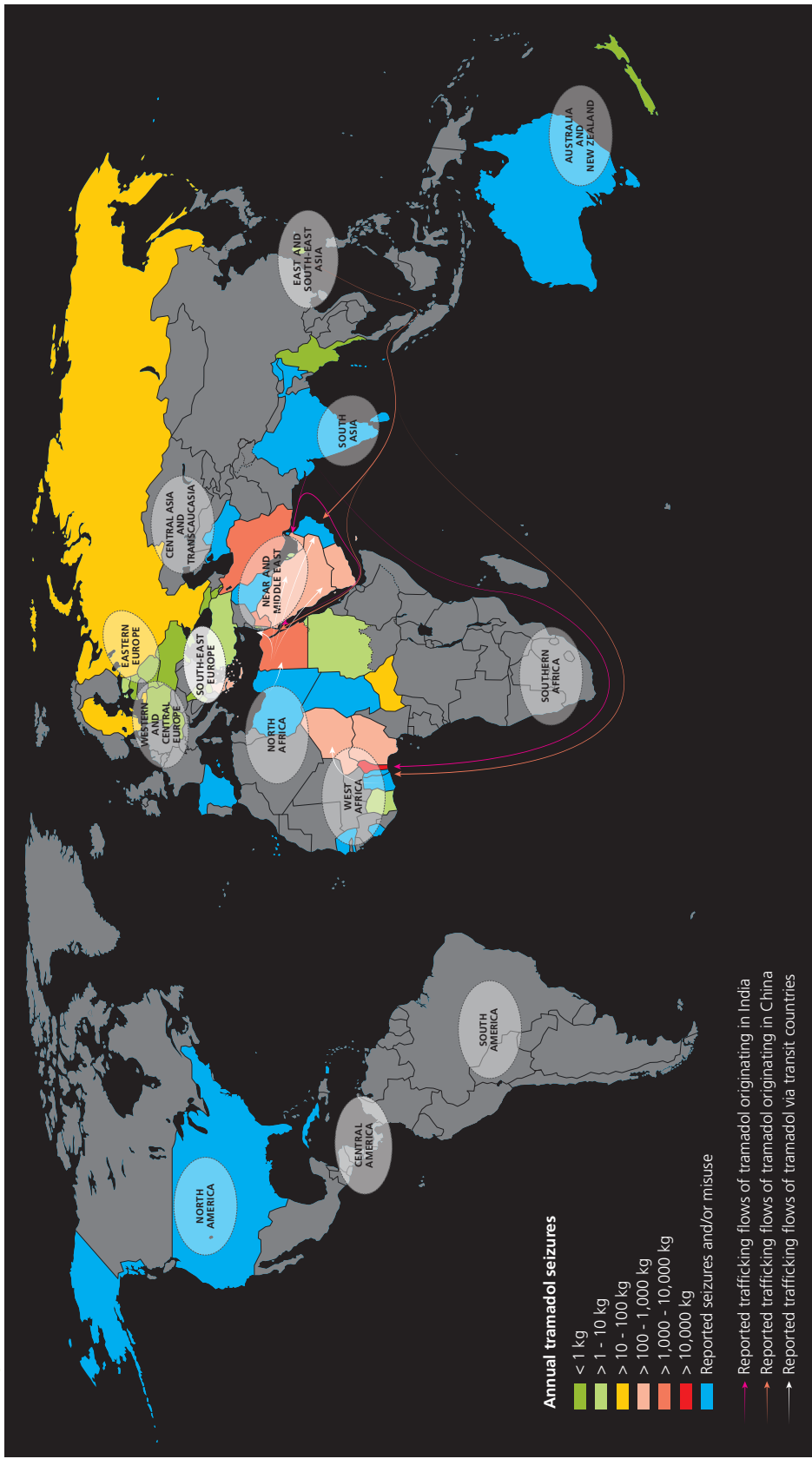
in the past five years. The most commonly misused prescription opioids reported in the National Survey on Drug Use and Health in 2016 in the United States are hydrocodone, oxycodone, codeine and tramadol. While the non-medical use of fentanyl self-reported in that survey is minimal (0.1 per cent of the population aged 12 years and older), illicit fentanyl and its analogues are increasingly found in the analysis of drug samples, including of heroin.²⁷ Illicit fentanyl is reportedly mixed into heroin as well as other illicit drugs such as “ecstasy”, or sold as counterfeit prescriptions opioids. Since users are often unaware of the contents of the substance or tablet they are taking, this can lead to fatal overdose incidents.²⁸

There were almost 64,000 overdose deaths in the United States in 2016, with opioid overdose deaths accounting for over 70 per cent of the total. While all opioid related deaths have increased in the United States, the most worrying trend is the number of overdose deaths related to synthetic opioids, which doubled in the past year. Synthetic opioids include fentanyl, fentanyl analogues and tramadol.

27 United States Department of Justice, Drug Enforcement Administration, “Emerging threat report: fourth quarter 2017”.

28 Drug Enforcement Administration, 2017 National Drug Threat Assessment.

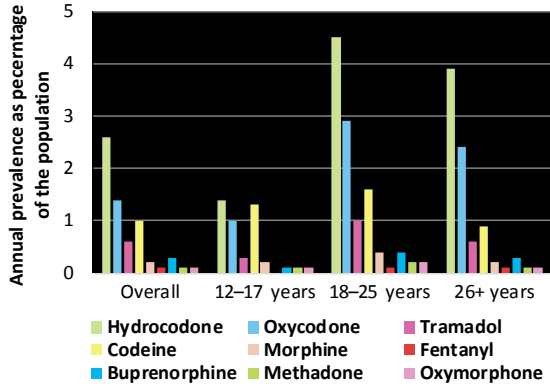
MAP 2 | Reported tramadol seizures (and/or misuse) and major tramadol trafficking/diversion flows, 2012–2016



Source: UNODC, annual report questionnaire data, *Report of the International Narcotics Control Board for 2016* (and previous years); report of Heads of National Law Enforcement Agencies for 2016 (and previous years); WHO Expert Committee on Drug Dependence: *Thirty-sixth Report*, WHO Technical Report Series, No. 902 (Geneva, World Health Organization, 2002); United States Department of State, Bureau for International Narcotics and Law Enforcement Affairs, *International Narcotics Control Strategy Report* (2017) (and previous years).

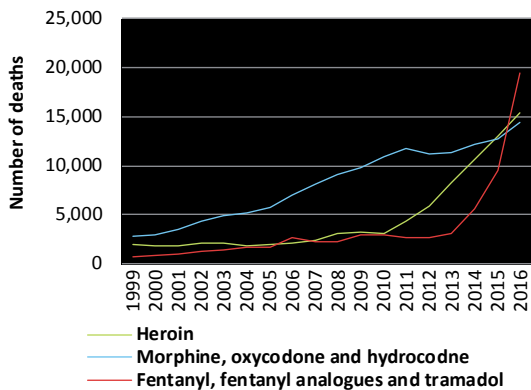
Notes: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. The final boundary between the Republic of Sudan and the Republic of 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).

FIG. 13 Non-medical past-year use of different prescription opioids in the United States, by age group, 2016



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2016 National Survey on Drug Use and Health: Detailed Tables* (Rockville Maryland, September 2017).

FIG. 14 Opioid overdose deaths in the United States



Source: United States, Centers for Disease Control and Prevention, National Center on Health Statistics, CDC WONDER, 2017.

Signs of use of pharmaceutical opioids emerging in Western and Central Europe

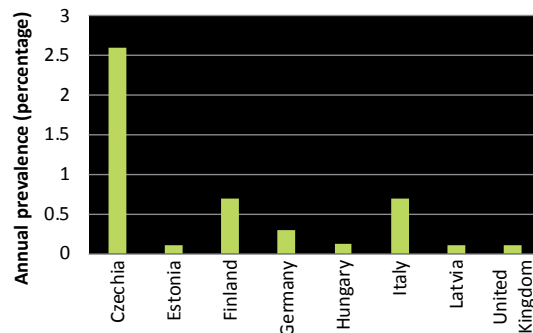
In Western and Central Europe, the non-medical use of pharmaceutical opioids is not at the same level as that reported in North America, but the emergence of new synthetic opioids (mostly fentanyl and its derivatives) is of concern in the subregion.²⁹ Although few countries in Western and Central Europe report the non-medical use of pharmaceutical

opioids in their national drug use surveys, in the countries that do so, such use ranges between 2.6 per cent of the adult population (Czechia) and 0.1 per cent (Latvia, Estonia and the United Kingdom).

Since 2009, 25 new opioids (mostly fentanyl and its analogues) have been reported in the subregion. Although new opioids currently represent only a fraction of the opioid market in Western and Central Europe, the new fentanyl analogues are highly potent substances that pose a serious threat to individual and public health. Illicit fentanyl has been sold in the subregion on online markets and illicit local markets and sold as, or mixed with, heroin and counterfeit opioids.³⁰

Heroin remains the most common opioid used in Western and Central Europe, but there are increasing signs of misuse of pharmaceutical opioids in the subregion. In 2015, 17 countries reported that more than 10 per cent of all opioid users entering treatment services did so for disorders related to use of opioids other than heroin. Opioids reported by treatment entrants included methadone, buprenorphine, fentanyl, codeine, morphine, tramadol and oxycodone.³¹ In some countries, pharmaceutical opioids such as fentanyl (Estonia) and buprenorphine (Finland) have been the most frequently misused opioid for some time. In Czechia, although heroin remains the most frequently misused opioid, other opioids make up over half of the share of all

FIG. 15 Annual prevalence of non-medical use of pharmaceutical opioids in European countries, 2016 or the latest year



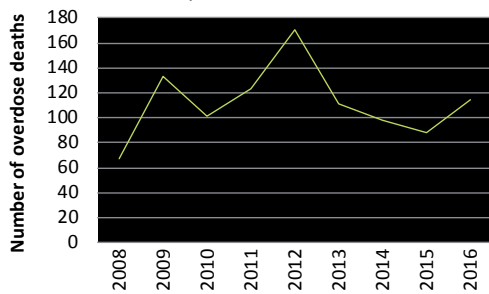
Source: UNODC, based on responses to the annual report questionnaire.

29 EMCDDA, *European Drug Report 2017: Trends and Developments*.

30 Ibid.

31 Ibid.

FIG. 16 Trends in fentanyl overdose deaths in Estonia, 2008–2016



Source: Estonian causes of death registry, 2017.

Note: In 2016, of 114 fentanyl overdose deaths in Estonia, 67 cases were attributed to 3-methylfentanyl, while the remaining were attributed to carfentanyl, furanylfentanyl and acrylfentanyl.

opioids used among those entering treatment for opioid-use disorders.³²

Although not to the same extent as in the United States, overdose deaths related to fentanyl and its analogues are also reported in Western and Central Europe. Between November 2015 and February 2017, 23 deaths associated with furanylfentanyl were reported in Estonia (4 deaths), Finland (1), Germany (4), Sweden (12), United Kingdom (1) and Norway (1).³³ Similarly, from April to December 2016, 47 deaths attributed to acrylfentanyl were reported in Denmark (1 death), Estonia (3) and Sweden (43). Many of those deaths were reported among high-risk opioid users.³⁴

Non-medical use and trafficking of tramadol is emerging as the main concern in several regions

Most of the tramadol seized worldwide in the period 2012–2016 originated in India and, to a lesser extent, in China.³⁵ Tramadol is smuggled to various markets

in West and Central Africa and North Africa, from where some of it is trafficked onwards to a number of countries in the Near and Middle East.

There is a range of pharmaceutical opioids that are used non-medically in most regions. However, the non-medical use of tramadol is of particular concern in Western and Northern Africa and in many countries in the Near and Middle East. While population-based estimates of their use are not available in that subregion, treatment provision data suggest that the extent of the non-medical use of pharmaceutical opioids in these subregions is quite high. Although fatal overdose deaths attributed to pharmaceutical opioids are small in numbers, many countries in the subregion also report them. In the United Arab Emirates, while tramadol was dominating by far the pharmaceutical opioids detected in people in treatment, the situation changed over the period 2013–2015.³⁶ Based on urine analysis of people in treatment, although the number of samples containing tramadol remains high, it has declined by half whereas the number of other opioids such as, morphine and codeine doubled over the period 2013–2015. In 2015, 23 overdose deaths attributed to pharmaceutical opioids were reported in the United Arab Emirates.³⁷

The first ever assessment of problem drug use in Palestine in 2016 estimated that 1.8 per cent of the male population aged 15 years and older were high-risk drug users. In Gaza, tramadol was the most commonly used substance, followed by benzodiazepines and methamphetamine. In the study sample of high-risk users, 97 per cent of respondents in Gaza reported non-medical use of tramadol, while in the West Bank, amphetamines

32 Ibid.

33 EMCDDA, Furanylfentanyl Report on the Risk Assessment of N-phenyl-N-[1-(2-phenylethyl)piperidin-4-yl] furan-2-carboxamide (furanylfentanyl) in the Framework of the Council Decision on New Psychoactive Substances, Risk Assessments (Luxembourg, Publications Office of the European Union, 2017).

34 EMCDDA, Acrylofentanyl: Report on the Risk Assessment of N-(1-phenethylpiperidin-4-yl)-N-phenylacrylamide (acrylofentanyl) in the Framework of the Council Decision on New Psychoactive Substances, Risk Assessments (Luxembourg, Publications Office of the European Union, 2017).

35 UNODC, annual report questionnaire data; *Report of the International Narcotics Control Board for 2016* (E/

INCB/2016/1) (and the Board's annual reports for previous years); Heads of National Law Enforcement Agency (HONLEA) report for 2016 (and previous years); *WHO Expert Committee on Drug Dependence: Thirty-sixth Report*, WHO Technical Report Series, No. 902 (Geneva, World Health Organization, 2002); and Bureau for International Narcotics and Law Enforcement Affairs, International Narcotics Control Strategy Report 2017 (and previous years).

36 Abuelgasim Elrasheed and others, "Changing patterns of substance abuse: analysis of lab test results of a patient cohort at the National Rehabilitation Center, Abu Dhabi, UAE", *International Addiction Review*, vol. 1, No. 1. (2017).

37 Responses to the annual report questionnaire submitted by United Arab Emirates, 2015.

Tramadol

Tramadol is the generic name for an opioid analgesic, first marketed by Grünenthal in 1977. It is used in the treatment of moderate to severe pain. The analgesic effect is multimodal and involves agonist activity at the μ -opioid receptor and adrenergic and serotonergic properties. The metabolite of tramadol, *O*-desmethyltramadol is primarily responsible for the agonist activity at the μ -opioid receptor, while the parent compound acts as a serotonin releaser and inhibits the reuptake of noradrenaline and serotonin, leading to mood enhancement.

The usual oral doses of tramadol are 50 to 100 mg every 4 to 6 hours, with a maximum daily dose not exceeding 400mg.^a Tramadol may also be used orally as an extended-release or a variable-release formulation, once or twice daily. Preparations of tramadol are also available for parenteral, rectal, sublingual and intranasal administration.

Tramadol is extensively metabolised in the liver following oral administration. The metabolic reaction to the active μ -opioid agonist, *O*-desmethyltramadol, depends on the activity of the hepatic enzyme CYP 2D6, which displays genetic polymorphism in man. Slow metabolizers have relatively low plasma concentrations of *O*-desmethyltramadol, whereas rapid metabolizers have relatively high plasma concentrations of this active metabolite.^b The corollary is a difference in expression of the net effect of tramadol on mood and of *O*-desmethyltramadol on the μ -opioid receptor. Of significance is the established body of knowledge that a number of medicines and drinks, such as grapefruit juice, can inhibit CYP 2D6 activity in man. In fact, several internet drug-user forums report on user experiences of combining tramadol with grapefruit juice to preserve or enhance its mood-enhancing properties, at the expense of the *O*-desmethyltramadol mediated analgesic effect.

According to WHO,^c tramadol can produce physical dependence, with studies showing that this dependence may occur when tramadol is used daily for more than a few weeks. Since 2013, Member States, through several resolutions of the Commission on Narcotic Drugs^{d, e} and its regional subsidiary

bodies, particularly in Africa^f and the Middle East,^g have highlighted problems with the non-medical use of tramadol. In 2017, the WHO Expert Committee on Drug Dependence reported^h that there was growing evidence of misuse of tramadol in many countries, accompanied by adverse reactions and tramadol-associated deaths and recommended a critical review of the substance. The UNODC early warning advisory on new psychoactive substances has received reports of seizures of both tramadol and *O*-desmethyltramadol.

- ^a *Martindale: The Complete Drug Reference*, 38th ed. (London, Pharmaceutical Press, 2014).
- ^b K. Miotto and others, "Trends in tramadol: pharmacology, metabolism, and misuse", *Anesthesia and Analgesia*, vol. 124, No. 1 (2017), pp. 44–51.
- ^c WHO Expert Committee on Drug Dependence, "Tramadol: pre-review report", Thirty-ninth Meeting, Geneva, 6–10 November 2017.
- ^d Joint Ministerial Statement of the 2014 high-level review by the Commission on Narcotic Drugs of the implementation by Member States of the Political Declaration and Plan of Action on International Cooperation towards an Integrated and Balanced Strategy to Counter the World Drug Problem (See Official Records of the Economic and Social Council, 2014, Supplement No. 8 (E/2014/28), chap. I, sect. C).
- ^e Commission on Narcotic Drugs resolution 56/14 on strengthening international cooperation in addressing the non-medical use and abuse, the illicit manufacture and the illicit domestic and international distribution of tramadol (2013).
- ^f Commission on Narcotic Drugs resolution 56/2 on the Accra declaration (2013).
- ^g Commission on Narcotic Drugs resolution 59/2 on the outcomes of the meetings of the subsidiary bodies of the Commission on Narcotic Drugs, including the Abu Dhabi declaration (2016).
- ^h *WHO Expert Committee on Drug Dependence: Thirty-ninth Report*, WHO Technical Report Series, No. 1009 (Geneva, World Health Organization, 2017).

were the most consumed substances, followed by cannabis, anticonvulsants (mainly pregabalin) and benzodiazepines.³⁸

Many countries in West and Central Africa and North Africa (mostly Egypt) have reported large quantities of tramadol seized; however, information on the non-medical use of tramadol and other pharmaceutical opioids in those subregions is limited.

Tramadol tablets available in some parts of Africa are reportedly meant for the illicit market and may be of a dosage higher than that normally prescribed for medical purposes. In Egypt, for example, the authorities report the availability of 225 mg tablets of tramadol on the illicit market, which are far stronger than the usual 50 mg tablets available for pain relief and the slow-release tablets that range from a strength of 50 mg to 200 mg.³⁹

38 Palestinian National Institute of Health and UNODC, *Estimating the Extent of Illicit Drug Use in Palestine* (November, 2017).

39 Egypt, General Secretariat of Mental Health of the Ministry of Health, "Report of the General Secretariat of Mental Health and Addiction Treatment on tramadol" (2017).

Tramadol in Ghana, 2016–2017

Non-medical use of tramadol in Ghana was first identified by the authorities in 2016, leading to the opioid being controlled at national level in that year. This resulted in the market for recreational use of tramadol disappearing, at least temporarily, although, despite its use being limited to medical purposes, new incidences of use of tramadol, which was being illegally imported, were observed in 2017.

There are no hard data to help determine the magnitude of non-medical use of and trafficking in tramadol in Ghana, but qualitative reporting from authorities has identified this as a fast emerging threat. Tramadol has been found to be increasingly used by gang members, commercial vehicle drivers, women who work in markets who need to trade long hours and students trying to keep awake during study periods. Tramadol is often used together with energy drinks, alcoholic beverages and marijuana, with users reporting taking tramadol to experience a feeling of euphoria, for extra energy or for aphrodisiac purposes. The authorities have identified increasing numbers of injuries and fatalities linked to driving under the influence of tramadol; the recruitment of young children as look-outs and drug peddlers; and overall increases in crime rates, including of drug-related crimes linked to other criminal activities, such as robbery,

rape, abduction, murder and violence, among tramadol users and tramadol trafficking gangs, who often use machetes, broken bottles and other weapons in their confrontations.

Police raids on markets in the suburbs of Accra and analyses of drugs seized by the laboratory of the Food and Drug Authority of Ghana revealed that capsules of high tramadol content, far above the usual adult medical dose (50–100 mg per capsule), are increasingly being sold. Most (40 per cent) of the 524,00 tramadol capsules seized and analysed in Ghana in 2017 had a content of 120 mg of tramadol, 18 per cent had a content of 200 mg, and a further 19 per cent had a strength of 225 mg per capsule. Only a small portion (13 per cent) of the tramadol seized had a typical content for medical purposes of 50–100 mg per capsule. About 87 per cent of the tramadol seized in 2017 originated in India, while no country of origin could be identified for the remaining quantities seized. It is, however, unclear whether the seized packages had been illicitly manufactured or diverted from licit manufacturing and where the diversion took place.

Source: Food and Drugs Authority, Ghana.

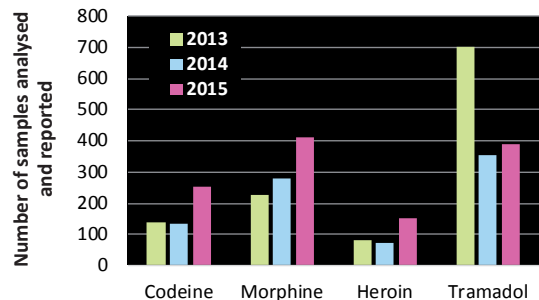
In Egypt, tramadol is reported to be the main opioid for non-medical use, with an estimated 3 per cent of the population diagnosed with tramadol dependence in 2016. In drug treatment, tramadol is also the main drug reported, with nearly 68 per cent of drug treatment patients in 2017 being treated for tramadol use disorders. High levels of emergency room cases (fatal and non-fatal) attributed to the non-medical use of tramadol are also reported in Egypt.⁴⁰

Also in Nigeria, the non-medical use of opioids is of concern. In 2016, cannabis (45 per cent) and opioids (36 per cent) were the main substances, excluding alcohol, for which people sought treatment for their drug use disorders. Most people treated for opioid use disorders were misusing tramadol, codeine and pentazocine.⁴¹

⁴⁰ Ibid.

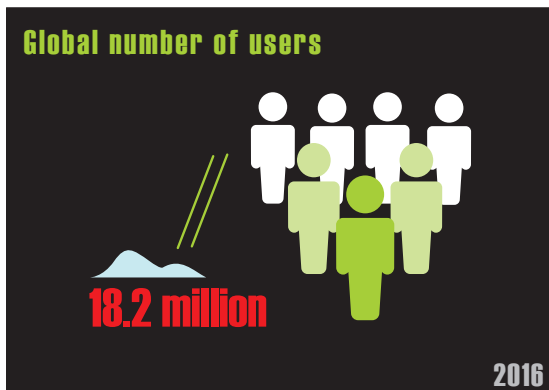
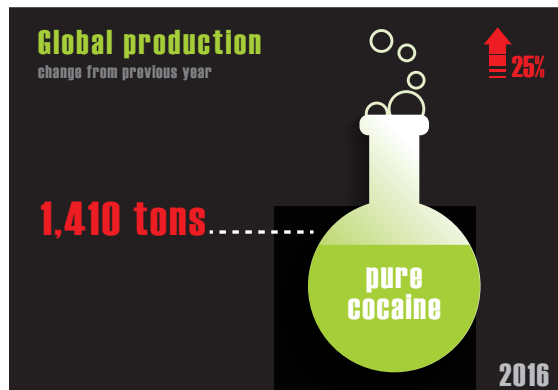
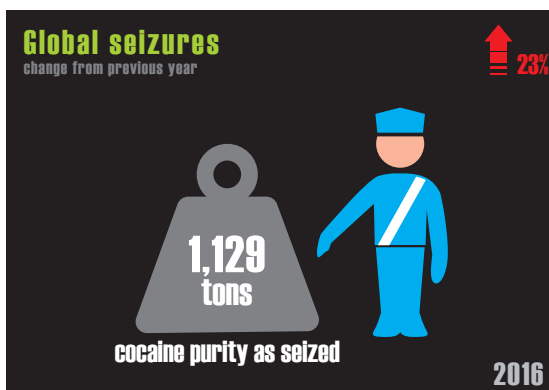
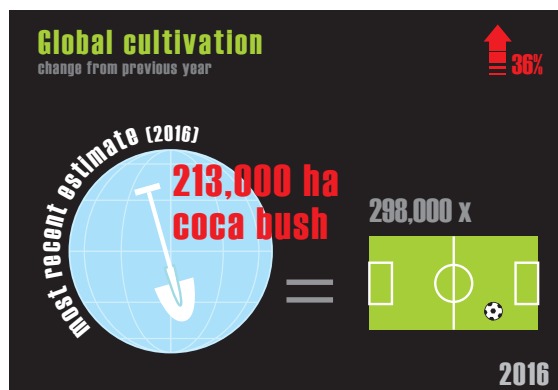
⁴¹ Nigeria, National Drug Law Enforcement Agency, "Patterns of drug and alcohol use in Nigeria" (2016).

FIG. 17 Trends in the non-medical use of pharmaceutical opioids and heroin among persons in treatment in the United Arab Emirates, 2013–2015



Source: Abuelgasim Elrasheed and others, "Changing patterns of substance abuse: analysis of lab test results of a patient cohort at the National Rehabilitation Center, Abu Dhabi, UAE", *International Addiction Review*, vol. 1, No. 1. (2017).

B. COCAINE



Note: All data refer to 2016.

After the downward trend, coca bush cultivation is expanding dramatically

After the peak in 2000, there was a long-term downward trend in coca bush cultivation that came to an end in 2013, and since then the global area under coca bush cultivation has increased by 76 per cent to reach 213,000 ha in 2016. The increase in coca bush cultivation in 2016 reported in Bolivia (Plurinational State of), Colombia and Peru took place in parallel with the decline in eradication reported in all three Andean countries.

The increase in coca bush cultivation in Colombia is the main driver of global expansion

Recent trends in the global area under coca bush cultivation have largely been driven by changes in coca cultivation in Colombia, where the cultivation area decreased by 70 per cent over the period 2000–2013 only to then triple in size from 2013 to 2016. With 146,000 ha under coca cultivation in 2016,

Colombia accounted for 68.5 per cent of the global cultivation area. Coca bush cultivation is widespread in Colombia, having been identified in 21 of the country's 33 departments in 2016, although more than two thirds of the total area under cultivation is located in the southern area of the country. The increase in coca bush cultivation in Colombia in 2016 came about for a number of reasons related to market dynamics and the strategies of trafficking organizations. Among other factors, it was also linked to a perceived decrease in the risk of illicit activities following the suspension of aerial spraying, the expectations in some communities of receiving compensation for replacing coca bush cultivation, and a reduction in alternative development interventions, which has undergone a period of transition from an approach based on crop elimination to an approach based on promoting the rule of law.¹

1 UNODC and Colombia, *Colombia: Monitoreo de Territorios Afectados por Cultivos Ilícitos 2016* (July 2017), p. 139.

The overall number of dismantled laboratories used for the manufacture of coca and cocaine products in Colombia more than doubled, from 2,334 in 2013 to 4,842 in 2016 (95 per cent of which were manufacturing coca paste and cocaine base, while 5 per cent were manufacturing cocaine hydrochloride),² the largest number ever reported. Seizures of cocaine hydrochloride more than doubled in Colombia, from 167 tons in 2013 to a record 378 tons in 2016; in addition, 43 tons of coca paste and cocaine base were intercepted in 2016.³ Eradication (manual eradication and spraying) fell, from more than 213,000 ha in 2006 to 69,000 ha in 2013 and less than 18,000 ha in 2016, while aerial spraying ceased in October 2015. Farmers cultivating coca bush may have felt that the threat of eradication had diminished, and some of them may have therefore felt emboldened to take collective action to block potential manual eradication efforts and were thus inclined to increase their coca bush production.⁴

Signs of increases in traditional coca bush cultivation areas in Peru

Following a decline that began in 2011, the area under coca bush cultivation in Peru increased to 43,900 ha in 2016, which was equivalent to 21 per cent of the global area under coca bush cultivation.

In 2016, Peru's coca bush production took place mainly to the east of Lima, across the Andes, in the Valle de los Ríos Apurímac, Ene y Mantaro (70 per cent) and further away in La Convención y Lares (14 per cent). By contrast, most of Peru's coca bush production in the 1980s and 1990s took place in Alto Huallaga, in central Peru. By 2016, Alto Huallaga accounted for just 4 per cent of the total area under coca bush cultivation in Peru. However, the long-term downward trend came to an end in 2016 when the area under cultivation in Alto Huallaga rose, from a low level, by 45 per cent from the previous year. None of the two main coca bush cultivation areas today (Valle de los Ríos Apurímac, Ene y Mantaro, and La Convención y Lares) were subject to eradication in 2016.⁵

2 Ibid., p. 151.

3 Ibid., p. 154.

4 Ibid., p. 14.

5 UNODC and the National Commission for Development

The downward trend in coca bush cultivation in the Plurinational State of Bolivia has also come to an end

The Plurinational State of Bolivia accounted for 10 per cent of global coca cultivation in 2016, when the area under coca bush cultivation in that country rose by 14 per cent, to 23,100 ha, returning to the level reported in 2013. The increase in 2016 ended the downward trend that started in 2010⁶ and which was the result of, among other factors, a government policy based on “voluntary” reductions in coca bush cultivation in the coca-growing areas,^{7, 8, 9} which went in parallel with eradication (as reported by the Government), particularly in national parks and other areas outside accepted cultivation areas. Overall, coca bush eradication almost doubled in the Plurinational State of Bolivia, from around 6,000 ha per year over the period 2005–2009 to around 11,000 ha per year over the period 2011–2015, then decreased to 6,600 ha of eradication in 2016, coinciding with the increase in cultivation reported that year.¹⁰

Global cocaine manufacture reached a record level in 2016

As a consequence of large increases in the areas under coca bush cultivation and improved cocaine manufacture know-how in the main coca leaf-producing areas, global cocaine manufacture is estimated to have reached an all-time high of some 1,410 tons in 2016, an increase of 25 per cent from the previous year. Most cocaine manufacture takes place in Colombia where, purely on the basis of estimated coca leaf production, cocaine manufacture

and Life without Drugs (DEVIDA) of Peru, *Peru: Monitoreo de Cultivo de Coca 2016* (November 2017).

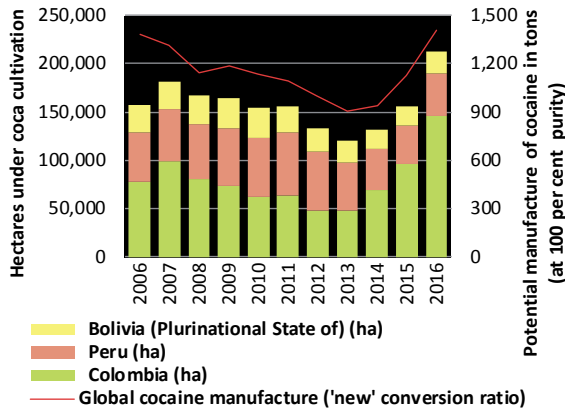
6 UNODC and the Plurinational State of Bolivia, *Estado Plurinacional de Bolivia: Monitoreo de Cultivos de Coca 2015* (July 2016).

7 Ibid.

8 Plurinational State of Bolivia, Ministry of Rural Development, Agriculture, Livestock and the Environment, Agreement between the national Government and coca producers (14 September 2008).

9 Robert Lessmann, “Bolivien: zwischen Modellfall und Unregierbarkeit”, in *Bolivien Staatszerfall als Kollateralschaden*, Thomas Jäger, ed. (Wiesbaden, Germany, VS Verlag für Sozialwissenschaften, 2009), p. 54.

10 UNODC and the Plurinational State of Bolivia, *Estado Plurinacional de Bolivia: Monitoreo de Cultivos de Coca 2015*, p. 52.

FIG. 1 Global coca cultivation and cocaine manufacture, 2006–2016

Source: UNODC, coca cultivation surveys in Bolivia (Plurinational State of), Colombia and Peru, 2014 and previous years.

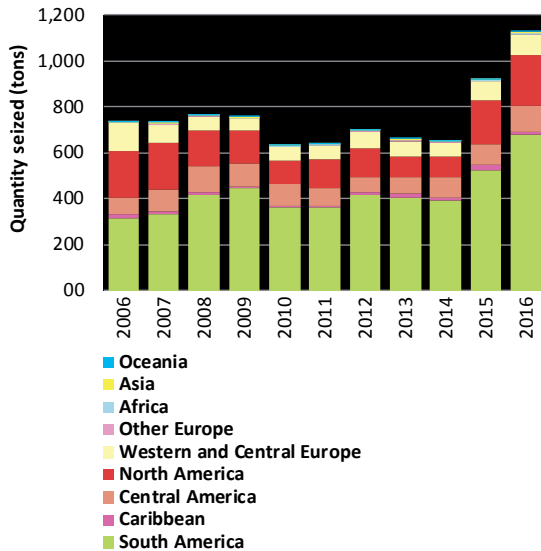
reached an estimated 866 tons in 2016. This represents a 34 per cent increase from the previous year, and a threefold increase over the entire period 2013–2016. Cocaine manufactured from coca leaf production in Peru and Bolivia (Plurinational State of) also increased in 2016, although at a slower pace.

At record levels in 2016, the largest quantity of cocaine seized was in the Americas and Western Europe, but seizure quantities are rising sharply in other regions

The quantity of cocaine seized worldwide in 2016 rose by 23 per cent from the previous year to reach, at 1,129 tons,¹¹ the highest level ever reported.

The Americas continued to account for the vast majority of the cocaine intercepted worldwide in 2016 (more than 90 per cent of the total quantity seized), of which South America accounted for 60 per cent of the total (more than half of which was seized in Colombia). North America, led by seizures made in the United States (18 per cent), accounted for less than one fifth of the global total, and Central America accounted for 11 per cent of cocaine seized, most of which was seized in Panama. The next largest portion of the cocaine seized in 2016 was reported in Western and Central Europe (8 per

11 This quantity is of cocaine seized with varying levels of purity. It is not comparable with the estimated amount manufactured, which is provided for cocaine of 100 per cent purity.

FIG. 2 Global quantities of cocaine seized,^a by region (and some subregions), 2006–2016

Source: UNODC, responses to the annual report questionnaire.

^a Includes cocaine hydrochloride, coca paste and base, and "crack" cocaine; not adjusted for purity.

cent), with the largest national total of cocaine seizures, for the first time ever, being that seized in Belgium (3 per cent of the global total), followed by Spain (1 per cent) and the Netherlands (1 per cent).

Most increases in the quantities of cocaine seized in 2016 took place outside the main cocaine destination markets of North America and Western and Central Europe, reflecting the ongoing spread of cocaine trafficking to emerging markets. For example, the quantity of cocaine seized in Asia tripled from 2015 to 2016, with most growth reported in South Asia, where the quantity seized increased tenfold, and in East and South-East Asia. The quantity of cocaine seized in the Near and Middle East/South-West Asia doubled in 2016.

The quantity of cocaine seized in Africa also doubled in 2016, most of that increase being reported in countries in North Africa, where the quantity of cocaine seized had a sixfold increase in 2016 from the previous year and accounted for 69 per cent of the quantity seized in the region. This contrasts with previous years, when cocaine was mainly seized in West and Central Africa.

Marked increases were reported in South-Eastern Europe, where the quantity of cocaine seized more than tripled in 2016 from the previous year. The quantity of cocaine seized in Europe as a whole rose by 11 per cent in 2016.

The quantity of cocaine seized in Oceania rose by more than 75 per cent from 2015 to 2016, with Australia accounting for 98 per cent of all cocaine intercepted in Oceania.

Cocaine continues to be trafficked primarily from South America to North America and Western and Central Europe, but trafficking routes to other subregions are proliferating

Seizure data suggest that most cocaine is trafficked from the Andean countries to the main consumer markets of North America and Western and Central Europe. Although seizures of cocaine trafficked to other subregions are comparatively small, they suggest that cocaine trafficking to those subregions may be increasing rapidly, contributing to the proliferation of trafficking routes across the globe. In some countries in those subregions, law enforcement agencies may still be unfamiliar with cocaine trafficking as they are more used to focusing on other drugs with long-established markets. In such cases, seizure patterns may hide significant unreported cocaine trafficking.

The primary cocaine trafficking flow continues to be that from the Andean countries to North America, particularly from Colombia to the United States, which continues to be reported as the main destination country for cocaine shipments intercepted in South America. Data of the United States Drug Enforcement Administration showed that 92 per cent of the cocaine seizure samples analysed in 2016 originated in Colombia and 6 per cent originated in Peru,¹² with about 80 per cent being trafficked via the Pacific Ocean and the rest via the Atlantic Ocean (including by transiting the Caribbean corridor).¹³ The predominance of trafficking via the Pacific Ocean is likely due to the concentration of coca leaf production and cocaine manufacture in

southern Colombia, from where the closest access to the sea are the Pacific ports of Colombia and of neighbouring Ecuador. The cocaine has typically been trafficked from Colombia to Central America and Mexico, often using ships and semi-submersible vessels, and then from Mexico across the border into the United States by car or truck, mostly by Mexican organized crime groups. In 2016, however, the United States authorities reported that more cocaine was seized at sea (46 per cent of the total) than on land (41 per cent);¹⁴ by comparison, in 2013, 81 per cent of cocaine seized was being trafficked by land and 12 per cent by sea. This suggests that in 2016, less cocaine was being trafficked overland via Mexico into the United States. In fact, according to data reported by the United States, the proportion of cocaine trafficked into the United States via Mexico fell from 70 per cent of all cocaine inflows in 2013 to 39 per cent in 2016.¹⁵

In 2016, most of the cocaine destined for Canada was trafficked via the Caribbean; mostly via Jamaica and the Dominican Republic. Cocaine also transited the United States before reaching Canadian markets.¹⁶

The second largest cocaine trafficking flow worldwide is that from the Andean countries to Western and Central Europe. Over the period 2012–2016, Colombia was the departure country most often mentioned in connection with seized cocaine destined for European markets (20 per cent of all mentions in the responses to the annual report questionnaire by European countries to the question on countries of origin, departure and transit outside Europe), followed by Brazil (16 per cent) and Ecuador and the Dominican Republic (9 per cent each). Within Europe, Spain and the Netherlands were the countries most frequently reported as countries of transit, followed by Germany and Belgium.

Seizures of cocaine reported to have entered Europe via African transit countries were less frequent: they accounted for 6 per cent of mentions in the responses to the annual report questionnaire by European

12 United States Department of Justice, Drug Enforcement Administration, *2017 National Drug Threat Assessment* (October 2017), p. 87.

13 *Ibid.*, p. 93.

14 A further 8 per cent of the cocaine was intercepted while it was being sent by mail, and 4 per cent while being trafficked by air in 2016 (UNODC, annual report questionnaire data).

15 UNODC, annual report questionnaire data.

16 UNODC, annual report questionnaire data.

countries regarding Africa countries as countries of origin, departure or transit of cocaine over the period 2012–2016. Cocaine trafficking flows to Africa are primarily directed towards countries in West and Central Africa (5 per cent), often for shipment onward to Europe and, to a lesser extent, to Southern Africa (1 per cent). Brazil was the single most frequently mentioned country of departure for cocaine intercepted in all the subregions of Africa in the period 2012–2017. Overall, 2 per cent of all mentions by countries in the Americas mentioned countries in Africa as destination countries for cocaine seized in the period 2012–2016.

Cocaine seized in Asia over the period 2012–2016 also seems primarily to have departed from or transited Brazil. This applies to the two main cocaine destination subregions of Asia, the Near and Middle East/South-West Asia and East and South-East Asia, as well as to Central Asia and Transcaucasia. Seized cocaine trafficked in Asia often transited the United Arab Emirates, while the most frequently mentioned final destination countries in Asia are China (including Hong Kong, China), followed by Israel.

Cocaine flows to Oceania are predominantly directed towards Australia. Based on reported quantities of cocaine seized in Australia in the period 2012–2016, the most important departure countries for cocaine shipments to Australia were the United States, Chile, Brazil, Argentina and Canada.¹⁷ That cocaine is being trafficked from the United States and Canada to Australia is likely due to the fact that the wholesale price of cocaine in Australia is higher than in North America. Cocaine wholesale prices in the United States ranged from \$4,000 to \$50,000 per kilogram in 2016, and in Canada from \$41,000 to \$59,000, while in Australia they ranged from \$137,000 to \$222,000 per kilogram.¹⁸

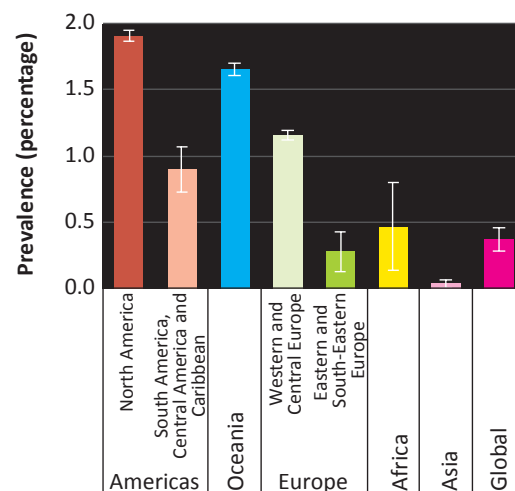
Given the existing trafficking routes, most of the cocaine interceptions take place at sea or close to it. Some 70 per cent of all cocaine seized (reported to UNODC by Member States as significant individual drug seizures) over the period 2012–2016 (cocaine hydrochloride and cocaine base) had been or was

intended to be trafficked by sea (seized in international waters, territorial waters, seaports, maritime zones, beaches, vessels, boats and shipping containers). A further 15 per cent of the total quantity of cocaine intercepted was seized at airports, and the remaining 15 per cent was seized on land routes (roads, highways, vehicles, streets, warehouses, post offices, bars, residences, offices, etc.).¹⁹

Cocaine use is still concentrated in the Americas and Europe, and is on the increase

In 2016, the global number of past-year cocaine users is estimated to have increased by almost 7 per cent from the previous year, to 18.2 million (range: 13.9–22.9 million), with increases reported in most regions. More than half of all cocaine users reside in the Americas, mostly North America (34 per cent of the global total), and almost one quarter reside in Europe, mostly in Western and Central Europe (about one fifth of the global total). Africa and, to a lesser extent, Asia and Oceania together may account for the remaining quarter of all cocaine users, but there are significant error margins for these estimates due to the lack of data in many countries in Africa and Asia.

FIG. 3 Estimated annual prevalence rates of cocaine use among the population aged 15–64 years, 2016



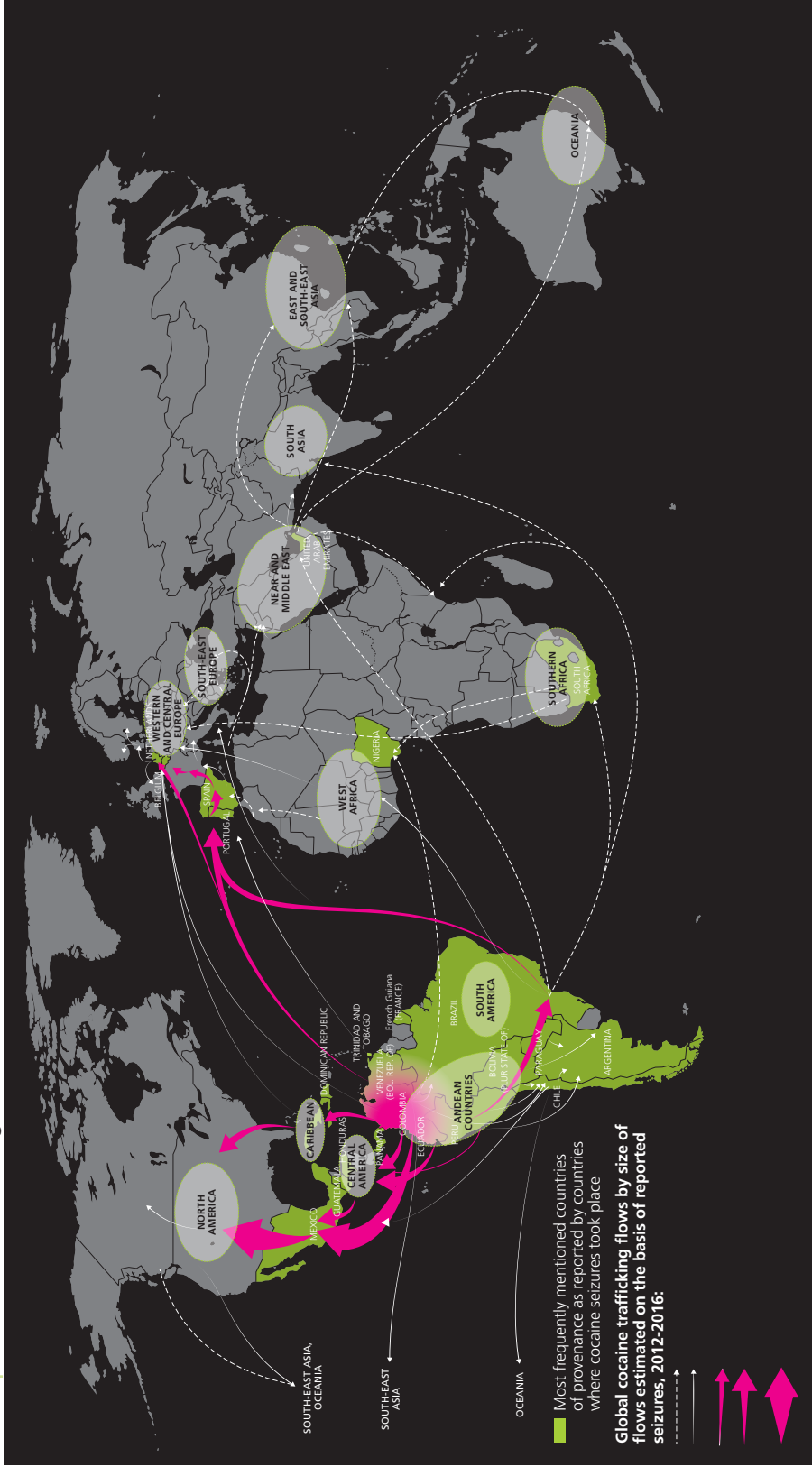
Source: UNODC estimates based on annual reports questionnaire data and other government reports.

17 Australian Criminal Intelligence Commission, *Illicit Drug Data Report 2015–16* (Canberra, June 2017), p. 98; and the Commission's illicit drug data reports of previous years.

18 Australian Criminal Intelligence Commission, *Illicit Drug Data Report 2015–16*, p. 102.

19 UNODC, the individual drug seizure database.

MAP 1 | Main cocaine trafficking flows, 2012–2016

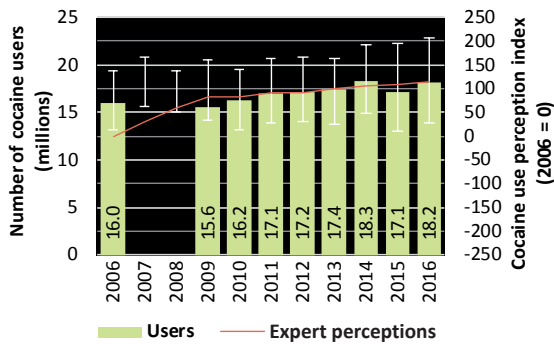


Sources: UNODC, responses to the annual report questionnaire and individual drug seizure database.

Notes: The size of the trafficking flow lines is based on the amount of cocaine seized in a subregion and the number of mentions of countries from where the cocaine has departed (including reports of "origin" and "transit") to a specific subregion over the period 2012–2016. The trafficking flows are determined on the basis of country of origin/departure, transit and destination of seized drugs as reported by Member States in the annual report questionnaire and individual drug seizure database: as such, they need to be considered as broadly indicative of existing trafficking routes while several secondary flows may not be reflected. Flow arrows represent the direction of trafficking; origins of the arrows indicate either the area of manufacture or the one of last provenance, end points of arrows indicate either the area of consumption or the one of next destination of trafficking.

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 determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Republic of Sudan and the Republic of South Sudan has not yet been determined. A dispute concerning sovereignty over the Falkland Islands (Malvinas).

FIG. 4 Trends in the number of annual cocaine users and cocaine use perception index, 2006–2016



Source: UNODC estimates based on annual report questionnaire data.

Note: For calculation methods and details, see the online methodology section of the present report.

Global annual prevalence of cocaine use was estimated at roughly 0.4 per cent of the global population aged 15–64 years in 2016, albeit with substantial variations from region to region. The subregion with the highest prevalence of cocaine use continues to be North America, where high prevalence rates are reported by the United States (2.4 per cent of the population aged 15–64 years) and Canada (1.5 per cent). Oceania as a whole also has a high prevalence of cocaine use, with prevalence of cocaine use in Australia among the population aged 14 years and older at 2.5 per cent. In Western and Central Europe, prevalence of cocaine use in the United Kingdom (2.3 per cent the population aged 16–59 years), Spain (2.0 per cent the population aged 15–64 years in 2015) and the Netherlands (1.9 per cent of the population aged 15–64 years in 2015) is also high.

Because only a limited number of countries provide new estimates every year,²⁰ error margins are so wide that it would be premature to draw conclusions about statistically significant increases. However, expert perceptions on changes in cocaine use²¹ suggest an upward trend in cocaine use worldwide over the period 2006–2016. Although reported in all regions, the increase appears to have been most noticeable, especially in 2016, in the Americas, Africa and Asia.

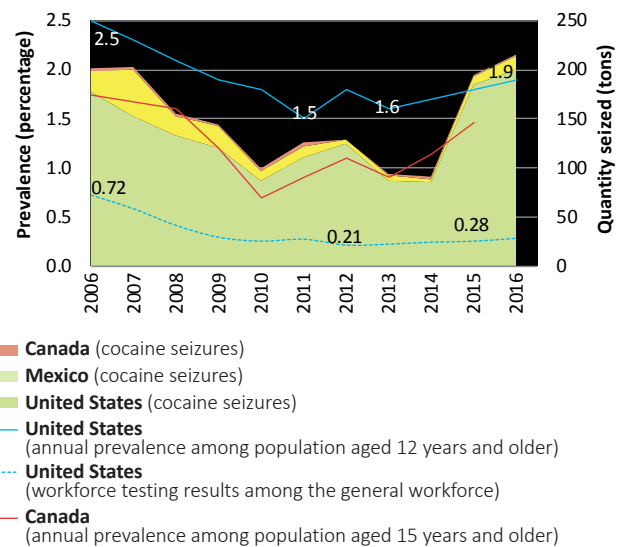
20 On average, 20–25 countries every year report new drug use estimates to UNODC.

21 See the online methodological annex of the present report.

Continued growth in the North American cocaine market

Most indicators in North America, the world's largest cocaine market, point to an expansion of the cocaine market from 2013 onwards, mirroring the changes in Colombia when the long-term downward trend in cocaine manufacture was reversed. The annual prevalence of cocaine use among the general population in Canada and the United States has been increasing since 2013. Further, data in the United States have shown an increase since 2013 in urine samples of the workforce that tested positive for cocaine, while from 2013 to 2016 the number of people initiating cocaine use rose by 80 per cent, returning to the level reported in 2002.²² The quantity of cocaine seized in the United States rose by more than 40 per cent, and by almost 50 per cent in North America as a whole, over the same period (2013–2016).

FIG. 5 Seizures of cocaine in North America and annual prevalence of cocaine use in the United States and Canada, 2006–2016



Source: UNODC, annual report questionnaire data; Substance Abuse and Mental Health Services Administration of the United States, *National Household Survey on Drug Use and Health*; Quest Diagnostics; Quest Diagnostics Drug Testing Index for 2016 and previous years; Health Canada, Canadian Alcohol and Drug Use Monitoring Survey; and Statistics Canada, Canadian Tobacco, Alcohol and Drugs Survey, 2015.

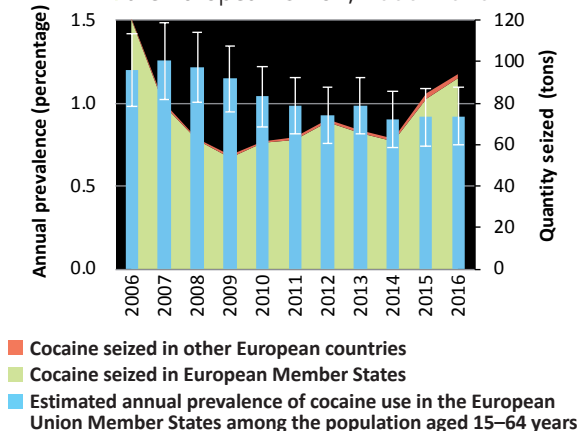
22 Substance Abuse and Mental Health Services Administration of the United States, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health*.

The number of cocaine-related deaths in the United States doubled over the period 2013–2016, rising from less than 5,000 to more than 10,000. However, since most of those deaths were related to the use of cocaine in combination with synthetic opioids (66 per cent in 2015,²³ up from 45 per cent in 2006),²⁴ they cannot be attributed exclusively to cocaine consumption.

Likely expansion of the cocaine market in Europe

The overall prevalence of cocaine use in the European Union is about half the rate reported in the United States. Based on limited data, the prevalence of cocaine use in Europe is perceived to have remained relatively stable in recent years, but there are also indications that the supply of cocaine to Europe has been increasing again. For example, although the quantity of cocaine seized in Europe fell from the peak of 121 tons seized in 2006 to 55 tons in 2009, it then almost doubled, to 94 tons in 2016, and rose by 50 per cent from 2014 to 2016. European Union countries accounted for 98 per cent of all the cocaine seized in Europe in 2016, as well as for the bulk of cocaine consumption in the region. UNDOC estimates that some 70 per cent

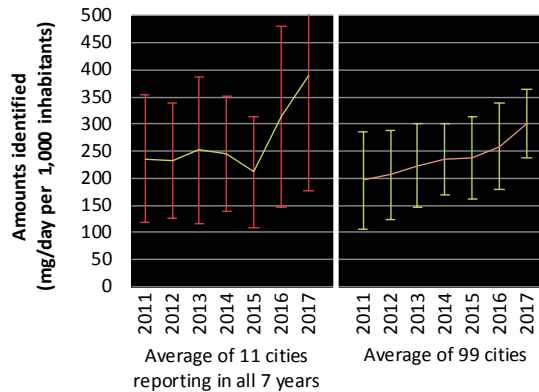
FIG. 6 Seizures of cocaine in Europe and annual prevalence of cocaine use in the European Union, 2006–2016



Source: UNODC calculations based on annual report questionnaire data; and EMCDDA.

23 No breakdown of cocaine-related deaths for 2016 was available at the time of writing this report.
 24 United States, National Institute on Drug Abuse, National Center for Health Statistics, CDC Wonder, National overdose deaths from select prescription and illicit drugs, 2017.

FIG. 7 Benzoylcegonine found in wastewater per 1,000 inhabitants in Europe (based on data from 99 European cities), 2011–2017



Source: UNODC calculations based on information from Sewage Analysis CORe Group—Europe (SCORE).

Note: Data included are from the analysis of wastewater in 27 European countries over the period 2011–2017. For calculation methods and details, see the online methodology section of the present report.

of all European cocaine users reside in European Union countries and more than 85 per cent in Western and Central Europe.

In contrast to prevalence surveys, which suggest that past-year cocaine use has remained rather stable, wastewater analysis points to a likely expansion of the European cocaine market in terms of the quantity consumed in recent years. The analysis of benzoylcegonine (a cocaine metabolite) in wastewater undertaken in cities across West, Central and South-Eastern Europe points to a growth in cocaine consumption over the period 2011–2017, particularly in the last two years of that period.

After growing until 2016, the cocaine market in Oceania may now be stabilizing

Conducted in 2016, the latest household survey in Australia confirmed a long-term upward trend in cocaine use in Oceania, with an annual prevalence of cocaine use of 2.5 per cent of the population aged 14 years and older in 2016,²⁵ which is relatively high by global standards. A number of other cocaine indicators have also shown an upward trend in recent years, including positive drug tests of detainees and

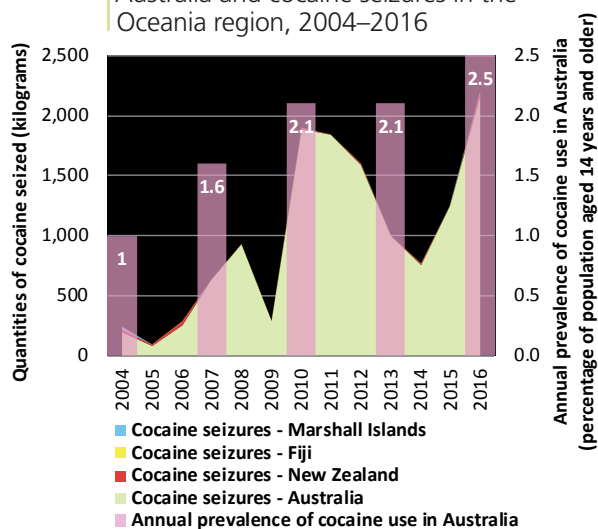
25 Australian Institute of Health and Welfare, 2016 National Drug Strategy Household Survey.

use of cocaine among “ecstasy” users in Australia.²⁶ In parallel, the quantities of cocaine seized have also increased, reaching a record level in Oceania (notably in Australia) in 2016, as did the number of cocaine seizures and the number of cocaine-related arrests.

By contrast, cocaine purity decreased in Australia’s main cocaine market, New South Wales (although prices increased slightly in Australia as a whole) in 2016, when the perceived availability of cocaine (by injecting drug users and regular “ecstasy” users) also decreased.²⁷ Taken together with the slight increase in wholesale prices in 2016,²⁸ this suggests a possible reduction in the availability of cocaine in Australia in 2016. Moreover, the analysis of wastewater data in Australia showed that cocaine consumption in 2017 had stabilized close to the level reported in late 2016.²⁹

Despite very high prevalence rates in Australia, treatment demand for cocaine use in Oceania as a whole seems to be low,³⁰ suggesting that, compared with the North American and the European markets, the number of people experiencing drug use disorders from cocaine use may be limited. Indeed, while the annual prevalence of cocaine use in Australia is three times that reported in the European Union, wastewater analysis suggests that the amount of cocaine consumed per capita (average benzoylecgonine content in wastewater per 1,000 inhabitants) in Australia is clearly below the European average.³¹ The price of cocaine in Australia, already very high compared with the markets in other developed countries,³² may be a factor behind the comparatively low consumption of cocaine, leading to fewer cocaine use disorders in Australia than in other major cocaine markets.

FIG. 8 Annual prevalence of cocaine use in Australia and cocaine seizures in the Oceania region, 2004–2016



Source: UNODC, annual report questionnaire data; and Australian Institute of Health and Welfare, 2016 *National Drug Strategy Household Survey*.

26 Australian Criminal Intelligence Commission, *Illicit Drug Data Report 2015–16*, pp. 91–108.

27 *Ibid.*, pp. 91–108.

28 *Ibid.*, p. 102.

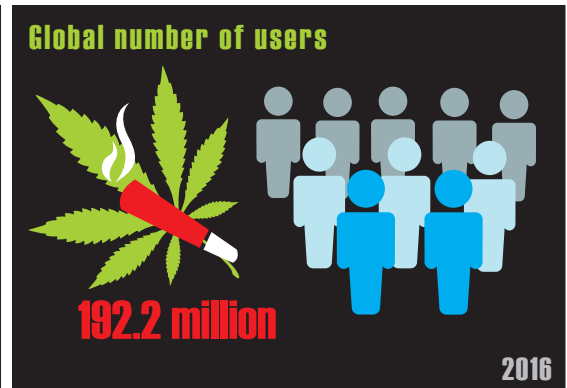
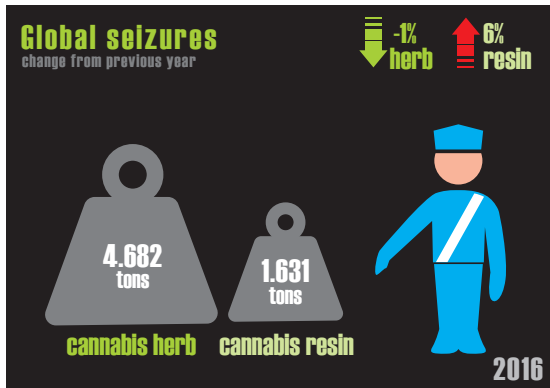
29 Australian Criminal Intelligence Commission, *National Wastewater Drug Monitoring Program*, Report No. 3 (November 2017), p. 40.

30 UNODC, annual report questionnaire data.

31 SCORE, Sewage Analysis CORE Group–Europe (SCORE) and Australian Criminal Intelligence Commission, *National Wastewater Drug Monitoring Program*, Report No. 3 (November 2017).

32 Australian Criminal Intelligence Commission, *Illicit Drug Data Report 2015–16*, p. 102.

C. CANNABIS



Note: Data refer to 2016.

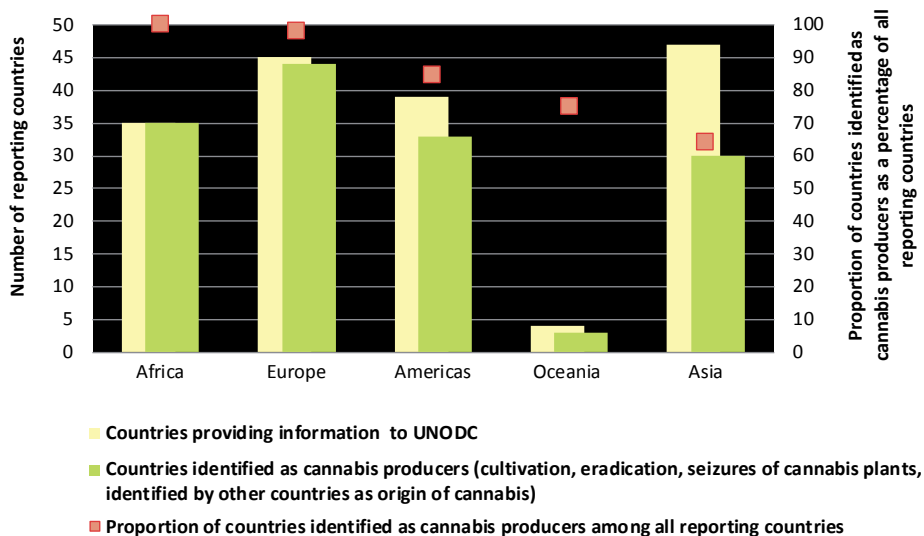
Cannabis production continues to affect all regions worldwide

Cannabis plant cultivation was reported —through either direct indicators (cultivation or eradication of cannabis plants) or indirect indicators (seizures of cannabis plants, origin of cannabis seizures as reported by other Member States) — by 145 countries (or 85 per cent of countries reporting to UNODC) over the period 2010–2016, representing 94 per cent of the world’s total population.

Global seizures of cannabis herb declined in 2016, while seizures of cannabis resin continued to rise

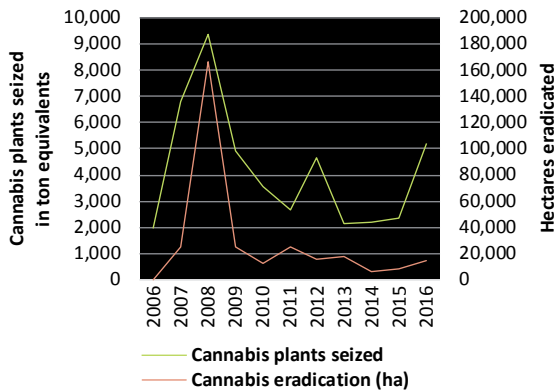
There is a lack of systematic and direct measurements of cannabis cultivation and production, which exist in only a few countries and are not carried out on a regular basis. However, a number of countries report on cannabis plants seized and on the eradication of cannabis; the data available suggest a peak in eradication activities in 2008 (reflecting the

FIG. 1 | Number of countries affected by cannabis production and number of countries reporting drug-related information to the United Nations Office on Drugs and Crime, 2010–2016



Source: UNODC, responses to the annual report questionnaire.

FIG. 2 Global quantity of cannabis plants seized and eradication of cannabis plants, 2006–2016



Source: UNODC, responses to the annual report questionnaire.

large amounts of cannabis plant seizures in Paraguay and large areas of cannabis eradication in Albania that year), and an increase in 2016, mainly a result of increases in cannabis plant seizures in Albania, Guatemala, the Philippines and Tajikistan and an increase in the area of cannabis cultivation eradicated in India.

Cannabis herb

As in previous years, the largest quantity of cannabis herb seized in 2016, accounting for almost two thirds of the global total, was reported in the Americas. North America accounted for 39 per cent of the global total, and South America and Central America and the Caribbean for 23 per cent. The next largest seizure amounts reported for regions were those of Africa (17 per cent), Asia (14 per cent), Europe (6 per cent) and Oceania (0.2 per cent). Whereas the amounts of cannabis plants seized and area of eradication increased, the global quantity of cannabis herb seized decreased by 22 per cent from 2015 to 2016, to 4,682 tons, the lowest level since 2000. That decrease in the amount of cannabis herb seized in 2016 was mainly due to the 51 per cent decrease reported in Africa (partly a reflection of reporting issues) and the 25 per cent decrease in the Americas, whereas the quantity of cannabis herb seized increased in Europe (49 per cent), Asia (135 per cent) and Oceania (6 per cent). The total number of cannabis herb seizure cases worldwide increased slightly in 2016 (2 per cent increase). In 2016, the quantity of cannabis plants seized

increased in Africa (mainly in North Africa), Asia and Europe, and decreased in the Americas and Oceania.

While there is no evidence that the global cannabis market is shrinking (the global number of cannabis users continued to rise in 2016), the decline in the global quantity of cannabis herb seized may indicate a shift in the priorities of law enforcement authorities. This may be the case in North America in particular, where the availability of medical cannabis in many jurisdictions and new legal frameworks that allow the cultivation of cannabis for recreational use in some states of the United States may have played a role.

By contrast, the quantities of cannabis herb seized increased in Europe, Oceania and Asia from 2015 to 2016. Over the period 2006–2016, cannabis herb seizures doubled in Europe, almost tripled in Asia and quadrupled in Oceania.

Even with the decline in cannabis herb seized in North America, the United States continued to be the country reporting the largest quantity of cannabis herb seized worldwide in 2016 (21 per cent of all cannabis herb seized), followed by Mexico (18 per cent). Cannabis herb seizures in the United States were, however, at 978 tons, at their lowest level since 2000, and cannabis herb seizures made in Mexico were, at 841 tons, at their lowest level since 1995. The next largest portions of the global quantity of cannabis herb seized were reported by Paraguay (9 per cent) — one of the largest cannabis-exporting countries in South America — followed by India (6 per cent), Brazil (5 per cent) and Egypt (4 per cent).

Cannabis resin

Trafficking in cannabis resin continues to be far more geographically concentrated than trafficking in cannabis herb. Some 50 per cent of the total quantity of cannabis resin seized worldwide in 2016 was intercepted in the Near and Middle East/South-West Asia, 23 per cent in North Africa, and 23 per cent in Western and Central Europe. Those three subregions thus accounted for 97 per cent of all cannabis resin seized worldwide in 2016.

The quantity of cannabis resin seized worldwide in 2016 was the second largest annual amount ever reported. The 6 per cent rise from 2015 to 2016,

Trafficking of cannabis herb continues to be predominantly intraregional in nature

Most trafficking of cannabis herb takes place in the region where it was produced, a phenomenon that has become even more pronounced since the spread of indoor cannabis cultivation.^a The countries most frequently reported in the period 2012–2016 as countries of origin of cannabis herb by region and subregion are as follows.

Americas

The most frequently reported source country for transnational shipments of cannabis herb in North America was Mexico, followed by Canada. Cannabis is grown in Mexico (notably in the state of Sinaloa and neighbouring states),^b in Canada, and all 50 states of the United States, mostly on the West Coast, in particular California.^c While ongoing increases in the domestic cultivation of cannabis were reported in the United States in 2016, Mexico remained the most important foreign source of cannabis herb,^c while lesser volumes were also smuggled from the Caribbean.^c The importance of Mexico as a source country for the United States cannabis market appears to be declining, and that decline seems to be mostly due to perceived differences in the quality of marijuana.^c While there are indications that some drug trafficking organizations in Mexico, in order to compete with cannabis produced in the United States, have started to produce higher-potency cannabis,^c other organized crime groups have allegedly prompted Mexican farmers to increase cultivation of opium poppy.^b In South America, the Caribbean and Central America, the most frequently reported source countries of cannabis herb were Colombia and Paraguay, followed by Jamaica. The vast majority of the cannabis produced in South America, the Caribbean and Central America is for consumption within the Americas.

Africa

In Africa, only 17 countries reported on the origin, transit and departure of cannabis herb over the period 2012–2016, suggesting a low level of transnational trafficking in the region. The most frequently mentioned countries of origin or transit of cannabis herb in the region were Ghana (reported by 5 countries), followed by Nigeria (3 countries), Mozambique (3 countries) and Swaziland (3 countries). Although most of the cannabis produced in Africa is for consumption within the region, a number of African countries (Nigeria, Ghana, South Africa and Zambia) have identified European countries as the final destination, notably the United Kingdom, the Netherlands and Italy.

Asia

In Asia, 26 countries reported on the origin, transit and departure of cannabis herb over the period 2012–2016. Most of the cannabis herb trafficking in the region seems to be at the national level. Only a handful of countries were identified by other countries as countries of origin or transit of cannabis herb: India (4 countries), Islamic Republic of Iran

(reported by 4 countries) and Afghanistan (3 countries). As in other regions, most of the cannabis produced in Asia is for consumption within the region. One major exception is cannabis herb produced in Central Asia, which is often destined for Eastern Europe, particularly for the Russian Federation.^b In addition, there are also some shipments of cannabis herb from North America (Canada and United States) to East Asia, notably Japan, the Republic of Korea and Hong Kong, China.^b

Europe

Cannabis herb is produced in practically all European countries. The most frequently mentioned source countries for cross-border trafficking of cannabis herb were the Netherlands and Albania, followed at some distance by Czechia. Albania and the Netherlands reported the largest eradication of cannabis plant in Europe in recent years (Albania reported the eradication of 5,205 outdoor sites with a total of 2,536,288 cannabis plants in 2016; and Netherlands reported the eradication of 5,856 indoor sites with a total of 994,068 cannabis plants.).^b Cannabis herb shipments from outside Europe seem to be of only minor importance and are limited to Central Asia (mostly for Eastern Europe), as well as some countries in Africa, the Americas, South-West Asia and South-East Asia. The overwhelming proportion (99 per cent of all mentions) of cannabis produced or imported into Europe was destined for final consumption in Europe.

Oceania

Most of the cannabis found in Oceania is locally grown and locally trafficked. Nevertheless, in Australia, the largest cannabis market in Oceania, a total of 38 “embarkation countries” for illegal cannabis imports were detected in the period 2015–2016, with most quantities smuggled by air cargo.^d In Oceania as a whole, cannabis herb sourced from abroad mainly originates in or transits the United States, followed by Canada, the Netherlands and South Africa, while Australia is reported as a source by New Zealand.^b

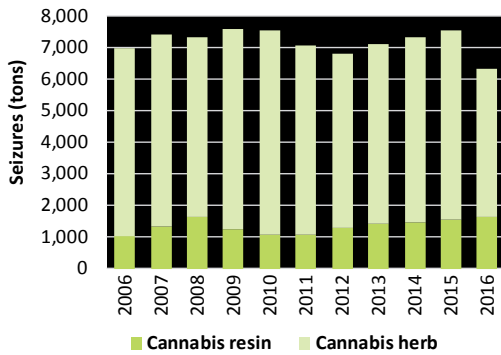
^a European Drug Report 2017: Trends and Developments (EMCDDA, Luxembourg, Publications Office of the European Union, 2017) and previous years.

^b UNODC, responses to the annual report questionnaire

^c United States, Department of Justice, Drug Enforcement Administration, 2017 National Drug Threat Assessment (October 2017).

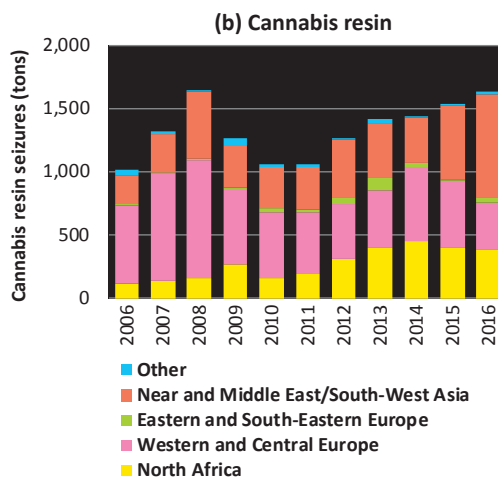
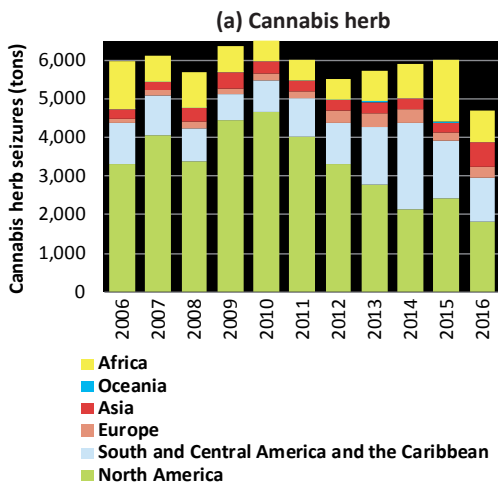
^d Australian Criminal Intelligence Commission, Illicit Drug Data Report 2015–16 (Canberra, 2017), pp. 60–71.

FIG. 3 Global quantities of main cannabis products seized, 2006–2016



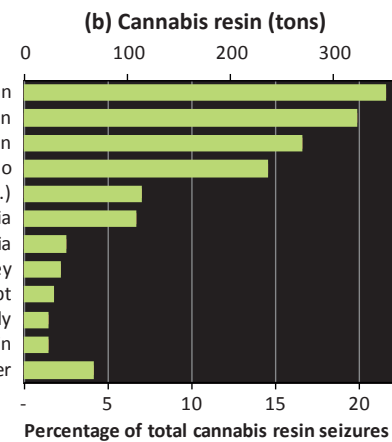
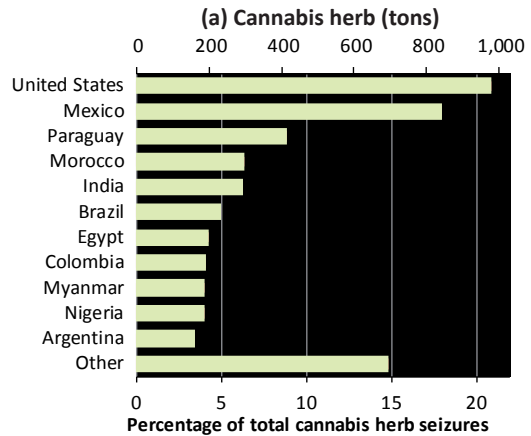
Source: UNODC, responses to the annual report questionnaire.

FIG. 4 Quantities of cannabis seized, by region, 2006–2016



Source: UNODC, responses to the annual report questionnaire.

FIG. 5 Quantities of cannabis seized, by country, 2016



Source: UNODC, responses to the annual report questionnaire.

to 1,631 tons, in the quantity of cannabis resin seized was primarily due to the 41 per cent increase in the quantity of cannabis resin seized in the Near and Middle East/South-West Asia, which more than tripled over the period 2006–2016. The quantity of cannabis resin seized in North Africa, by contrast, decreased by 3 per cent, while in Western and Central Europe — which for years was the main cannabis resin market — it fell by more than 30 per cent from 2015 to 2016. This seems to reflect an underlying shift away from the use of cannabis resin to the use of cannabis herb grown in Europe. For the first time ever, the largest quantity of cannabis resin seized in 2016 was reported by Afghanistan (22 per cent of the global total), followed by Spain (20 per cent), Pakistan (17 per cent) and Morocco (15 per cent).

Cannabis resin continues to be trafficked mostly from Morocco and Afghanistan to key destination markets

While the trafficking of cannabis herb — in contrast to the trafficking of other plant-based drugs — mostly takes place within the region of production (see box), there is substantial interregional trafficking of cannabis resin, most notably between North Africa and Western and Central Europe, between Central Asia and Eastern Europe and between the Near and Middle East/South-West Asia and Europe.

However, while cannabis herb has a global reach, cannabis resin has a more restricted market mainly confined to the Near and Middle East/South-West Asia, North Africa and Europe. Cannabis resin that is consumed within this smaller market mainly originates in Afghanistan and Morocco, although some also originates in other countries such as Lebanon and Pakistan.

Over the period 2012–2016, Morocco was reported as a source of cannabis resin by a large share of countries in North Africa (80 per cent of all mentions by countries in that subregion that reported the source of cannabis resin seized) and Western and Central Europe (41 per cent of mentions in that subregion). Some cannabis resin of Moroccan origin was also reportedly trafficked to Eastern Europe (27 per cent of all mentions in that subregion) and South-Eastern Europe (11 per cent of mentions). The largest quantities of cannabis resin seized in North Africa continues to be reported in Morocco and Algeria.¹ For years, Spain has been identified by other European countries as the principal country of departure and transit of cannabis resin in the region, accounting for 19 per cent of all such mentions in the period 2012–2016, followed by the Netherlands (14 per cent of all mentions), another important hub for cannabis trafficking in Europe.

Afghanistan is also an important source country of cannabis resin, with 19 per cent of all mentions by countries that reported the source of cannabis resin in the period 2012–2016. Cannabis resin originating in Afghanistan has been identified in countries in Central Asia and Transcaucasia, in Eastern Europe (most notably in the Russian Federation) and in

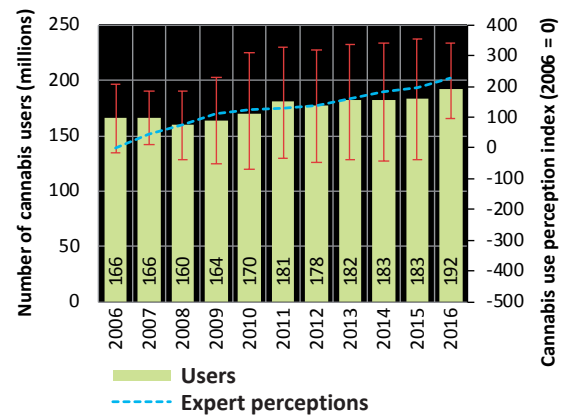
Western and Central Europe (13 per cent of all mentions in that subregion). Lebanon was also mentioned as the source country by 7 per cent of reporting countries and Pakistan by 5 per cent. Those two countries supply cannabis resin to the neighbouring countries in the Near and Middle East/South-West Asia.

Estimated global number of cannabis users higher in 2016

Cannabis continues to be the most widely used drug worldwide. UNODC estimates that roughly 3.9 per cent (range: 3.4–4.8 per cent) of the global population aged 15–64 years used cannabis at least once in 2016: some 192.2 million people (range: 165.8 million–234.1 million). The number of cannabis users estimated for 2016 is 16 per cent higher than the number estimated for 2006. As some large countries do not report hard data on cannabis use, this change may mask undetected changes, but qualitative assessments by national experts, as reported by an average of 77 Member States per year, confirm the trend of increasing cannabis use over the period 2006–2016.

According to the cannabis use perception index, the increase in cannabis use over the period 2010–2016 appears to have been greatest in countries in Asia and Africa, followed by increases in countries in the Americas and Europe. In Oceania, by contrast,

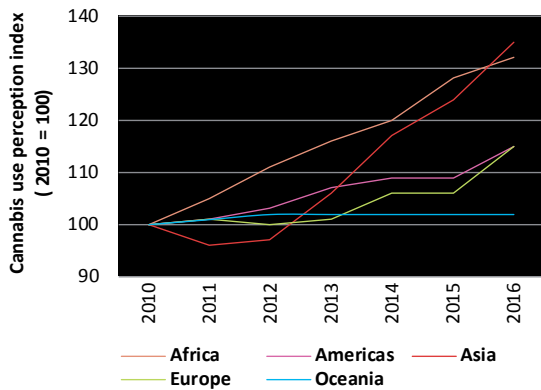
FIG. 6 Trends in the number of annual cannabis users and cannabis use perception index, 2006–2016



Source: UNODC, responses to the annual report questionnaire.

Note: For details on the perception index calculations, refer to the online methodological annex.

¹ UNODC, responses to the annual report questionnaire.

FIG. 7 Trends in cannabis use perception index, by region (2010 = 100)

Source: UNODC, responses to the annual report questionnaire.
 Note: For further information on the calculations of drug use perception indexes, see the online methodological annex.

hardly any change has been reported in the past decade.

Cannabis use is still on the increase in North America

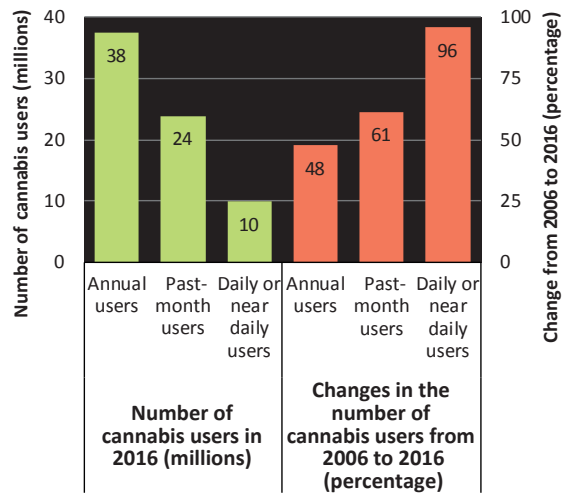
Cannabis use increased in the Americas in the past decade from 40.5 million people who used cannabis in the past year, or 6.9 per cent of the population aged 15–64 years, in 2006,² to 52.9 million, or 8.0 per cent of the population aged 15–64 years, in 2016. The increase was most pronounced in the United States where, after some minor decreases at the beginning of the 2000s, up until 2007, annual prevalence of cannabis use grew significantly thereafter to 13.5 per cent of the population aged 12 years and older in 2015, and 13.9 per cent in 2016.³ These increases are taking place at a time when there is a decrease in risk perceptions⁴ regarding the use of cannabis⁵ and discussions in some individual

2 World Drug Report 2008 (United Nations publication, Sales No. E.08.XI.11), p. 112.

3 United States, SAMHSA, Center for Behavioral Health Statistics and Quality, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health*, HHS Publication No. SMA 17-5044, NSDUH Series H-52, (Rockville, Maryland, 2016).

4 Lloyd D. Johnston and others, , 2017 overview, (Ann Arbor, Michigan, University of Michigan Institute for Social Research, 2018).

5 Naji Salloum and others, “A reciprocal effects analysis of cannabis use and perceptions of risk”, *Addiction*, vol. 113, No. 6 (2018), pp. 1077–1085; Eldon Spackman and others,

FIG. 8 Cannabis users in the United States, 2006–2016

Source: United States, SAMHSA, Center for Behavioral Health Statistics and Quality, (Rockville, Maryland, September 2017).

states on the legalization of cannabis for recreational use. The growth in cannabis use in the United States exacerbated problematic patterns of consumption, as the number of daily or almost daily cannabis users almost doubled over the period 2006–2016, while the number of past-month users increased by 60 per cent and that of past-year users by almost half.⁶

In North America, comparatively high levels of cannabis use have also been reported in Canada, where cannabis use in the past year was reported by 14.7 per cent⁷ of the population aged 15 years and older in 2015, up from 10.7 per cent in 2013,⁸ and 9.1 per cent in 2011.⁹

“Marijuana use and perceptions of risk and harm: a survey among Canadians in 2016”, *Healthcare Policy*, vol. 13, No. 1 (2017), pp. 17–27; Jason Kilmer and others, “Marijuana use, risk perception, and consequences: is perceived risk congruent with reality?”, *Addictive Behaviors*, vol. 32, No. 12 (2007), pp. 3026–3033.

6 United States, SAMHSA, Center for Behavioral Health Statistics and Quality, *Results from the 2016 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, September 2017).

7 UNODC, responses to the annual report questionnaire, drawing on data from the Canadian Tobacco, Alcohol and Drugs Survey 2015.

8 Canada, Canadian Tobacco, Alcohol and Drugs Survey: summary of results for 2015.

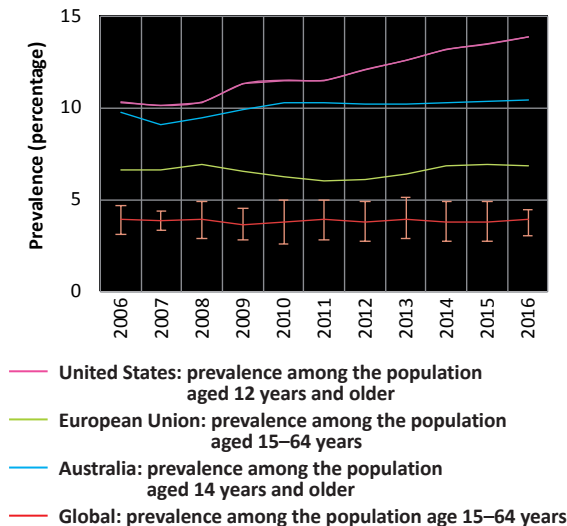
9 Canada, Canadian Alcohol and Drug Use Monitoring Survey: summary of results for 2011.

Cannabis use remains quite stable in Europe and in Oceania

Annual prevalence rates of cannabis use in Oceania, most notably Australia, were substantially higher than in the United States in the 1990s, but the annual prevalence of cannabis use in Australia decreased dramatically, from almost 18 per cent of the population aged 14 years and older in 1998 to roughly 10 per cent a decade later, and has remained at that lower level throughout the past decade.

Although above the global average, cannabis use in the European Union has fluctuated over the last decade, during which between 6 and 7 per cent of the population aged 15–64 years reported having used cannabis in the past year. The highest annual prevalence rates of cannabis use in Europe in recent years have been reported by countries in Western and Central Europe, notably France (11.1 per cent in 2015), Spain (9.5 per cent in 2015), Czechia (9.4 per cent in 2015), Italy (9.2 per cent in 2013/2014), Switzerland (9.1 per cent in 2016) and the Netherlands (8.7 per cent in 2015).¹⁰

FIG. 9 Annual cannabis use in the United States, the European Union, Australia and at the global level, 2006–2016



Source: UNODC, responses to the annual report questionnaire, SAMHSA, EMCDDA and the Australian Institute of Health and Welfare.

¹⁰ UNODC, responses to the annual report questionnaire.

The prevalence of cannabis use among students aged 15–16 years in Europe has remained largely stable over the past decade¹¹ — about twice the rate of the general population.

Developments in measures regulating non-medical use of cannabis

Since 2017, eight state-level jurisdictions in the United States have allowed non-medical use¹² of cannabis, as well as the District of Columbia.^{13, 14} All those jurisdictions, except for the District of Columbia, are now licensing for-profit companies to produce, market and sell a wide range of cannabis products. All of the states that have legalized the production and sale of cannabis had prior measures allowing the medical use of cannabis.

The *World Drug Report 2017* looked at developments in cannabis legislation in the United States, in particular, the extent of exposure of the adult and youth populations to cannabis, as well as the interplay between the use of cannabis for recreational purposes and use for medical purposes. The present section focuses on the evidence that has become available in the State of Colorado, as it was among the first adopters of measures to allow non-medical use of cannabis in the United States. The outcomes of the legislation in terms of public health and public safety measures in Colorado are starting to emerge from the available information and are presented below, although the results have been mixed and outcomes are inconclusive. It should be pointed out that the cannabis legislation in Colorado has not been applied homogeneously across the state because the regulation allows counties and cities to opt out. Only 25 of the 64 counties in Colorado have chosen to allow some elements of recreational cannabis legislation in their jurisdictions.

The present section also provides a brief update on the status of implementation of cannabis regulation

¹¹ EMCDDA and European School Survey Project on Alcohol and Other Drugs, *ESPAD Report 2015: Results from the European School Survey Project on Alcohol and Other Drugs* (Luxembourg, Publication Office of the European Union, 2016).

¹² In this section, the terms “non-medical use” and “recreational use” of cannabis have been used interchangeably.

¹³ Home cultivation is not allowed in the State of Washington. The number of plants allowed in each state varies.

¹⁴ National Conference of State Legislatures (www.ncsl.org).

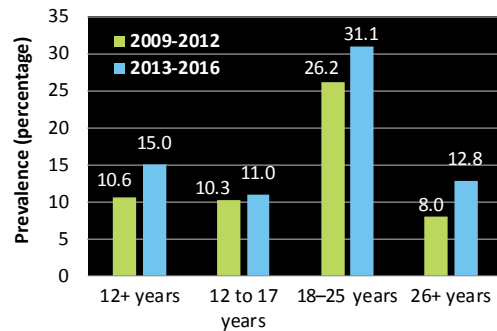
in Uruguay, where cannabis regulation is being implemented gradually, and only limited information is available on the outcomes.

Extent of cannabis use in Colorado

In 2016, Colorado was among the states with the highest annual and past-month prevalence of cannabis use in the United States. Annual and past-month prevalence of cannabis use in 2016 were, respectively, 13.7 and 8.6 per cent per cent at the national level, whereas they were 23.1 per cent and 15.9 per cent in Colorado. Since past-month use of any substance indicates the extent of more recent use, data on past-month use of cannabis have been used to present the trends in cannabis use in Colorado. According to the National Survey on Drug Use and Health, with the exception of 2015–2016, prevalence of past-month cannabis use in Colorado has increased every year since 2009–2010. While the comparison of the periods prior to legalization (2009–2012) and after legalization (2013–2016) is not enough in itself to evaluate the impact of the new regulation, the past-month prevalence of cannabis use mainly increased among people aged 18–25 years and 26 years and older. Among the population aged 26 years and older, past-month cannabis use increased by more than half while it increased by 18 per cent among young adults aged 18–25 years from one period to the other.

Different surveys at both the national and state levels provide information on alcohol and drug use among high school students. There are three main national surveys and those conducted by single state authorities. The National Survey on Drug Use and Health reports data on the extent of drug use among the population aged 12–17 years at national and state levels. The Monitoring the Future survey presents national level results for eighth, tenth and twelfth grade students, but the sample size remains relatively small for yielding valid state-level results. The Centers for Disease Control and Prevention conduct the Youth Risk Behaviors Survey, which also looks at substance use among high school students, although the state-level participation in the survey is not consistent every year. In 2015, the latest year for which Youth Risk Behaviors Survey results are reported, weighted data for Colorado fell short of the required 60 per cent response rate to generate state-level

FIG. 10 Past-month use of cannabis in Colorado prior to and following legalization of non-medical use of cannabis, by age group, 2009–2012 and 2013–2016



Source: UNODC elaboration based on results from the national survey on drug use and health: state-level estimates (SAMHSA) for 2009–2010 to 2011–2012 and from 2013–2014 to 2015–2016.

representative data.¹⁵ Among state-specific surveys, Colorado has conducted the Healthy Kids Colorado Survey, for which the latest results available are for 2015. As the sample size and methodology of those national and state surveys differ, they have yielded different results as to whether there has been an increase in youth cannabis use in Colorado. This has become a cause of significant debate in Colorado and the United States as a whole.

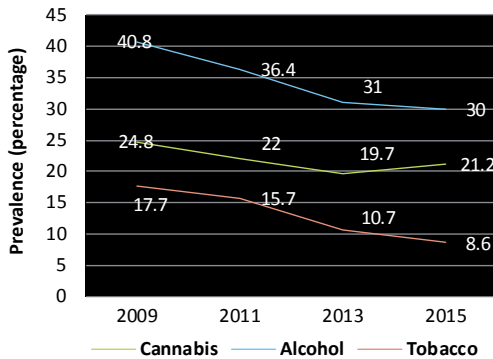
The National Survey on Drug Use and Health and the Colorado Healthy Kids Survey both show that past-month cannabis use among high school students has remained rather stable since the legalization of cannabis use. On average, past-month cannabis use among young people aged 12–17 years remained relatively stable, at between 10 and 11 per cent, over the periods 2009–2012 and 2013–2016. While they should be interpreted with caution, trends in past-month cannabis use reported in the Colorado Healthy Kids Survey generally follow those seen in the past-month use of alcohol and tobacco, although the past-month use of cannabis among high school students increased slightly in the survey years 2013 and 2015.

Public health outcomes

One public health measure used for looking at the possible adverse effects of cannabis use is emergency room visits and hospitalization related to cannabis

15 Centers for Disease Control and Prevention, “YRBS participation maps and history”. Available at www.cdc.gov.

FIG. 11 Trends in alcohol, tobacco and cannabis use in the past month among high school students (grades 9 to 12) in Colorado

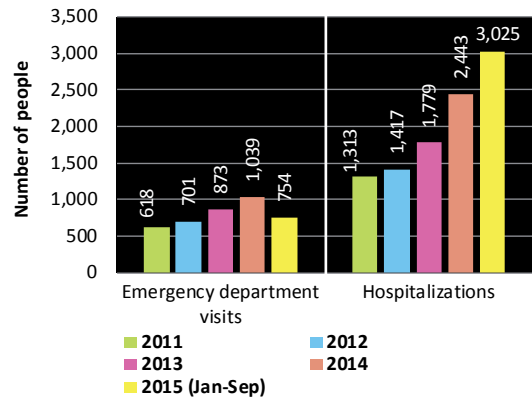


Source: Healthy Kids Colorado Survey, 2015.

use, especially due to acute intoxication. People suffering from acute intoxication from cannabis use may present themselves in emergency departments with anxiety, panic attacks, public intoxication, vomiting and other non-specific symptoms that could be precipitated by cannabis use.¹⁶ It is difficult to fully quantify a trend in health-care utilization as cannabis use could be a causal, contributing or co-existing factor depending on how it was noted by the physician on duty.¹⁷

In the period 2013–2014, the total number of emergency department visits related to cannabis use increased by 20 per cent. Since only partial data for health-care utilization is available for 2015, it is difficult to ascertain the trend beyond 2014 in emergency department visits related to cannabis use. Nevertheless, as reported by the Colorado Department of Public Health and Environment, hospitalizations attributed to cannabis use increased significantly each year up to September 2015.¹⁸ The number of people in treatment for cannabis as the primary substance of abuse was reported as 6,120 in 2016, a figure that had remained stable overall since 2012.

FIG. 12 Health-care utilization related to cannabis use in Colorado



Source: Colorado Department of Public Health and Environment, (Denver, United States, 2017).

Note: The 2015 data on emergency department visits and hospitalizations that are publicly available are for the period January–September only.

The number of calls to the poison and drug centre in Colorado in the years subsequent to the introduction of medical cannabis in 2010 and measures allowing the non-medical use of cannabis in 2013 also increased significantly. Over the period 2013–2014, calls about cannabis exposure increased by 75 per cent and remained relatively stable from 2014 to 2016.¹⁹ While the overall numbers are small, one important health outcome reported with respect to emergency room visits data is the increasing number of children admitted due to unintentional ingestion of edible cannabis products. Over the period 2013–2016, an average of 37 cannabis exposure cases among children aged 5 years or younger were reported by the poison and drug centre in Colorado, compared with 13 cases over the prior period 2009–2012.²⁰ Over the period 2014–2015, the rate of cannabis-related hospitalizations among children aged 9 years and under was 14 per 100,000 population, and the rate of cannabis-related emergency department visits was 9 per 100,000 population. Those rates over the prior

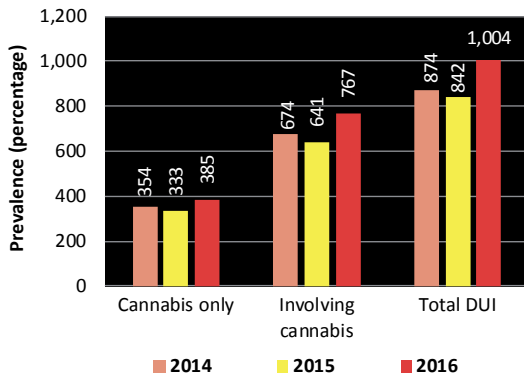
16 Andrew A. Monte, Richard D. Zane and Kennon J. Heard, “The implications of marijuana legalization in Colorado”, *JAMA*, vol. 313, No. 3 (20 January 2015), pp. 241–242.

17 Ibid.

18 Colorado Department of Public Health and Environment, *Monitoring Health Concerns Related to Marijuana in Colorado: 2016* (Denver, United States, 2017).

19 Based on information of the Rocky Mountain Poison and Drug Centre, as reported in Santhi Chilukri, “The impact of recreational marijuana legalization on Colorado policy analysis on Amendment 64”, Master’s thesis, University of Kentucky, 2017.

20 Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado: The Impact*, vol. 5 (October 2017).

FIG. 13 Driving under the influence of drugs in Colorado

Source: Data from the Colorado State Patrol, as reported through Rocky Mountain High Intensity Drug Trafficking Area, vol. 5 (October 2017).

period 2010–2013 had been, respectively, 6 and 8 per 100,000 population.²¹

Public safety and criminal justice

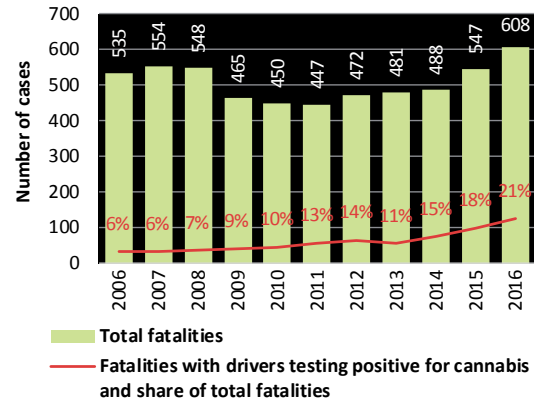
Driving under the influence of drugs can pose a threat not only to the driver but also to other people in a vehicle or at the roadside. Driving under the influence of cannabis was not tracked in Colorado prior to 2014. Between 2014 and 2016, the data show an increase in the number of cases of driving under the influence of cannabis only, and in the number of cases where cannabis and other substances were involved.

According to data on traffic fatalities, in Colorado there has been a steady year-on-year increase in the number of traffic deaths in which a driver tested positive for cannabis use. On average, in the period 2009–2012, there were 53 traffic deaths in which the driver tested positive for cannabis, a figure that increased to an average of 88 such deaths in the period 2013–2016, although the proportion actually doubled over that period.

In 2016, 163 investigations by Colorado Bureau of Investigations of individuals and organizations involved in the illegal sale of cannabis within and outside the State of Colorado were completed and approximately 3.5 tons of cannabis were seized.²²

21 Colorado Department of Public Health and Environment, *Monitoring Health Concerns Related to Marijuana in Colorado: 2016*.

22 Rocky Mountain High Intensity Drug Trafficking Area, *The*

FIG. 14 Traffic deaths with one driver testing positive for cannabis in Colorado, United States

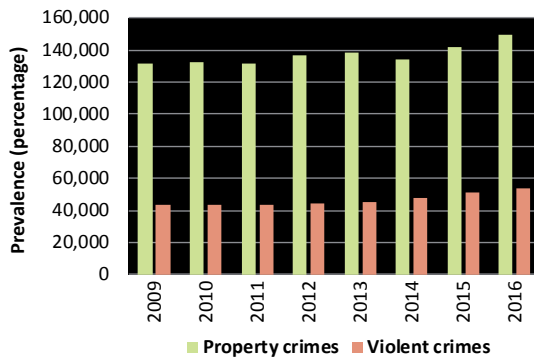
Source: Rocky Mountain High Intensity Drug Trafficking Area, vol. 5 (October 2017).

Such seizures are considered to have increased by 50 per cent since 2013, when the non-medical use of cannabis was legalized in Colorado. There was also a fivefold increase in the number of parcels containing cannabis that were mailed from Colorado to other states. Since the legalization of cannabis, as reported by the Colorado Bureau of Investigation, there has been an increase in both property and violent crimes in the state. The average number of property crimes increased by 9 per cent from the period 2009–2012 to the period 2013–2016, while the average number of violent crimes increased by 14 per cent.

The analysis of data since 2014, when the non-medical use of cannabis was legalized in Colorado, shows that cannabis use has increased significantly among the older population while it has remained relatively stable among the younger population (12–17 years). On the other hand, there has been a significant increase in health-care visits, hospital admissions, traffic deaths and driving under the influence of cannabis in the state.²³ As noted in the *World Drug Report 2017*, evaluation of the impact of measures allowing the commercial production, sale and recreational use of cannabis on health, criminal justice and other outcomes requires regular

Legalization of Marijuana in Colorado: The Impact, vol. 5 (October 2017).

23 Chilukri, “The impact of recreational marijuana legalization on Colorado policy analysis on Amendment 64”.

FIG. 15 | Property and violent crimes in Colorado

Source: Colorado Bureau of Investigation as reported through Rocky Mountain High Intensity Drug Trafficking Area, , vol. 5 (October 2017).

monitoring over time, and it may take years to determine their long-term effect on cannabis use and associated harm among adults, as well as their influence on cannabis use among adolescents.

Cannabis regulation in Uruguay: provisions and recent developments

In 2013, the Government of Uruguay approved legislation (Law No. 19.172) regulating the cultivation, production, dispensing and use of cannabis for recreational purposes.²⁴ In accordance with Uruguayan legislation, cannabis for recreational use can be obtained via registration with the national Institute for the Regulation and Control of Cannabis by choosing one of the three options: purchase in authorized pharmacies, membership of a club or domestic cultivation.²⁵ The quantity of cannabis permitted per person, obtained through any of the three mechanisms, cannot exceed 480 grams per year.

Domestic cultivation

Uruguayan legislation allows domestic cultivation for personal or shared use in a household, up to a maximum of six cannabis plants per household for personal consumption. At the time that the legislation was adopted in 2013, those who had already been cultivating cannabis had a period of up to six months to register with the Institute for the

Regulation and Control of Cannabis. As of the end of February 2018, 8,125 individuals had been registered for domestic cultivation, of whom 2,178 were authorized to grow cannabis in the period March 2017–February 2018. Cannabis production from domestic cultivation in that period is estimated to have reached 3,900 kg.

Cannabis clubs

Cannabis clubs are accredited as “civil associations” by the Ministry of Education and Culture and registered with the Institute for the Regulation and Control of Cannabis for the purpose of collective cultivation, production and use of cannabis among their members. Each club can have a minimum of 15 and a maximum of 45 members and is allowed 99 plants in a flowering state. Up to the end of February 2018, 78 clubs had been registered, 20 of which in the 12-month period March 2017–February 2018. At the end of February 2018, the membership of cannabis clubs stood at 2,049 adults, suggesting a maximum production of cannabis of 984 kg in 2017; 122 kg of cannabis were declared to the Institute for the Regulation and Control of Cannabis in 2016. Each club and its facilities are subject to the control of the Institute for the Regulation and Control of Cannabis

Sale through pharmacies

Adults who are registered in the system can opt to buy quantities of cannabis from pharmacies of up to 10 g per person per week or 40 g per month, provided they hold Uruguayan citizenship or permanent residency in Uruguay. Since July 2017, when the process of registering the pharmacies began, 16 pharmacies have been registered in the network of cannabis dispensing pharmacies. In the meantime, due to transaction issues with certain banks, six pharmacies have rescinded their registration, while another six are being evaluated for inclusion in the network. In order to increase the geographical coverage of cannabis dispensing outlets under the control of the Institute for the Regulation and Control of Cannabis, the Uruguayan Government is considering the evaluation and subsequent granting of licences to new commercial establishments that will sell cannabis to registered users. The cannabis price is evaluated every six months and was raised by 6 per cent in February 2018 to 200 pesos per 5 g package

²⁴ The main elements of regulation are given in table 1 and 2 in Annex C. Cannabis.

²⁵ The information in this section is taken from the Institute for the Regulation and Control of Cannabis.

(approximately \$1.40 per gram). Between July 2017 and February 2018, 20,900 individuals were registered to obtain cannabis through pharmacies. Some 150,000 transactions have been made to date.

Limits on tetrahydrocannabinol and cannabidiol content

The cannabis varieties distributed by the Institute for the Regulation and Control of Cannabis allow a minimum of 3 per cent of the cannabidiol content and maximum of 9 per cent the tetrahydrocannabinol content.

Limited scale of legal supply to date

As of February 2018, in Uruguay 8,125 individuals and 78 cannabis clubs with a total of 2,049 members were registered in addition to the 20,900 people registered through pharmacy sales for cannabis. The system potentially provides cannabis to around 30,000 of the 140,000 past-month cannabis users estimated in Uruguay in 2014. The impact of the provisions regulating the non-medical use of cannabis in Uruguay will only become evident, however, in the coming years once more information on the outcome measures related to public health and public safety is made available.

TABLE 1 | Regulations for legalizing the use of cannabis within jurisdictions in the United States of America

	Alaska	California	Colorado	District of Columbia	Maine
Legal Process	Voter initiative, state statute	Voter initiative	Voter initiative, amendment to state constitution	Voter initiative	Voter initiative
Title	Ballot Measure 2	Proposition 64	Amendment 64	Initiative 71	Question 1
Date passed	November 2014	November 2016	November 2012	November 2014	November 2016
Date implemented/required date of rule adoption	February 2015: Personal possession, consumption, cultivation October 2016: Retail sales	Not stated, but licences to be issued by 11 January 2018	December 2012: Personal possession, consumption, cultivation January 2014: Retail sales	February 2015: Personal possession, consumption, cultivation	Take effect on 7 January 2017; regulation for business to be in place August 2017
Regulatory authority	Marijuana Control Board (Alcoholic Beverage Control Board)	Bureau of Marijuana Control	Marijuana Enforcement Division (Department of Revenue)	Not applicable; considering separate legislation to regulate commercial production and sale to adults.	Department of Agriculture, Conservation and Forestry
Minimum age	21	21	21	21	21
Residency requirement	None	Not specified	None	None	Not specified
Personal possession quantity	28.5 g	1 oz flower 8 g concentrate	28.5 g	57 g	2.5 oz (70.8 g) 5g concentrate
Home cultivation	Six plants, three of which can be flowering; not subject to public views; within property with lawful possession or with consent of the person in lawful possession	Six plants, away from view	Six plants, three of which can be flowering	Six plants per person; Twelve plants per household, six of which can be flowering	Six mature plants, twelve immature plants, unlimited amount of seedlings away from view and tagged with personal identification number. Property owners can prohibit home cultivation. Cultivation for medical purposes not subject to same restrictions
Interpersonal sharing	28.5 g	Yes	28.5 g	28.5 g	Yes for home grow. Not permitted for retail marijuana
Retail transaction limit	28.5 g	Not specified, presumably same limits for personal possession	Residents: 28.5 g Non-residents: 7 g	Not applicable	2.5 oz. of marijuana Twelve seedlings
Retail pricing structure	Market	Market/commercial	Market	Market	Market/commercial
Average retail price per gram after tax	Average price \$20	Low quality \$10 High quality \$14	Medium quality \$15.5	Not applicable	Medium quality \$14
Maximum THC content	Not set initially	Not set initially	Not set initially	Not set initially	Not set initially
Registration requirements	None	Not specified	None	None	Not specified



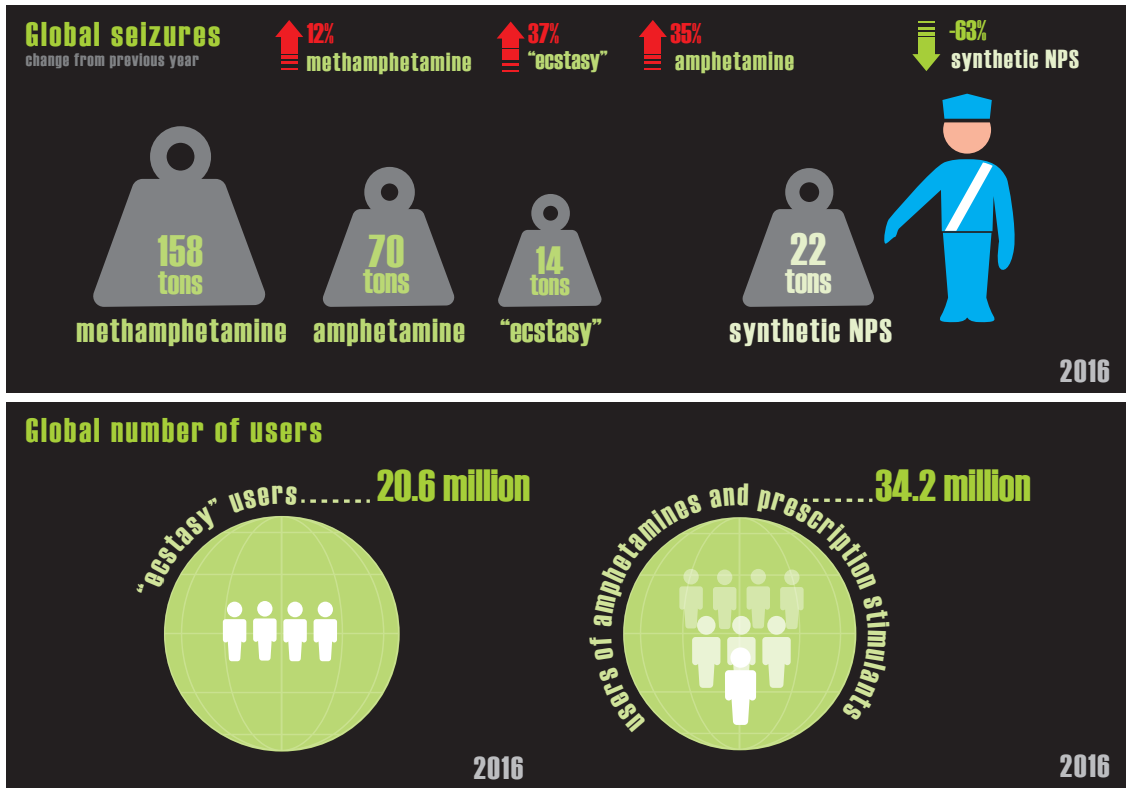
	Alaska	California	Colorado	District of Columbia	Maine
Commercial production	Licensed cannabis producers	Licensed cultivators and manufacturers, varying types	Licensed cannabis cultivation facilities	None	Licensed cultivators; two types based on size
Commercial distribution	Licensed retail cannabis stores	Limits on market concentration	Licensed retail cannabis stores	None	State authority may not limit total number of stores; localities may regulate number and location of establishments
Restrictions on edibles	5 mg of THC for single serving, no more than 50 mg of homogenous THC allowed per package. Child-resistant packaging required. Separate warnings on risks, not appealing to children	10 mg THC per serving. Warning and potency labels. List of ingredients and cannabinoid content	Maximum of 10 mg of THC in each individually packed serving; warning labels "keep out of reach of children"; THC symbol on labels and not attractive to children	Currently not allowed	Serving size and potency limits to be developed in regulations. List of ingredients packing and labels; products and edibles may not contain additives designed to make product more appealing to children
Advertising	Final advertising regulations to be determined by the Alaska Department of Health and Social Services Division of Public Health	Restricted to those over 21. Restrictions on false advertisement or claims of untrue health benefits. Products cannot appeal to children	Restricted to media with no more than 30 per cent of the audience under the age of 21	Not applicable, no commercial market	Restricted to those over 21. Restrictions on false advertisement or claims of untrue health benefits. Products cannot appeal to children
Taxation	\$50 excise tax per ounce on sales or transfers from cultivation facility to retail store or product manufacturer; other parts of plant e.g., stems and leaves are taxed at \$15 per ounce	15 per cent excise on retail, \$9.25 per dry weight ounce on flower after harvest. \$2.75 per drug weight ounces on leaves	15 per cent excise tax on cultivation; 10 per cent retail marijuana sales tax to be decreased to 8per cent in July 2017 2.9 per cent state sales tax Up to 3.5 per cent local sales taxes	Not applicable, no commercial market	10 per cent excise on retail
Cannabis clubs	Not explicitly allowed or prohibited Earlier ban on in-store consumption repealed in November 2015	Not specified though they may exist in the form of microbusiness that allow on site consumption	Not allowed	Not allowed; currently under investigation by city task force.	Allowed
Medical cannabis	1998: Patient registry, no dispensaries registration; out-of-state patients recognized for approved conditions but not for dispensary purchases; possession, home cultivation	1996 and 2003; Patient registry - voluntary registration; cooperatives and collectives; State-wide licensing of dispensaries will begin 2018	2000: Patient registry, dispensaries already existed; out-of-state patients not recognized; possession, consumption; 2010: commercial production and sales	1998/2010: Patient registry, dispensaries allowed	1999: Patient registry or identification card; dispensaries, recognizes patients from other states but not for dispensary purchases

TABLE 2 | Regulations for legalizing the use of cannabis within jurisdictions in the United States of America and Uruguay (continued)

	Massachusetts	Nevada	Oregon	Washington	Uruguay
Legal Process	Voter initiative	Voter initiative	Voter initiative, state statute	Voter initiative, state statute	Government initiative, national law
Title	Question 4	Question 2	Measure 91	Initiative 502	Law No. 19.172
Date passed	November 2016	November 2016	November 2014	November 2012	December 2013
Date implemented/ required date of rule adoption	15 September 2017. Licences issued starting 1 October 2017	Takes effect on 1 January 2017 and regulations to be in place by 1 January 2018	July 2015: Personal possession, consumption, cultivation October 2015 up to December 2016: Retail sales through medical dispensaries January 2017: retail sales through licensed retailers	December 2012: Personal possession, consumption July 2014: Retail sales	August 2014: Personal cultivation October 2014: Grower clubs Mid-2017: pharmacy sales
Regulatory authority	1) Cannabis Control Commission, and Cannabis Advisory Board 2)	Department of Taxation	Oregon Liquor Control Commission	Liquor and Cannabis Board (formerly the Liquor Control Board)	Institute for the Regulation and Control of Cannabis (IRCCA)
Minimum age	21	21	21	21	18
Residency requirement	Not specified	Not specified	None	None	Uruguayan citizenship or permanent Uruguayan residency required
Personal possession quantity	1 oz. flower (28.5 g) 5g concentrate	1 oz. flower 3.5g concentrate Six plants, no more than twelve on property in indoor or in enclosed with permission of landlord and must be 25 miles away from retail cannabis store	In public: 28.5 g At home: 228 g	28.5 g	40 g per month
Home cultivation	6 plants, 12 in a single residence away from view, 10 oz. of dried marijuana permitted at home	Yes	Four plants in flower	Not allowed	Six plants in flower
Interpersonal sharing	Yes	Yes	28.5 g	Not allowed	Allowed within the home
Retail transaction limit	Not specified, presumably same limits as for personal possession	Not specified, presumably same limits as for personal possession	7 g	28.5 g	40 g per month, 10 g per week (sale through pharmacies to registered users)
Retail pricing structure	Market/commercial	Market/commercial	Market	Market	Government price control
Average retail price per gram after tax	Medium quality \$16	Medium quality \$20	Medium quality \$10	Medium quality \$11.6	200 pesos per 5 grams (approx. \$1.4 per gram)
Maximum THC content	Not set initially	Not set initially	Not set initially	Not set initially	15 per cent maximum THC content (suggested criterion not fixed by law)
Registration requirements	Personal data collection not required	Personal data collection not required	None	None	Yes, with IRCCA for any of the three modes of access

	Massachusetts	Nevada	Oregon	Washington	Uruguay
Commercial production	Licensed establishments	Licensed establishment	Licensed cannabis producers	Licensed cannabis producers	Licensed marijuana producers
Commercial distribution	Licensed establishments; localities can regulate, limit or prohibit the operation of businesses	Limits on market concentration by population	Licensed retail cannabis stores	Licensed retailers	Licensed pharmacies
Restrictions on edibles	Serving size and potency limits to be developed in regulations. List of ingredients	Not specified	Maximum of 10 mg of THC in each individually packed serving; edible products to undergo a preapproval process; not appealing to children	10 mg of THC in each individually packaged serving; child-proof packaging; THC labeling; marijuana-infused products, packages and labels be approved by the State Liquor Control Board before sale.	
Advertising	Restrictions on marketing to children to be developed in regulations	Restrictions to be developed in regulations	Entry sign required on exterior of dispensaries; Oregon Liquor Control Commission has authority to further regulate or prohibit advertising	Limited to one sign for retailers at business location	Prohibited
Taxation	3.75 per cent excise on retail	15 per cent excise on retail	No tax on retail sales from October 2015 to December 2015 25 per cent sales tax after 5 January 2016 17 per cent sales tax 2017 with options for local communities to establish local tax up to 3 per cent	July 2014-June 2015: 25 per cent tax at each stage (production, processing, retail) July 2015: 37 per cent sales tax	No tax, although IRCCA can impose tax in the future.
Cannabis clubs	Not allowed although they may exist in establishments that allow on-site-consumption	Not specified	Not allowed	Not allowed	Clubs with 15-45 members allowed to cultivate up to 99 plants, maximum 480 g of dried product per member per year
Medical cannabis	2012/2013; patient registry or identification cards; dispensaries, out-of-state patients not recognized	2000: Patient registry or identification card, No dispensaries; recognize out of state patients if other state's programmes are substantially similar; patients must fill out Nevada paper work	1998: Patient registry, dispensaries already existed but not clearly authorized by law or regulated; possession, home cultivation work	1999/2010/2011; no registration or identification card; dispensaries approved as of November 2012, first stores opened in July 2014; 1999 possession 2012: Home cultivation	2014: Passed, but not yet effective

D. SYNTHETIC DRUGS



The present chapter contains a brief overview of a segment of the drug market that has grown in complexity in recent years. It encompasses both amphetamine-type stimulants (ATS), such as amphetamine, methamphetamine and "ecstasy", and new psychoactive substances (NPS).

Amphetamine-type stimulants

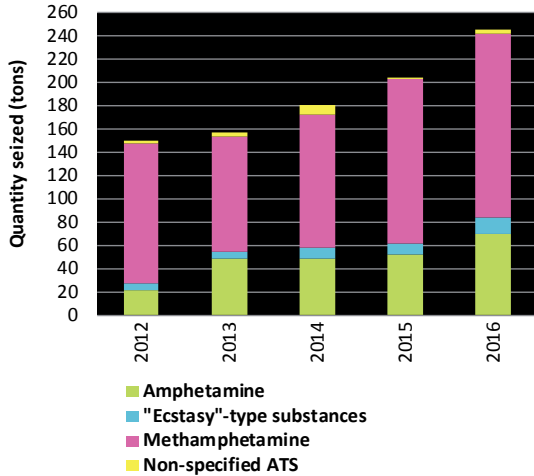
The global market for ATS is characterized by a combination of ongoing trends and new challenges. The persistence of methamphetamine, as reflected in seizure, manufacturing and use statistics, continues, particularly in North America and East and South-East Asia, where crystalline methamphetamine is a growing concern. There continues to be a large market for "ecstasy" in Australia and New Zealand, while Western and Central Europe remain a trafficking hub for the substance. Recently, other new developments have been observed: synthetic drug markets have developed in South Asia, and there are indications that amphetamine trafficking

and use may be expanding beyond established markets in the Near and Middle East/South-West Asia to countries in North Africa.

Significant increase in the quantity of amphetamine-type stimulants seized globally

Seizures of all types of ATS have risen since 2015. The global quantity of ATS seized in 2016 increased by a fifth from the previous year, rising from 205 tons to 247 tons. Methamphetamine continues to account for the largest share of global quantities of ATS seized. In keeping with the upward trend in global methamphetamine seizures over the past few years, seizures continued to increase in 2016, to more than 158 tons. The global quantity of "ecstasy" seized almost tripled from 2012 to 2016, reaching 14 tons, and the global quantity of amphetamine seized also increased in 2016, to 70 tons, having remained at the 50-ton mark in the previous three years.

FIG. 1 Quantities of amphetamine-type stimulants seized worldwide, by type, 2012–2016



Source: UNODC, responses to the annual report questionnaire, 2012–2016.

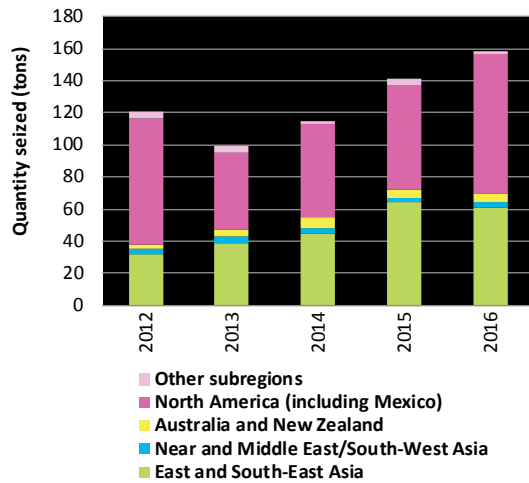
Rise in global methamphetamine seizures continues

In 2016, the global quantity of methamphetamine seized increased for a fourth consecutive year. That year, 87 tons of methamphetamine were seized in North America, almost 26 tons more than the quantity of methamphetamine reported to have been seized in East and South-East Asia in 2016. Methamphetamine seizures continued to remain stable in Australia and New Zealand in 2016. It seems reasonable to assume that the increase in global methamphetamine seizure quantities in recent years is not only a result of increased law enforcement activities but also, in connection with other indicators, a reflection of the dynamic and growing market for methamphetamine.

East and South-East Asia and North America: the main markets for methamphetamine

In an analysis of global trafficking flows based on seizure information, East and South-East Asia and North America emerge as the two core subregions for methamphetamine trafficking. Not only is methamphetamine trafficked extensively between countries within each of those subregions, but also most methamphetamine trafficked between regions is destined for countries in those two subregions.

FIG. 2 Quantities of methamphetamine seized worldwide, by subregion, 2012–2016



Source: UNODC, responses to the annual report questionnaire, 2011–2016.

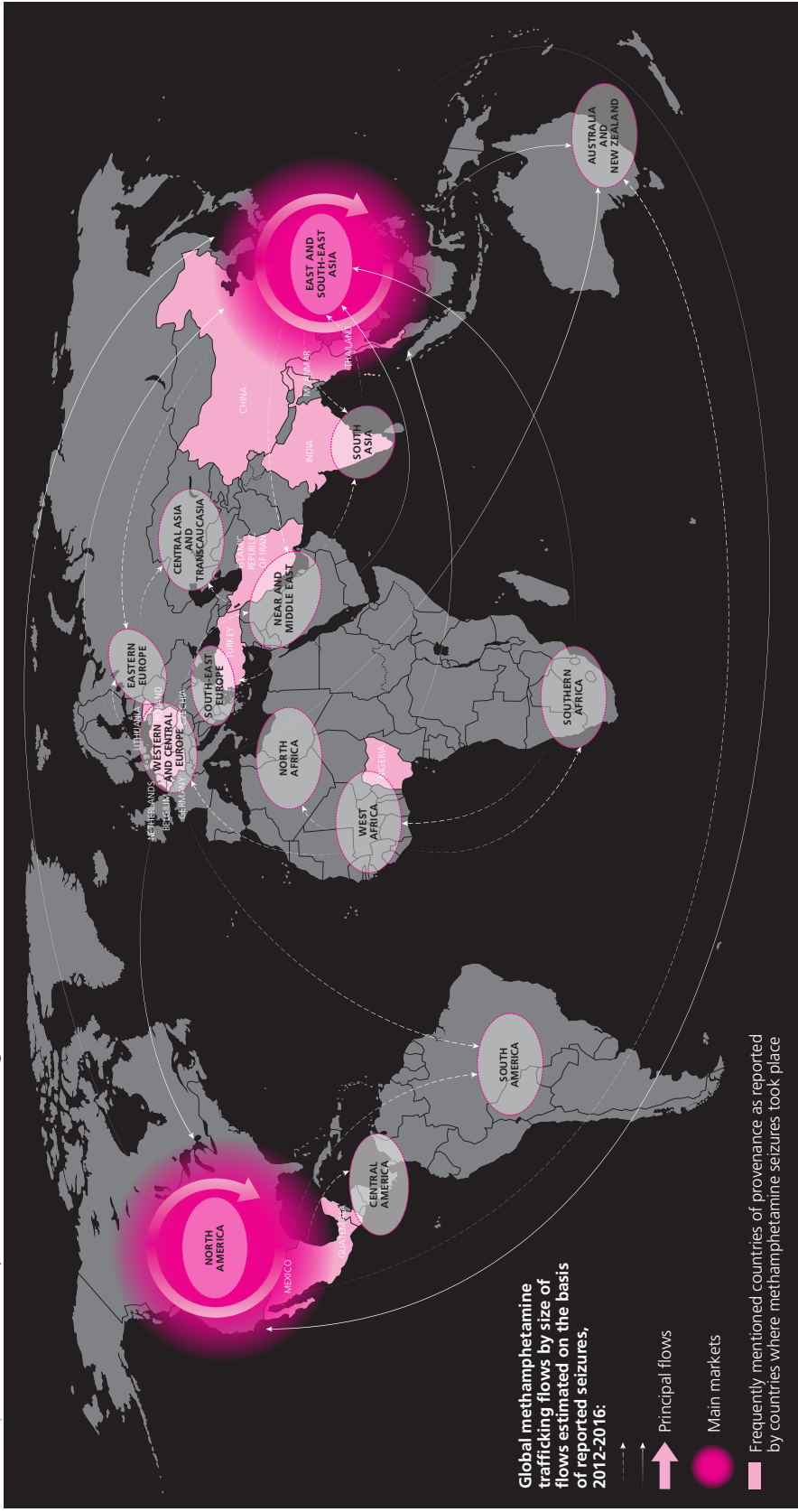
Additionally, a number of countries in Western and Central Europe, as well as India, Iran (Islamic Republic of), Nigeria and Turkey, have frequently been identified as the country of provenance of methamphetamine seized worldwide. Other subregions such as West, Central and Southern Africa appear to be transit areas for methamphetamine trafficking.

Crystalline methamphetamine: a growing market

Perceived increases in consumption and manufacturing capacity and increasing seizures point to a growing market for crystalline methamphetamine in North America, East and South-East Asia and Oceania. In East and South-East Asia and Oceania, methamphetamine has long been available in the form of both crystalline methamphetamine and methamphetamine tablets, but crystalline methamphetamine use has now become a key concern. Also called “crystal meth”, “ice” or “shabu”, crystalline methamphetamine is usually of much higher purity than the tablet form. Methamphetamine tablets, commonly known as “yaba” in East and South-East Asia, are small pills, typically of low purity, which in addition to methamphetamine often contain a large portion of caffeine, plus a range of adulterants.

In some countries in East and South-East Asia, health concerns relating to crystalline methamphetamine

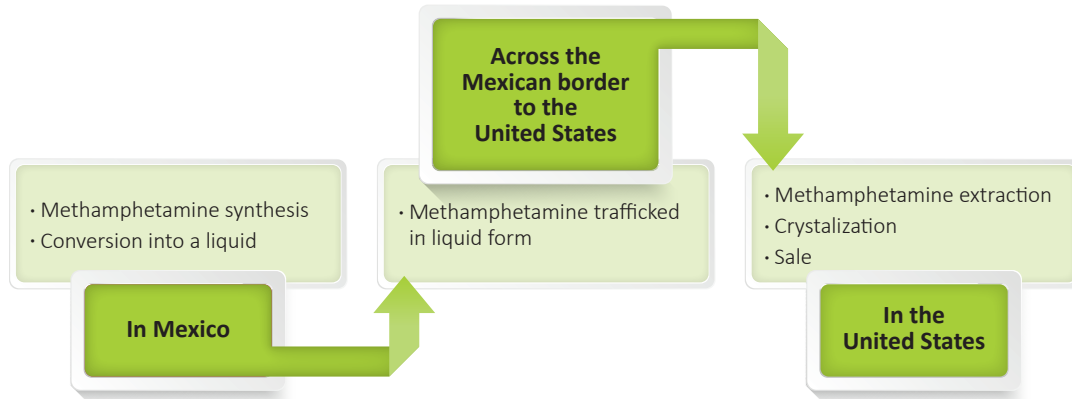
MAP 1 | Main methamphetamine trafficking flows, 2012–2016



Sources: UNODC, responses to the annual report questionnaire and individual drug seizure database.

Notes: The size of the trafficking flow lines is based on the amount of methamphetamine seized in a subregion and the number of mentions of countries from where the methamphetamine has departed (including reports of "origin" and "transit") to a specific subregion over the period 2012–2016. The trafficking flows are determined on the basis of country of origin/departure, transit and destination of seized drugs as reported by Member States in the annual report questionnaire and individual drug seizure database: as such, they need to be considered as broadly indicative of existing trafficking routes while several secondary flows may not be reflected. Flow arrows represent the direction of trafficking; origins of the arrows indicate either the area of manufacture or the one of last provenance, end points of arrows indicate either the area of consumption or the one of next destination of trafficking.

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 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).

FIG. 3 | A reported strategy for trafficking methamphetamine from Mexico to the United States

Source: Diagram based on information reported by United States Drug Enforcement Administration, 2017 National Drug Threat Assessment (October 2017).

use are supported by treatment data. In Malaysia, for example, crystalline methamphetamine users accounted for 20 per cent of people receiving treatment for drug use, whereas in Brunei Darussalam, crystalline methamphetamine users accounted for almost all people (94 per cent) in treatment for drug use in 2015.¹

Until recently, most crystalline methamphetamine seizures reported worldwide were in East and South-East Asia. After remaining stable for several years, crystalline methamphetamine seizures in East and South-East Asia almost tripled from 2013 to 2016, reaching 30 tons.² Overall, methamphetamine seizures have also increased significantly in the United States of America, from 30 tons in 2013 to 52 tons in 2016.

In North America, a trafficking strategy often employed by organized criminal networks to facilitate the concealment of shipments is to traffic methamphetamine in powder or liquid form from Mexico to the United States, where the substances are then converted to crystalline methamphetamine in so-called “conversion laboratories”. Although the United States Drug Enforcement Administration reported that most of the conversion laboratories seized in the country in 2016 were located in California and other south-western states close to the Mexican border, conversion laboratories were also

seized in Georgia, Kansas, Nevada, North Carolina and Oklahoma.³ In 2013, more than 3 tons of liquid methamphetamine were reported to have been seized in Mexico.

Methamphetamine was perceived to be the second greatest drug threat in the United States after heroin in 2016, and its availability, as reported by law enforcement agencies in the country, increased between 2013 and 2016.⁴

Western and Central Europe: an international trafficking hub for “ecstasy”

The established markets for “ecstasy” have traditionally been in Europe, North America and Oceania, with large quantities of the drug being seized over the years. Data on dismantled facilities manufacturing “ecstasy”, together with seizure statistics, suggest that Western and Central Europe has remained an international hub for the manufacture and trafficking of “ecstasy”. According to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and the European Union Agency for Law Enforcement Cooperation (Europol), Belgium and the Netherlands are key countries for the manufacture of 3,4-methylenedioxymethamphetamine (MDMA) in Europe.⁵ Seizures of “ecstasy”

1 Drug Abuse Information Network for Asia and the Pacific.

2 Drug Abuse Information Network for Asia and the Pacific.

3 United States, *Drug Enforcement Administration, 2017 National Drug Threat Assessment* (October 2017).

4 Ibid., *2016 National Drug Threat Assessment Summary* (November 2016).

5 EMCDDA and European Union Agency for Law Enforcement

originating in Western and Central Europe have frequently been reported by countries in the Americas, East and South-East Asia and Oceania. Recent surveys also indicate an overall increase in the use of “ecstasy” in Europe.⁶

After 2005, the global “ecstasy” market went through a change triggered by a shortage of MDMA. As demand for “ecstasy” continued unchanged despite the shortage, traffickers turned to other chemicals as an alternative to MDMA in order to satisfy the existing market.⁷ However, following a period in which products sold as “ecstasy” contained little or no MDMA, “ecstasy” tablets containing high doses of MDMA have reappeared on the synthetic drug market. Although in Europe “ecstasy” is mainly available in tablet form, “ecstasy” in the form of powder or crystalline MDMA has also emerged in some European countries.⁸

High levels of “ecstasy” use continue to be reported in Oceania, and estimated past-year prevalence rates for “ecstasy” use in the region are among the highest in the world. Perceived increases in the use of “ecstasy” were reported in New Zealand in 2016, whereas in Australia the reported past-year use of “ecstasy”⁹ among the population aged 14 and older decreased from 2.5 per cent in 2013 to 2.2 per cent in 2016.¹⁰ Although “ecstasy” seizures in New Zealand have remained below 50 kg annually, seizures have increased significantly in Australia, to around 5 tons in 2016 from less than 1 ton in the previous year. Trafficking and manufacturing data suggest that the “ecstasy” consumed in the region is sourced

through a combination of domestic manufacture and international supply networks. For instance, in 2015 and 2016 a total of 17 laboratories manufacturing MDMA were reported to have been detected in Australia, and another 18 were detected in 2014 and 2015. New Zealand last reported the discovery of two MDMA manufacturing laboratories in 2013.

New developments: amphetamine spreads to North Africa and North America

For many years, amphetamine dominated synthetic drug markets in the Near and Middle East and Western and Central Europe, but recent reports of increasing quantities being seized in North Africa and North America point to the growing activity in other subregions. While the reasons for a spike in the quantity of amphetamine seized in North Africa are not entirely clear, it may be related to the trafficking of amphetamine destined for the large market in the neighbouring subregion of the Near and Middle East. The large quantities of amphetamine seized in North America could be due to an expansion of domestic manufacture.

Taken together, seizure data, information on trafficking and expert perceptions reported by Member States on use trends point to a growing amphetamine market in the Near and Middle East. Expert perceptions in the Near and Middle East reveal a picture of mixed trends on amphetamine use, as some countries have reported increases in use for several years, while others have reported trends of stable or decreasing use. The only countries in the subregion where expert perceptions have consistently suggested an increase in amphetamine use are the Syrian Arab Republic (2013–2015) and Jordan (2014–2016). Although aggregate treatment data for amphetamine are not available for countries in the Near and Middle East, treatment data for Jordan show that people treated for ATS use were the second largest group of people treated for drug use in the country in 2015, after cannabis.

Quantities of amphetamine seized in the subregion of the Near and Middle East/South-West Asia more than doubled, from 20 tons in 2015 to 46 tons in 2016, and accounted for 65 per cent of amphetamine seizures worldwide in 2016. About 39 per cent of reported amphetamine seizures in that subregion, totalling 18 tons, were in Saudi Arabia. A further 14 tons of amphetamine were seized in Jordan that

ment Cooperation (Europol), *EU Drug Markets Report: In-Depth Analysis*, Joint Publications Series (Luxembourg, Publications Office of the European Union, 2016).

6 EMCDDA, *European Drug Report: Trends and Developments 2016* (Luxembourg, Publications Office of the European Union, 2016).

7 United Nations Office on Drugs and Crime (UNODC), “Understanding the synthetic drug market: the NPS factor”, *Global SMART Update*, vol. 19 (March 2018).

8 Claudio Vidal Giné and others, “Crystals and tablets in the Spanish ecstasy market 2000–2014: are they the same or different in terms of purity and adulteration?” *Forensic Science International*, vol. 263 (2016), pp. 164–168.

9 “Ecstasy” tablets sold as ecstasy in Australia may contain substances other than MDMA.

10 Australian Institute of Health and Welfare, *National Drug Strategy Household Survey 2016: Detailed Findings*, chap. 5, 28 September 2017. Available at www.aihw.gov.au/reports/illicit-use-of-drugs/2016-ndshs-detailed/data.

South Asia: an emerging synthetic drug threat

There are strong indications that synthetic drug trafficking is expanding in South Asia. For example, although quantities of synthetic drugs seized have remained at low levels in India for a number of years, large quantities were reported in 2016, with seizures of 24 tons of methaqualone and 2 tons of amphetamine. In 2016, most amphetamine seized in India was considered to have originated within the country. Most amphetamine and the smaller amounts of “ecstasy” and methamphetamine seized in India in 2016 were reported to have been destined for the domestic market. The remaining amounts seized in the country were reported to have been destined for Malaysia and to a lesser extent the Netherlands, the United Kingdom of Great Britain and Northern Ireland, and Zambia.

Although there is no information available on methaqualone trafficking in India for 2016, the 0.2 tons of methaqualone seized in that country in 2015 were reported to have been destined for countries outside South Asia, such as Malaysia, the United Republic of Tanzania and Zambia. A small number of methamphetamine laboratories were also reported to have

been dismantled in India in 2011, 2014 and 2015. In 2016, the country reported the dismantling of two amphetamine laboratories and, for the first time, a mephedrone laboratory. The diversion of pharmaceutical preparations containing ephedrine or pseudoephedrine indicates the risk of illicit synthetic drug manufacture, and India reported seizures of more than 10 tons of ephedrine and 8.5 tons of pseudoephedrine in 2016.^a

In 2015, Bangladesh reported seizures of almost 2 tons of methamphetamine tablets, which were reported to have been destined for the domestic market and trafficked from Myanmar. Previously, the country had reported the seizure of 3 tons of methamphetamine tablets in 2013.

^a *Precursors and Chemicals Frequently Used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances: Report of the International Narcotics Control Board for 2016 on the Implementation of Article 12 of the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988 (E/INCB/2016/4).*

year, and large amounts of seizures were also reported by the United Arab Emirates (6 tons), Pakistan (4 tons), Lebanon (2 tons) and the Syrian Arab Republic (1 ton). Trafficking reports show that in that subregion, amphetamine is mostly trafficked between countries within the region and, as in previous years, most of the amphetamine seized in the subregion was considered to have originated in Lebanon and the Syrian Arab Republic. Countries such as Saudi Arabia and the United Arab Emirates were the countries most frequently reported as destination countries for amphetamine seized in the subregion in 2016. However, recent seizure reports indicate that countries in North Africa and Asia are also connected to the trafficking routes in the Near and Middle East. It remains to be seen whether these new reports of amphetamine trafficking from outside the subregion indicate the development of new routes.¹¹

Recently, large amounts of amphetamine seizures have been reported in North Africa, with more than 6 tons reported in Egypt in 2016 and another 2 tons in 2015, as well as another 0.5 tons reported in

Sudan in 2016. Information on the domestic availability of amphetamine in those countries is not available. However, limited data on synthetic drug trafficking, taken together with the geographic proximity of the Near and Middle East, suggest that seizures in Egypt and Sudan could be the result of a growing trafficking connection between North Africa and countries in the Near and Middle East. For instance, in 2016, Egypt was reported to be the intended destination of amphetamine seized in Jordan, while amphetamine seized in the Syrian Arab Republic was reported to have been destined for the Sudan and Egypt. So far, it remains unclear whether amphetamine seizures in North African countries are the result of isolated incidents or whether they are representative of a wider trend.

Amphetamine seizures have been reported in all countries of North America, including Mexico. However, amphetamine seized in the United States accounts for the majority of amphetamine seizures in that subregion and constituted a 6 per cent share of the total quantity of amphetamine seized worldwide in 2016. In 2016, amphetamine was trafficked both into and out of the United States from countries in various subregions, including Central America, Western and Central Europe, East and South-East Asia and New Zealand. Within North

¹¹ For a more detailed analysis of amphetamine trafficking to and from countries in the Near and Middle East, see *World Drug Report 2017*.

America, amphetamine seized in Canada and in Mexico in 2016 was also reported to have departed from the United States. Use data for the United States do not indicate a growing market for amphetamine in the country; however, the large number of amphetamine laboratories dismantled from 2011 to 2015 suggests sizeable domestic amphetamine manufacture. Data on amphetamine manufacture for 2016 are not available, but the United States reported the dismantling of several amphetamine laboratories in 2015, 1 of industrial scale, 7 of medium scale and 34 of either small or kitchen scale. In 2014, the country had reported the dismantling of 62 amphetamine laboratories, 10 of which were of industrial scale.

New psychoactive substances

Following the emergence of hundreds of new psychoactive substances (NPS), the range of psychoactive substances available on the market has probably never been greater. NPS are marketed in many different ways and forms, their use is observed among many different groups, and the patterns of their emergence and persistence show significant differences between countries and regions. The effects of some NPS on the human body are not yet fully understood: safety data regarding their toxicity are often unavailable, and their long-term side effects are not known. This situation poses additional challenges for identification, prevention, treatment and control efforts. Although the global NPS market is extremely diverse, only a few substances seem to have established markets of their own or replaced traditional drugs, but the harm caused by their use remains considerable. Some single substances have become cemented in niche markets, specifically among small and vulnerable population groups, while others have penetrated the existing established markets of controlled substances, increasing the complexity of the offer of products in the market. The global analysis of NPS in this chapter includes ketamine, which differs from other NPS in that it is widely used in human and veterinary medicine, whereas most NPS have little or no history of medical use. To ensure comparability with figures presented in previous editions of the *World Drug Report*, the analysis also includes substances that have come under international control since 2015, unless stated otherwise.

New psychoactive substances: facts and figures

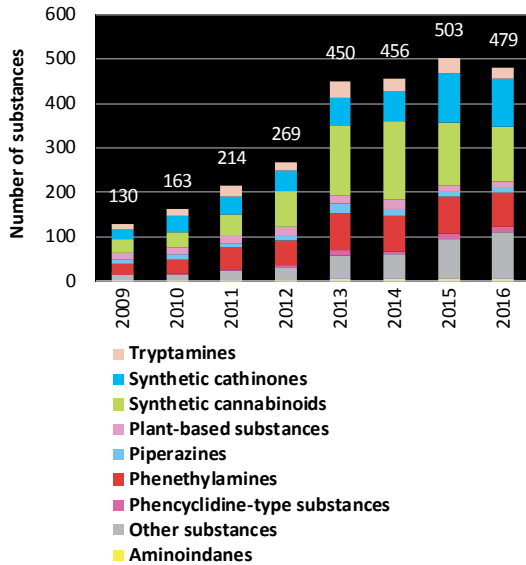
The global NPS market continues to be characterized by the emergence of large numbers of new substances belonging to diverse chemical groups. From 2009 to 2017, 111 countries and territories reported a cumulative total of 803 individual NPS.¹² Since the United Nations Office on Drugs and Crime (UNODC) began monitoring NPS in 2009, the number of NPS reported annually increased year on year until 2015, but seems to have stabilized since.

Among all NPS reported to UNODC by the end of 2017, synthetic cannabinoids constitute the largest category in terms of the number of different substances reported (251 substances), followed by the categories of “other substances” (155), synthetic cathinones (148) and phenethylamines (136). Only a comparatively small number of tryptamines, piperazines, aminoindanes and plant-based NPS are reported annually. The category of “other substances”, which includes structurally diverse substances, has grown considerably, especially since 2014, totalling 155 substances by the end of 2017. This category includes NPS-derivatives of prescription medicines, including fentanyl analogues and derivatives of benzodiazepine.

Since UNODC global monitoring of NPS started in 2009, more than a quarter of the countries and territories reporting NPS have identified more than 100 different substances. At the same time, just under a quarter of all countries and territories reporting NPS have reported only one substance, which may be attributable to limited technical capacity for identifying NPS. The substances reported by the largest number of countries and territories include ketamine, khat, JWH-018, methylone, 4-methylmethcathinone, 25I-NBOMe, 5F-APINACA and AM-2201, which were each reported by at least 47 countries. With exception of ketamine and khat, all of those substances were placed under international control between 2015 and 2017.

12 UNODC, early warning advisory on new psychoactive substances, 2017. UNODC would like to thank EMCDDA, the International Narcotics Control Board and the World Customs Organization for making available information on NPS to the early warning advisory on new psychoactive substances.

FIG. 4 Number of new psychoactive substances reported annually, 2009–2016



Source: UNODC, early warning advisory on new psychoactive substances.

Emergence of new psychoactive substances: some stay, some disappear

The NPS market continues to be dynamic. New substances continue to emerge, with some establishing themselves on the market and others disappearing after a short time. In 2016, 72 NPS were reported for the first time, a much smaller number than in 2015 (137 NPS). About 70 of the 130 NPS reported at the start of UNODC global monitoring in 2009 have since been reported every year to date. While this persistence does not necessarily indicate widespread use, it suggests that some NPS seem to have established themselves on the drug market. Several of these persistent NPS were placed under international control after 2015. On the other hand, about 200 NPS reported between 2009 and 2014 were no longer reported in 2015 and 2016 and may have disappeared from the market, although this is difficult to determine given the complexity of NPS identification in many parts of the world.

4-fluoroamphetamine establishing a niche market

The stimulant 4-fluoroamphetamine (4-FA) is an example of an NPS that seems to have established

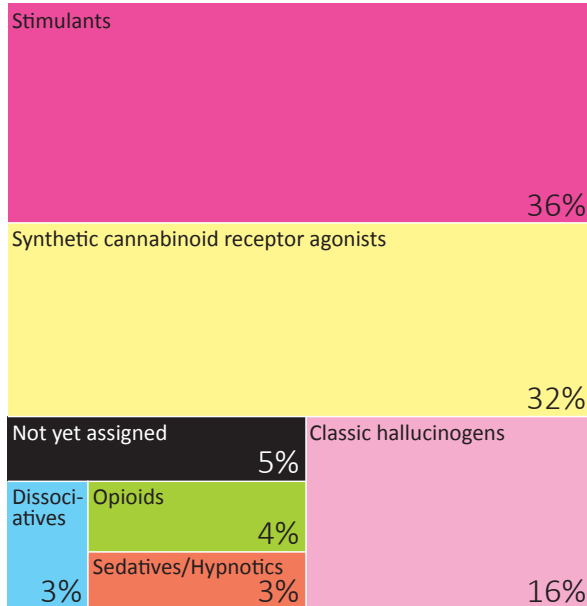
itself on the drug market in some countries. In the Netherlands, from 2007 to 2009, when the availability of MDMA, the main component of “ecstasy” tablets, decreased, 4-FA was mainly sold as “amphetamine” or “ecstasy”. This changed after the MDMA and amphetamine markets rebounded¹³ and 4-FA established its own niche market in the Netherlands among users who reportedly preferred 4-FA over MDMA for its specific psychoactive effects.¹⁴ The use of 4-FA reportedly produces the desired entactogenic effect, which is perceived to be less intense than that of MDMA and have a reduced tendency to cause confusion, changes in perception and dizziness. Similar to MDMA, 4-FA is typically consumed at music-related events such as festivals, dance parties, clubs and after-parties. The use of 4-FA is related to several adverse events including death, cerebral haemorrhage, myocardial infarction, acute heart failure, hypertension and tachycardia.¹⁵ There are indications that the use of 4-FA may have increased in other European countries, such as Denmark, Germany and Spain.¹⁶

Most new psychoactive substances are stimulants but other effect groups are growing

Grouped by their main pharmacological effect, the largest portion of NPS reported since UNODC monitoring began are stimulants, followed by synthetic cannabinoid receptor agonists and classic hallucinogens. Smaller effect groups such as opioids,

- 13 *World Drug Report 2017: Market Analysis of Synthetic Drugs—Amphetamine-type Stimulants, New Psychoactive Substances* (United Nations publication, Sales No. E.17.XI.10).
- 14 Felix Linsen and others, “4-Fluoroamphetamine in the Netherlands: more than a one-night stand”, *Addiction*, vol. 110, Nr. 7 (2015).
- 15 Laura Hondebrink and others, “Fatalities, cerebral hemorrhage, and severe cardiovascular toxicity after exposure to the new psychoactive substance 4-fluoroamphetamine: a prospective cohort study”, *Annals of Emergency Medicine*, vol. 71, No. 3 (2018).
- 16 Claudio Vidal Giné, Iván Fornís Espinosa and Mireia Ventura Vilamala, “New psychoactive substances as adulterants of controlled drugs. A worrying phenomenon?” *Drug Testing and Analysis*, vol. 6, Nos. 7 and 8 (2014); Sys Stybe Johansen and Tina Maria Hansen, “Isomers of fluoroamphetamines detected in forensic cases in Denmark”, *International Journal of Legal Medicine*, vol. 126, No. 4 (2012); J. Röhrich and others, “Detection of the synthetic drug 4-fluoroamphetamine (4-FA) in serum and urine”, *Forensic Science International*, vol. 215, Nos.1-3 (2012).

FIG. 5 Proportion of new psychoactive substances, by psychoactive effect group, December 2017



Source: UNODC, early warning advisory on new psychoactive substances.

Note: The analysis of the pharmacological effects comprises NPS registered up to December 2017. Plant-based substances were excluded from the analysis as they usually contain a large number of different substances, some of which may not have been known and whose effects and interactions are not fully understood.

dissociatives and sedatives/hypnotics have grown over the past few years, in proportional terms, at the expense of synthetic cannabinoids and classic hallucinogens. The number of NPS in each group and their growth does not necessarily indicate their scope of use and/or magnitude of threat to public health. This is demonstrated by NPS with opioid effects, which, albeit small in number, have been associated with a growing number of often fatal overdose events in recent years.¹⁷

Decreasing quantities of synthetic new psychoactive substances seized

Analysing trends in synthetic NPS seizures by looking at aggregate quantities seized, for example, is challenging because of the many different forms in which they appear. Five grams of an NPS may constitute less than 10 doses or several tens of thousands of doses, depending on whether the seized material

consists of an NPS sprayed on herbal material or of an NPS in the form of a powder of high purity with potent effects even at the microgram level. Analysis of NPS seizures is also limited by the fact that most substances are not under national or international control and therefore may not be seized and/or reported systematically to UNODC. Quantities of NPS seized may also not reflect their availability, since detecting them represents a challenge to law enforcement authorities, one reason being that international trafficking mostly occurs in small quantities and via postal mail.

As seizures of ketamine, as well as of khat and kratom, are discussed later in this chapter, the analysis below focuses on synthetic NPS other than ketamine and plant-based substances.

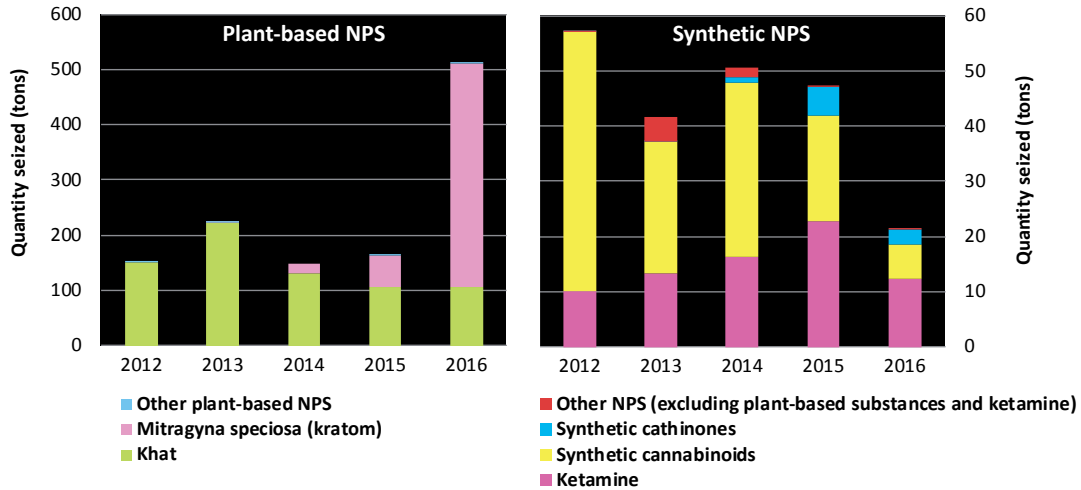
Quantities of synthetic cannabinoids have dominated global seizures of synthetic NPS since 2012. The number of countries reporting seizures of synthetic cannabinoids has been relatively stable, but the quantities reported have declined sharply since 2014. However, in 2016, large quantities of synthetic cannabinoids were seized by the United States (5 tons), the Russian Federation (0.7 tons) and Turkey (0.6 tons).

In terms of synthetic cathinones, the number of countries and territories reporting seizures and the quantities seized have actually increased, and synthetic cathinones constituted 30 per cent of global seizures of synthetic NPS (excluding ketamine) by weight in 2016. The Russian Federation (2 tons), Hong Kong, China (0.2 tons) and Belgium (0.1 tons), in particular, reported large quantities of synthetic cathinone seizures in 2016.

The analysis of NPS seizure data across countries is complex due to the large number of different substances involved and the variety of NPS products available, which often contain more than one psychoactive substance. According to 2014–2015 seizure data submitted to UNODC by seven Member States,¹⁸ the type of NPS seized varied greatly from one year to another. Among NPS seized, the proportion of substances that were seized in both years analysed (2014 and 2015) ranged from

¹⁷ For more information on this topic, see booklet 2 of the present report.

¹⁸ UNODC, responses to the 2016 questionnaire on new psychoactive substances submitted by Australia, Belgium, Estonia, Finland, Sweden, Turkey and the United Kingdom. The reporting years for seizures were 2014 and 2015.

FIG. 6 | Annual quantities of new psychoactive substances seized globally, 2012 to 2016

Source: UNODC, responses to the annual report questionnaire, 2012–2016.

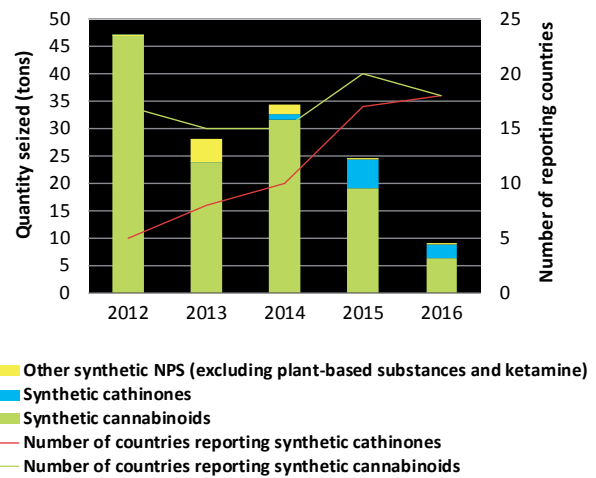
Note: Figures include ketamine and plant-based NPS.

a low 12 to 27 per cent per country. That rather small overlap of similar substances from one year to the next highlights the highly dynamic market and underscores the challenges that law enforcement agencies, border control and customs authorities are facing. While in some countries, almost half of all NPS seizure cases in the period 2014–2015 concerned substances that were placed under international control in 2015, in other countries the proportion of such substances was as low as 6 per cent. This reflects the heterogeneity of the NPS market and the challenge of identifying a set of NPS that are of general international concern.

Trends in the use of new psychoactive substances

The comparison of epidemiological data on the use of NPS in different countries is not easy because the definition of NPS may differ from country to country and may include substances that have been placed under national or international control. There are limited data available to make comparisons of the prevalence of NPS use over time and limited survey tools for capturing NPS use, and NPS users have limited knowledge about the substances they use. The information on the use of NPS presented in this chapter should be read as an update of the more detailed analysis contained in the *Global Synthetic Drugs Assessment 2017*.¹⁹

19 UNODC, *Global Synthetic Drugs Assessment: Amphetamine-*

FIG. 7 | Annual quantities of synthetic new psychoactive substances (excluding ketamine) seized globally and number of countries reporting seizures of synthetic cannabinoids or cathinones, 2012–2016

Source: UNODC, responses to the annual report questionnaire, 2012–2016.

Although data on trends in NPS use are still limited to very few countries, in the past three years there seems to have been a shift away from herbal smoking mixtures and an increase in the use of NPS in

type Stimulants and New Psychoactive Substances (Vienna, 2017).

New trends in the use of kratom

The leaves of the kratom tree (*Mitragyna speciosa*), an indigenous plant found in South-East Asia, contain mitragynine, which produces a range of dose-dependent psychoactive effects. Low doses may have stimulant effects, whereas higher doses may result in sedative, dysphoric and euphoric effects.^a Kratom has been widely used in a traditional context in South-East Asia: for example, as a herbal remedy for diarrhoea, fatigue and pain. However, it has also been utilized for non-medical purposes.^b In recent years, kratom has gained popularity in countries in North America and Europe as a plant-based NPS. At the global level, 31 countries reported the detection of kratom between 2012 and 2017.^c

An increasing number of reports in the scientific literature associate the use of high doses of kratom with adverse health events, including tachycardia, seizures and liver damage. In addition, regular use of the substance may cause dependence, while discontinuing its use can cause the development of withdrawal symptoms.^d In North America in particular, a variety of products have been marketed as kratom, which may actually contain kratom in combination with other, often unknown, substances. The severe adverse health events associated with the use of such products could be related to differences in dosages of the powdered, refined form of kratom rather than in the traditional forms of use in South-East Asia.^e In North America, the use of kratom products has been reported in the context of self-management of opioid withdrawal symptoms in small-scale studies in the United States.^d The reportedly increasing popularity of kratom products may also be related to its wide availability: its sale is not controlled in many countries, it can be easily obtained through online shops and, compared with opioid-replacement therapies, its price is low.^f In the United States, 44 deaths have been associated with the use of products containing kratom in polydrug use. The United States Food and Drug Administration issued a warning against the consumption of kratom over concerns about the potential risk of abuse and dependence.^g The role of kratom products in drug overdose cases, including fatalities, is still not fully understood.

Currently, neither kratom nor the psychoactive substances contained in its leaves are under international control. Given the scarcity of data on the potential pharmacological, therapeutic and toxicological effects of kratom and kratom products, and the lack of controlled laboratory studies, it is difficult to understand the health risks and potential benefits associated with their use.^d

- ^a Walter C. Prozialeck, Jateen K. Jivan, and Shridhar V. Andurkar. "Pharmacology of kratom: an emerging botanical agent with stimulant, analgesic and opioid-like effects", *Journal of the American Osteopathic Association*, vol. 112, No. 12 (2012), pp. 792–799; Zurina Hassan and others, "From kratom to mitragynine and its derivatives: physiological and behavioural effects related to use, abuse and addiction", *Neuroscience and Biobehavioral Reviews*, vol. 37, No. 2 (2013), pp. 138–151.
- ^b *World Drug Report 2013* (United Nations publication, Sales No. E.13.XI.6).
- ^c UNODC early warning advisory on NPS; EMCDDA, "Kratom (*Mitragyna speciosa*) drug profile" (www.emcdda.europa.eu/publications/drug-profiles/kratom).
- ^d Walter C. Prozialeck, "Update on the pharmacology and legal status of kratom", *Journal of the American Osteopathic Association*, vol. 116, No. 12 (2016), pp. 802–809.
- ^e Darshan Singh, Suresh Narayanan and Balasingam Vicknasingam, "Traditional and non-traditional uses of mitragynine (kratom): a survey of the literature", *Brain Research Bulletin*, vol. 126, part 1 (2016), pp. 41–46.
- ^f George C. Chang Chien, Charles A. Odonkor and Prin Amorapant, "Is kratom the new legal high on the block?: The case of an emerging opioid receptor agonist with substance abuse potential", *Pain Physician*, vol. 20, No. 1 (2017), pp. E195–E198.
- ^g United States Food and Drug Administration, Public Health Focus, "FDA and kratom". Available at www.fda.gov/NewsEvents/PublicHealthFocus/ucm584952.htm.

tablet and liquid form.²⁰ A change in NPS packaging in the United Kingdom was noted following the implementation of NPS legislation. The marketing of NPS previously focused on presenting them to give the perception of being legal alternatives to traditional drugs, with substances contained in bright, colourful and appealing packaging, but since about 2016 NPS have been increasingly presented in plastic wraps or bags with no detailed information on their contents.²¹

20 Global Drug Survey 2017, detailed findings. Available at www.globaldrugsurvey.com.

21 Scotland, United Kingdom, Highland Substance Awareness

Recent data on the prevalence of NPS use show divergent trends. Data from England and Wales show that past-year NPS use among people 16–59 years old has fallen significantly, from 0.7 per cent in the period 2015/16 to 0.4 per cent in the period 2016/17.²² NPS past-year use in Ireland, among the general population (15–64 years old), also declined from the period 2010–2011 to the period

Toolkit, "NPS at Crew Annual Report 2016–2017". Available at www.highlandsubstanceawareness.scot.nhs.uk/.

22 United Kingdom, Home Office, *Drug Misuse: Findings from the 2016/17 Crime Survey for England and Wales*, Statistical Bulletin 11/17 (July 2017).

2014–2015, from 3.5 per cent to 0.8 per cent. Findings in Australia, likewise, show a substantial drop in past-year use of synthetic cannabinoids in people aged 14 years or older, from 1.2 per cent in 2013 to 0.3 per cent in 2016.²³ Other countries where data were available, however, experienced an increase in NPS use among the general population. For example, in Czechia, NPS use rose from 0.5 per cent in 2014 to 1.2 per cent in 2015, and in Romania NPS use rose from 0.3 per cent in 2013 to 0.9 per cent in 2016. National household surveys are likely to underestimate drug use prevalence because they may be affected by the underrepresentation of a number of population subgroups known to have much higher than average rates of substance use, including the homeless and other marginalized groups.

Diverging trends in the use of new psychoactive substances among young people

Monitoring the rate of substance use among students provides an important insight into current youth risk behaviours and potential future trends in NPS use. In the several countries where recent trend data relating to young people are available, a decline in NPS use can be seen. In the United States, for example, past-year use of synthetic cannabinoids has dropped significantly among twelfth graders, from 11.3 per cent in 2012 to just under 3.7 per cent in 2017. That decrease may be due to several factors, namely legislation implemented in the United States during that period which placed a large number of synthetic cannabinoids under national control, and increasing awareness of the health risks associated with the use of those substances. In recent years, the use of synthetic cathinones among youth has become an issue of concern in the United States, but the level of use of those substances by twelfth graders has also decreased since 2012, from 1.3 per cent to 0.6 per cent in 2017.²⁴ In England, of the young people registered in specialist substance misuse services in the period 2016/17, the percentage that reported problematic use of NPS (4 per cent) was lower than for “ecstasy” (11 per cent) and cocaine

(9 per cent).²⁵ The proportion of young people reported by specialist services as having problems with NPS fell by 45 per cent from the level seen in the period 2015/16.

In 2016, a survey of drug use among university students was conducted in Bolivia (Plurinational State of), Colombia, Ecuador and Peru, which revealed the use of synthetic cannabinoids for the first time in those countries.²⁶ Only a small proportion of those reporting the use of synthetic cannabinoids reported having used them exclusively; a far larger proportion had used them in combination with herbal cannabis. From 2012 to 2016, the number of synthetic cannabinoids reported by countries in South America increased each year, suggesting the growing importance of such substances among specific subgroups of the population in that subregion.

Continued use of new psychoactive substances by vulnerable and high-risk groups

Patterns of NPS use of among marginalized, vulnerable and socially disadvantaged groups, including homeless people and people with mental health disorders, continue to be documented in some countries.

Use of new psychoactive substances among the homeless population

The use of new psychoactive substances among homeless people has been documented in Czechia, Finland, Hungary, Ireland, the United Kingdom and the United States. Most recently, areas with the highest levels of social deprivation in Scotland reported an increase in the use of such substances.²⁷ In Manchester, England, a study was conducted on the homeless population in 2016. The study of 53 homeless people showed that rough sleepers (n=28) were more prone to the use of new psychoactive substances than non-rough sleepers (n=25). A total

23 Australian Institute of Health and Welfare, *National Drug Strategy Household Survey 2016: Detailed Findings*.

24 United States, Department of Health and Human Services, National Institute on Drug Abuse; “Monitoring the future survey: high school and youth trends”, 14 December 2017. Available at www.drugabuse.gov/.

25 United Kingdom, Public Health England, Department of Health, *Young People’s Statistics from the National Drug Treatment Monitoring System (NDTMS), 1 April 2016 to 31 March 2017* (London, 2017).

26 UNODC, *III Estudio Epidemiológico Andino sobre Consumo de Drogas en la Población Universitaria: Informe Regional 2016* (Lima, 2017).

27 National Records of Scotland, “Drug-related deaths in Scotland in 2016”, 15 August 2017. Available at www.nrscotland.gov.uk/.

of 93 per cent of rough sleepers (n=26) had used such substances in the past year, compared with 64 per cent (n=16) of non-rough sleepers.²⁸ The majority (81 per cent) of those reporting use of new psychoactive substances also reported using other drugs, including cocaine and cannabis. Of those who reported using new such substances in the past year (n=42), 64 per cent had used them every day, and 14 per cent had used them five or six days per week. Synthetic cannabinoids were the substances most often reported. In Czechia, data pertaining to clients of needle-syringe programmes in the period 2013 and 2014 indicated that repeated synthetic cathinone use was associated with polydrug use and homelessness.²⁹

Use of new psychoactive substances associated with mental health disorders

The use of new psychoactive substances among people with mental health disorders has previously been documented in studies in the United Kingdom. In Scotland, the use of such substances among inpatients aged 18–65 on general adult psychiatric wards was equal to 22 per cent (n=86) of total admissions analysed (n=388) between July and December 2014.³⁰ Of inpatients reporting NPS use, a diagnosis of drug-induced psychosis was significantly more likely, and a diagnosis of depression was significantly less likely. NPS use was prevalent among young male psychiatric inpatients, in particular among those diagnosed with drug-induced psychosis. Illicit drug use, specifically cannabis use, was common in this group. Stimulant NPS use was identified in adult inpatients released from general psychiatric wards more than three times more frequently than was synthetic cannabinoid use.

In a recent study in England, the current rate of use of NPS by patients prior to admission to a secure

mental health setting stood at 12 per cent (218 patients).³¹ About 20 per cent of mental health units had required an emergency response to assist with NPS use in the past 12 months. Those responses were related to emergency treatment for NPS that induced physical and psychological symptoms, such as collapse, cardiovascular symptoms and acute exacerbations of existing mental health conditions. Psychological symptoms were reported more frequently than physical symptoms. Some data indicate that male users of NPS admitted to acute inpatient wards in the United Kingdom are 10 times more likely to require care in the psychiatric intensive care unit than are inpatients that do not use NPS.³²

High levels of use of new psychoactive substances reported by prisoners and people on probation

NPS use in prisons and among people on probation remains an issue of concern in numerous countries, including the United Kingdom and 14 other European countries,³³ New Zealand and the United States. It is likely that the high levels of NPS use in prisons are related to the challenge of detecting and identifying those substances. NPS use continued to be linked to violence, debt, organized crime and medical emergencies in most adult male prisons in the United Kingdom in 2017. Although NPS use was rarely identified prior to arrest, it was identified while the subject was either in custody or on probation.³⁴ Synthetic cannabinoids were the most frequent type of NPS used, and polydrug use was common. Some former detainees reported issues in maintaining their tenancies or placements in

28 Rob Ralphs, Paul Gray and Anna Norton, *New Psychoactive Substance Use in Manchester: Prevalence, Nature, Challenges and Responses* (Manchester, Substance Use and Addictive Behaviours, Research Group Manchester Metropolitan University, 2016).

29 Vendula Belackova and others, “‘Just another drug’ for marginalized users: the risks of using synthetic cathinones among NSP clients in the Czech Republic”, *Journal of Substance Use*, vol. 22, No. 6 (2017), pp. 567–573.

30 Jack L. Stanley and others, “Use of novel psychoactive substances by inpatients on general adult psychiatric wards”, *British Medical Journal*, vol. 6, No. 5 (2016).

31 United Kingdom, Public Health England, “A review of new psychoactive substances in secure mental health: summary document”, (London, 2017).

32 Charlie Place and others, “Spice boys: an exploratory study around novel psychoactive substance use on a male acute ward”, *Advances in Dual Diagnosis*, vol. 10, Nr. 3 (2017), pp. 97–104.

33 Countries reporting prison use: Bulgaria, Croatia, Czechia, Ireland, Finland, France, Germany, Hungary, Latvia, Poland, Portugal, Romania Slovenia and Sweden. EMCDDA, *High-risk Drug Use and New Psychoactive Substances: Results from an EMCDDA Trendspotter Study*, Rapid Communication Series (Luxembourg: Publications Office of the European Union, 2017).

34 United Kingdom, Her Majesty’s Inspectorate of Probation and Care Quality Commission, *New Psychoactive Substances: The Response by Probation and Substance Misuse Services in the Community in England* (Manchester, 2017).

homeless hostels as a direct result of their NPS use. Continued NPS use was linked to addiction and inability to cope with withdrawal symptoms. The primary motives reported for ongoing use of NPS were the easier access to NPS compared with other drugs such as heroin or cocaine, and the desire to avoid detection. According to prison staff and detainees in the United Kingdom, prisons are becoming increasingly unsafe due to intoxicated NPS users and the violence associated with NPS-related debt and bullying.³⁵

The proportion of detainees in New Zealand who had used synthetic cannabinoids in the previous 12 months declined from 47 per cent in 2013 to 20 per cent in 2016.³⁶ However, reported dependency among those users increased from 17 per cent in 2013 to 29 per cent in 2016, which underscores the health risks and dependence-inducing potential of synthetic cannabinoids. Detainees in New Zealand who had used synthetic cannabinoids in the previous 12 months used them an average of 97 days in 2016. In the United States, 29 per cent of prisoners in Illinois, for example, used synthetic cannabinoids in the 12 months prior to incarceration, some in combination with synthetic cathinones.³⁷ Among the most commonly reported reasons for their use were curiosity, desire to avoid positive drug test results, personal preferences and for relaxation.

Injecting use of stimulant new psychoactive substances remains a concern

The injecting of stimulant NPS, which are typically short-acting stimulants, remains a concern, in particular because of reported associated high-risk injecting practices. In addition to the high number of daily injecting episodes, the rate of sharing and reusing of injecting equipment is high among people who inject drugs (PWID) that inject stimulants.³⁸

Injecting use of NPS has been reported in France, Greece, Hungary, Ireland, Romania, Slovenia, the United Kingdom and the United States.³⁹

The substitution of controlled drugs with stimulant NPS has been reported in Slovenia, where a study of 249 NPS users found that 3-methylmethcathinone (3-MMC) was being used as a replacement for cocaine.⁴⁰ While national data on PWID attending syringe exchange programmes in Hungary from 2011 to 2015 showed a transition from injecting use of amphetamine and heroin to injecting use of stimulant NPS,⁴¹ the most frequently encountered substance in discarded injecting paraphernalia in 2016 was methadone, a prescription opioid, followed by several stimulant NPS.⁴² Whereas methadone was mostly used in isolation, stimulant NPS largely co-occurred with additional substances.

Reports from needle exchange programmes in the United Kingdom indicate that many heroin users who switch to injecting stimulant NPS subsequently return to heroin injection after experiencing negative effects of NPS use. Injecting use of mephedrone has declined in England, Wales and Northern Ireland,⁴³ but those who had injected mephedrone during the preceding year were twice as likely to report having injected drugs with a needle or syringe that had previously been used by someone else.⁴⁴ A

mine-Type Stimulant Use and the Transmission of HIV and other Blood-borne Viruses in the Southeast Asia Region, ANCD Research Paper No. 25 (Melbourne, National Drug Research Institute, Australian National Council on Drugs, 2013).

35 United Kingdom, Her Majesty's Inspector of Prisons, *Her Majesty's Inspector of Prisons in England and Wales: Annual Report 2016–17* (London, 2017).

36 Chris Wilkins and others, *New Zealand Arrestee Drug Use Monitoring (NZ-ADUM): 2016 Report*, (Wellington, New Zealand Police and Massey University, 2017). Available at www.police.govt.nz/.

37 Lily Gleicher, Jessica Reichert and Dustin Cantrell, "Study of self-reported synthetic drug use among a sample of Illinois prisoners", 17 February 2017. Available at www.icjia.state.il.us/.

38 Andrea Fischer and others, *The Link between Ampheta-*

39 *World Drug Report 2017* (United Nations publication, Sales No. E.17.XI.6).

40 Matej Sande, "Characteristics of the use of 3-MMC and other new psychoactive drugs in Slovenia, and the perceived problems experienced by users", *International Journal of Drug Policy*, vol. 27 (2016), pp. 65–73.

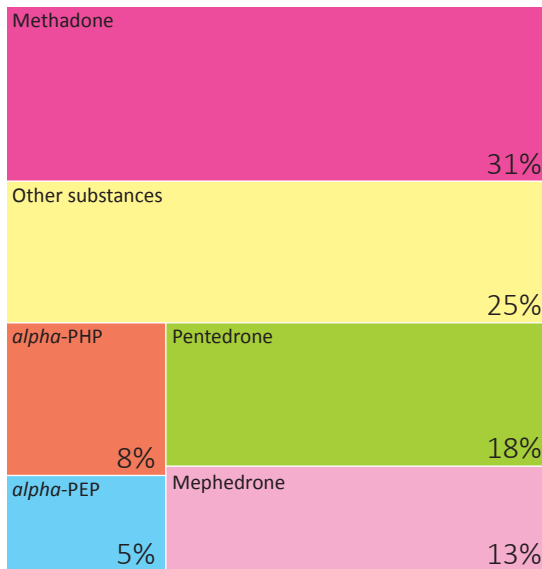
41 Anna Tarján and others, "HCV prevalence and risk behaviours among injectors of new psychoactive substances in a risk environment in Hungary: an expanding public health burden", *International Journal of Drug Policy*, vol. 41 (2017), pp. 1–7.

42 Valéria Anna Gyarmathy and others, "Diverted medications and new psychoactive substances: a chemical network analysis of discarded injecting paraphernalia in Hungary", *International Journal of Drug Policy*, vol. 46 (2017), pp. 61–65.

43 United Kingdom, Public Health England, "Shooting up: infections among people who inject drugs in the UK, 2016" (November 2017).

44 *Ibid.*, "Shooting up: infections among people who inject drugs in the UK, 2015" (November 2016).

FIG. 8 Psychoactive substances found in discarded injecting paraphernalia in Hungary, 2016



Source: Valéria Anna Gyarmathy and others, “Diverted medications and new psychoactive substances—a chemical network analysis of discarded injecting paraphernalia in Hungary”, 2017.

cross-sectional survey on PWID in Scotland covering 2,696 participants from selected agencies and pharmacies that provide injecting equipment recorded injecting use of NPS. Injection of NPS was first monitored in 2015/16, and for that survey period, 10 per cent of those who had injecting drug use in the past six months had injected NPS.⁴⁵

Deaths related to new psychoactive substances are on the increase in some countries

In a number of countries, concerns have been growing over the harm caused by NPS, although the number of deaths caused by NPS constitute a relatively small portion of all drug-related deaths.⁴⁶

45 Health Protection Scotland, University of the West of Scotland, Glasgow Caledonian University, West of Scotland Specialist Virology Centre, “Needle exchange surveillance initiative: prevalence of blood-borne viruses and injecting risk behaviours among people who inject drugs attending injecting equipment provision services in Scotland, 2008–09 to 2015–16” (Glasgow, Health Protection Scotland March, 2017).

46 For more information on drug-related deaths, including those associated with NPS with opioid effects, see booklet 2 of the present report.

NPS-related deaths may not be systematically recorded in all countries and trends for NPS-deaths differ from country to country. In England and Wales, NPS-related deaths have increased over the past five years, reaching 123 cases of the total of 2,593 drug misuse deaths in 2016.^{47, 48} While the number of deaths related to synthetic cannabinoids more than tripled, from 8 deaths in 2015 to 27 deaths in 2016, the number of deaths related to the synthetic cathinone mephedrone fell by more than half, declining from 44 deaths in 2015 to 15 deaths in 2016.⁴⁹ Over the same period, NPS-related deaths in Germany more than doubled, from 39 deaths to 98 deaths. Overall, 1,333 drug-related deaths were reported in Germany in 2016, a 9 per cent increase from the previous year.⁵⁰ In Ireland, deaths related to NPS decreased from 14 deaths in 2014 to 7 deaths in 2015.⁵¹

Increasing use of benzodiazepines

Increases in use and deaths related to benzodiazepine-type NPS, sold under names such as “legal benzodiazepines” or “designer benzodiazepines”, are a growing public health issue in some countries.⁵² In Scotland, of the reported 867 drug-related deaths in 2016, 286 deaths were related to NPS use, and in most cases, benzodiazepine-type NPS were found to have been implicated in, or to have potentially contributed to, the cause of death. Most cases involved etizolam, with a few relating to diclazepam or phenazepam.⁵³ In Barcelona, a drug-checking service reported a massive increase in the number of samples that tested positive for benzodiazepine-type

47 Of the 3,744 cases of death, 2,038 were related to opiates, 460 to anti-depressants, and 219 to paracetamol.

48 United Kingdom, Office for National Statistics, “Statistical bulletin: deaths related to drug poisoning England and Wales—2016 registrations”, 2 August 2017. Available at www.ons.gov.uk/.

49 Ibid.

50 Germany, Bundeskriminalamt, “Globalisierung und Digitalisierung prägen auch die Rauschgiftkriminalität”, press release of 8 May 2017.

51 Ena Lynn and Suzi Lyons, d, “National drug-related deaths index 2004 to 2015 data”, 12 December 2017. Available at www.hrb.ie/.

52 UNODC, “Non-medical use of benzodiazepines: a growing public health threat?” Global SMART Update, vol. 18 (September 2017).

53 National Records of Scotland, “Drug-related deaths in Scotland in 2016”.

NPS, from 2.3 per cent in 2014 to 48.8 per cent in 2016, suggesting an increase in use.⁵⁴

The synthetic opioid overdose crisis

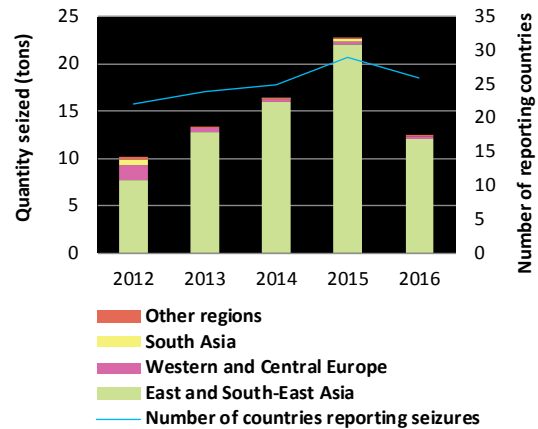
Many NPS with opioid effects have emerged in the past five years. Between 2009 and 2017, a total of 34 synthetic opioids, including 26 fentanyl analogues, were reported to UNODC early warning advisory by countries on all continents, and most of those synthetic opioids have been reported since 2016. The fentanyl analogues reported by most countries included furanylfentanyl, acetylfentanyl, ofentanil and butyrfentanyl. Synthetic opioids belonging to other chemical groups were also reported, including U-47700, AH-7921, MT-45 and *O*-desmethyltramadol. The non-medical use of synthetic opioids in North America has escalated, leading to a crisis of overdose deaths, specifically in the United States and Canada, while dozens of deaths have also been reported in Europe (see booklet 3, section on opioids).

Ketamine

A widely used human and veterinary anaesthetic, ketamine is listed as an essential medicine by the World Health Organization. Because of its potential for abuse, the health risks associated with it, evidence of its illicit manufacture and its presence on illicit drug markets, ketamine is under national control in many countries.

The significant increases in global seizures of ketamine from 2012 to 2015 were largely attributable to increases in East and South-East Asia, with global seizures reaching 22 tons in 2015. In 2016, global seizures declined, which was largely due to a massive drop in quantities seized in China, including Hong Kong, China. In recent years, clandestine ketamine laboratories have been dismantled mainly in East and South-East Asia, with Chinese authorities dismantling 93 illicit ketamine manufacturing facilities in 2016 alone. In the same year, a clandestine ketamine manufacturing facility was dismantled in Malaysia for the first time ever.

FIG. 9 Quantities of ketamine seized globally and number of countries reporting ketamine seizures, 2012–2016



Source: UNODC, responses to the annual report questionnaire, 2012–2016.

54 S. Pérez González and others, “New designer benzodiazepines use in Barcelona”, *European Psychiatry*, vol. 41, Suppl. (2017), p. 874.

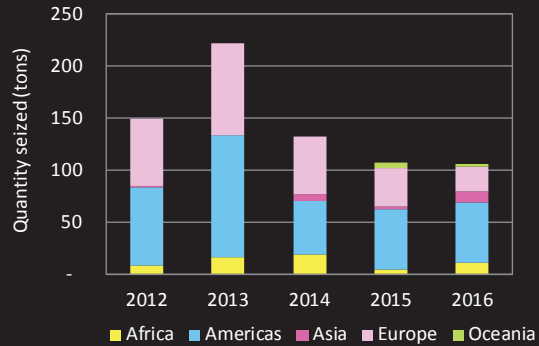
Khat: new aspects of a traditional plant-based drug

Khat (*Catha edulis*) is a shrub cultivated mainly in East Africa and the Arabian Peninsula. Khat leaves contain cathinone, a substance with stimulant effects similar to amphetamine, and their use has been a traditional practice in those areas. More recently, the use of khat has spread to Asia, Europe and North America, first among immigrants from the countries of traditional use and from there, into other communities.^a

Although khat is not under international control, many national jurisdictions do not allow the import of khat leaves. Significant khat seizures are reported to UNODC each year, mainly by authorities of countries outside the areas of traditional use. The largest quantities seized are reported not in the country of origin but in the destination countries, including in North America and Europe.^b Between 2012 and 2016, more than 700 tons of khat were seized by 35 countries.^c

Traditionally, khat leaves are consumed in a fresh state, within 48 hours of being harvested. After that point, the quality of the leaves deteriorates and the quantity of cathinone, the main psychoactive component, decreases rapidly. In order to limit those effects and slow down the process of decay, khat leaves are often dried before being transported long distances.^d Drying has the additional benefit of a reduction in the volume and weight of the leaves, making transportation easier. The number of countries reporting khat seizures increased from 2012 to 2016, and since 2015 seizures have been reported in other regions, such as Oceania, that are too far from the traditional sources to conserve freshness and hence maintain the potency of the khat. Despite the geographical expansion of khat shipments observed in seizure reports, the total quantities of khat seized are declining. Detailed studies on the global khat market and the patterns of khat use in destination countries are required to better understand this phenomenon.

Quantities of khat seized worldwide, 2012–2016 (tons)



Source: UNODC, responses to the annual report questionnaire, 2012–2016.

^a Ling-Yi Feng and others, “New psychoactive substances of natural origin: a brief review”, *Journal of Food and Drug Analysis*, vol. 25, No. 3 (2017), pp. 461–471; Birhane A. Berihu and others, “Toxic effect of khat (*Catha edulis*) on memory: systematic review and meta-analysis”, *Journal of Neurosciences in Rural Practice*, vol. 8, No. 1 (2017), pp. 30–37.

^b UNODC, questionnaire on new psychoactive substances for 2016.

^c UNODC, responses to the annual report questionnaire, 2010–2016.

^d World Customs Organization, Regional Intelligence Liaison Office for Western Europe; Ton Nabben and Dirk J. Korf, “Consequences of criminalisation: the Dutch khat market before and after the ban”, *Drugs: Education, Prevention and Policy*, vol. 24, No. 4 (2017), pp. 332–339.



GLOSSARY

amphetamine-type stimulants — a group of substances composed of synthetic stimulants controlled under the Convention on Psychotropic Substances of 1971 and from the group of substances called amphetamines, which includes amphetamine, methamphetamine, methcathinone and the “ecstasy”-group substances (3,4-methylenedioxymethamphetamine (MDMA) and its analogues).

amphetamines — a group of amphetamine-type stimulants that includes amphetamine and methamphetamine.

annual prevalence — the total number of people of a given age range who have used a given drug at least once in the past year, divided by the number of people of the given age range, and expressed as a percentage.

coca paste (or coca base) — an extract of the leaves of the coca bush. Purification of coca paste yields cocaine (base and hydrochloride).

“crack” cocaine — cocaine base obtained from cocaine hydrochloride through conversion processes to make it suitable for smoking.

cocaine salt — cocaine hydrochloride.

drug use — use of controlled psychoactive substances for non-medical and non-scientific purposes, unless otherwise specified.

new psychoactive substances — substances of abuse, either in a pure form or a preparation, that are not controlled under the Single Convention on Narcotic Drugs of 1961 or the 1971 Convention, but that may pose a public health threat. In this context, the term “new” does not necessarily refer to new inventions but to substances that have recently become available.

opiates — a subset of opioids comprising the various products derived from the opium poppy plant, including opium, morphine and heroin.

opioids — a generic term applied to alkaloids from opium poppy (opiates), their synthetic analogues (mainly prescription or pharmaceutical opioids) and compounds synthesized in the body.

problem drug users — people who engage in the high-risk consumption of drugs; for example, people who inject drugs, people who use drugs on a daily basis

and/or people diagnosed with drug use disorders (harmful use or drug dependence), based on clinical criteria as contained in the Diagnostic and Statistical Manual of Mental Disorders (fifth edition) of the American Psychiatric Association, or the International Classification of Diseases and Related Health Problems (tenth revision) of the World Health Organization.

people who suffer from drug use disorders/people with drug use disorders — a subset of people who use drugs. People with drug use disorders need treatment, health and social care and rehabilitation. Harmful use of substances and dependence are features of drug use disorders.

harmful use of substances — defined in the International Statistical Classification of Diseases and Related Health Problems (tenth revision) as a pattern of use that causes damage to physical or mental health.

dependence — defined in the International Statistical Classification of Diseases and Related Health Problems (tenth revision) as a cluster of physiological, behavioural and cognitive phenomena in which the use of a substance or a class of substances takes on a much higher priority for a given individual than other behaviours that once had greater value. A central descriptive characteristic of dependence syndrome is the desire (often strong, sometimes overpowering) to take psychoactive drugs.

substance or drug use disorders — the Diagnostic and Statistical Manual of Mental Disorders (fifth edition) of the American Psychiatric Association also refers to “drug or substance use disorder” as patterns of symptoms resulting from the use of a substance despite experiencing problems as a result of using substances. Depending on the number of symptoms identified, substance use disorder may vary from moderate to severe.

prevention of drug use and treatment of drug use disorders — the aim of “prevention of drug use” is to prevent or delay the initiation of drug use, as well as the transition to drug use disorders. Once a person develops a drug use disorder, treatment, care and rehabilitation are needed.



REGIONAL GROUPINGS

The World Drug Report uses a number of regional and subregional designations. These are not official designations, and are defined as follows:

- East Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Uganda and United Republic of Tanzania
- North Africa: Algeria, Egypt, Libya, Morocco, South Sudan, Sudan and Tunisia
- Southern Africa: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe
- West and Central Africa: Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone and Togo
- Caribbean: Antigua and Barbuda, Bahamas, Barbados, Bermuda, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines and Trinidad and Tobago
- Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama
- North America: Canada, Mexico and United States of America
- South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela (Bolivarian Republic of)
- Central Asia and Transcaucasia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan
- East and South-East Asia: Brunei Darussalam, Cambodia, China, Democratic People's Republic of Korea, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Timor-Leste and Viet Nam
- South-West Asia: Afghanistan, Iran (Islamic Republic of) and Pakistan
- Near and Middle East: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, State of Palestine, Syrian Arab Republic, United Arab Emirates and Yemen
- South Asia: Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka
- Eastern Europe: Belarus, Republic of Moldova, Russian Federation and Ukraine
- South-Eastern Europe: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Romania, Serbia, the former Yugoslav Republic of Macedonia and Turkey
- Western and Central Europe: Andorra, Austria, Belgium, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom of Great Britain and Northern Ireland
- Oceania: Australia, Fiji, Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu and small island territories

Following last year's 20th anniversary edition, the *World Drug Report 2018* is again presented in a special five-booklet format designed to enhance reader friendliness while maintaining the wealth of information contained within.

Booklet 1 summarizes the content of the four subsequent substantive booklets and presents policy implications drawn from their findings. Booklet 2 provides a global overview of the latest estimates of and trends in the supply, use and health consequences of drugs. Booklet 3 examines current estimates of and trends in the cultivation, production and consumption of the three plant-based drugs (cocaine, opiates and cannabis), reviews the latest developments in cannabis policies and provides an analysis of the global synthetic drugs market, including new psychoactive substances. Booklet 4 looks at the extent of drug use across age groups, particularly among young and older people, by reviewing the risks and vulnerabilities to drug use in young people, the health and social consequences they experience and their role in drug supply, as well as highlighting issues related to the health care needs of older people who use drugs. Finally, Booklet 5 focuses on the specific issues related to drug use among women, including the social and health consequences of drug use and access to treatment by women with drug use disorders; it also discusses the role played by women in the drug supply chain.

Like all previous editions, the *World Drug Report 2018* is aimed at improving the understanding of the world drug problem and contributing towards fostering greater international cooperation for countering its impact on health and security.

The statistical annex is published on the UNODC website:
<https://www.unodc.org/wdr2018>



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