



UNODC
United Nations Office on Drugs and Crime



4 CROSS-CUTTING ISSUES: EVOLVING TRENDS AND NEW CHALLENGES

WORLD 2020 DRUG REPORT

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PREFACE

This is a time for science and solidarity, as United Nations Secretary-General António Guterres has said, highlighting the importance of trust in science and of working together to respond to the global COVID-19 pandemic.

The same holds true for our responses to the world drug problem. To be effective, balanced solutions to drug demand and supply must be rooted in evidence and shared responsibility. This is more important than ever, as illicit drug challenges become increasingly complex, and the COVID-19 crisis and economic downturn threaten to worsen their impacts, on the poor, marginalized and vulnerable most of all.

Some 35.6 million people suffer from drug use disorders globally. While more people use drugs in developed countries than in developing countries, and wealthier segments of society have a higher prevalence of drug use, people who are socially and economically disadvantaged are more likely to develop drug use disorders.

Only one out of eight people who need drug-related treatment receive it. While one out of three drug users is a woman, only one out of five people in treatment is a woman. People in prison settings, minorities, immigrants and displaced people also face barriers to treatment due to discrimination and stigma. Of the 11 million people who inject drugs, half of them are living with hepatitis C, and 1.4 million with HIV.

Around 269 million people used drugs in 2018, up 30 per cent from 2009, with adolescents and young adults accounting for the largest share of users. More people are using drugs, and there are more drugs, and more types of drugs, than ever.

Seizures of amphetamines quadrupled between 2009 and 2018. Even as precursor control improves globally, traffickers and manufacturers are using designer chemicals, devised to circumvent international controls, to synthesize amphetamine, methamphetamine and ecstasy. Production of heroin and cocaine remain among the highest levels recorded in modern times.

The growth in global drug supply and demand poses challenges to law enforcement, compounds health risks and complicates efforts to prevent and treat drug use disorders.

At the same time, more than 80% of the world's population, mostly living in low- and middle-income

countries, are deprived of access to controlled drugs for pain relief and other essential medical uses.

Governments have repeatedly pledged to work together to address the many challenges posed by the world drug problem, as part of commitments to achieve the Sustainable Development Goals, and most recently in the 2019 Ministerial Declaration adopted by the Commission on Narcotic Drugs (CND). But data indicates that development assistance to address drug control has actually fallen over time.

Balanced, comprehensive and effective responses to drugs depend on governments to live up to their promises, and provide support to leave no one behind.

Health-centred, rights-based and gender-responsive approaches to drug use and related diseases deliver better public health outcomes. We need to do more to share this learning and support implementation, most of all in developing countries, including by strengthening cooperation with civil society and youth organizations.

The international community has an agreed legal framework and the commitments outlined in the 2019 CND Ministerial Declaration. The United Nations Office on Drugs and Crime (UNODC) provides integrated support to build national capacities and strengthen international cooperation to turn pledges into effective action on the ground.

The theme for this year's International Day against Drug Abuse and Illicit Trafficking, "Better Knowledge for Better Care", highlights the importance of scientific evidence to strengthen responses to the world drug problem and support the people who need us. It also speaks to the ultimate goal of drug control, namely the health and welfare of humankind. Through learning and understanding we find compassion and seek solutions in solidarity.

It is in this spirit that I present the UNODC *World Drug Report 2020*, and I urge governments and all stakeholders to make the best use of this resource.



Ghada Waly
Executive Director
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The analysis on purchases of drugs on the darknet in Booklet 4 is based on original data graciously shared by the *Global Drug Survey* team.

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EXPLANATORY NOTES

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.

Since there is some scientific and legal ambiguity about the distinctions between “drug use”, “drug misuse” and “drug abuse”, the neutral term “drug use” is 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” and the term “drug use” in the World Drug Report refer to substances controlled under the international drug control conventions, and their non-medical use.

All analysis contained in the World Drug Report is based on the official data submitted by Member States to the UNODC 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 2019 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:

alpha-PVP	<i>alpha</i> -pyrrolidinovalerophenone
APAAN	<i>alpha</i> -phenylacetoacetonitrile
ATS	amphetamine-type stimulants
CBD	cannabidiol
DEA	Drug Enforcement Administration
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
Europol	European Union Agency for Law Enforcement Cooperation
GDP	gross domestic product
INCB	International Narcotics Control Board
INTERPOL	International Criminal Police Organization
LSD	lysergic acid diethylamide
MAPA	methyl <i>alpha</i> -phenylacetoacetate
MDA	methylenedioxyamphetamine
MDMA	3,4-methylenedioxymethamphetamine
MDPV	methylenedioxypropylvalerone
4-MEC	4-methylethcathinone
3-MMC	3-methylmethcathinone
4-MMC	4-methylmethcathinone
NPS	new psychoactive substances
PCP	phencyclidine
P-2-P	1-phenyl-2-propanone
PMK	piperonyl methyl ketone
S-DDD	defined daily doses for statistical purposes
THC	Δ -9 – tetrahydrocannabinol
UNODC	United Nations Office on Drugs and Crime

SCOPE OF THE BOOKLET

This, the fourth booklet of the *World Drug Report 2020*, contributes evidence to support the international community in implementing operational recommendations on cross-cutting issues for addressing and countering the world drug problem, in particular its evolving reality, trends and existing circumstances, as well as emerging and persistent challenges and threats, including the recommendations contained in the outcome document of the special session of the General Assembly, held in 2016.

The booklet first analyses the macro-dynamics that are driving the expansion and increasing complexity of the drug markets. Factors such as population growth, urbanization and income levels and distribution are examined, the interplay between a number of substances at the manufacture, trafficking and use levels is considered, and the question on whether changes in drug markets are mostly demand-, supply- or control-driven is addressed.

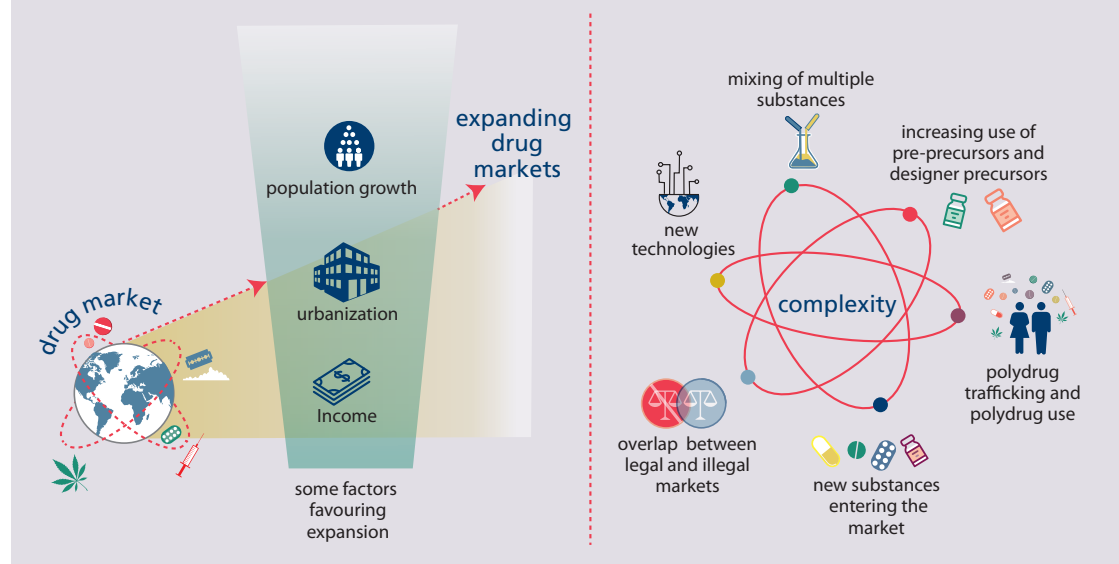
With the market for opioids being the most rapidly evolving drug market, the booklet then provides an up-to-date review of the latest information regarding the multifaceted global opioid crisis, which was

examined in the *World Drug Report 2019*. With a particular focus on fentanyl and its analogues in North America and on tramadol in Africa and the Middle East, an analysis of the spread of the opioid crisis beyond those subregions is also included.

The booklet subsequently reviews recent trends in the market for new psychoactive substances, including their trafficking, use and geographical spread, and provides the latest updates on the use of the darknet for supplying drugs, in the context of emerging dynamics and threats, with an analysis of the evolution over time of the main marketplaces selling drugs on the darknet and of the trends in drug purchases by users.

The booklet concludes by reviewing new developments in jurisdictions that have measures allowing the non-medical use of cannabis. It describes the outcome of one year of implementation of different aspects, and the status to date, of legislation and the regulation of the non-medical use of cannabis in Canada, as well as developments in selected jurisdictions in the United States of America and in Uruguay.

Global drug market: expanding and more complex



CHANGES IN DRUG MARKETS

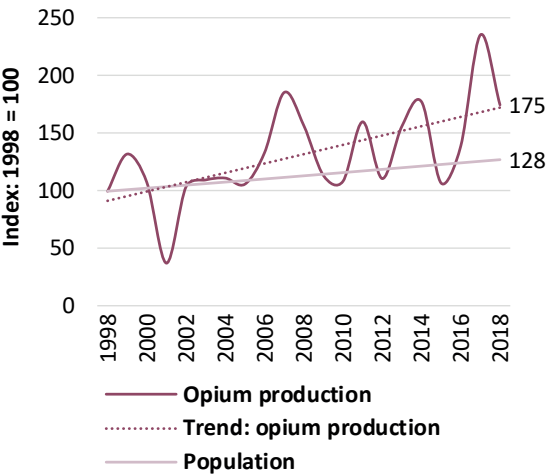
General upward trend in the global drug market over the past two decades

As seen from a combination of indicators related to drug production, trafficking and use, it appears that the global drug market has expanded over the past two decades. Expansions can be seen in terms of the overall number of people who use drugs, the illicit production of opium and manufacture of cocaine and the quantities of drugs seized. If analysed in isolation, however, each of those indicators by itself would not justify the conclusion that there has been an overall market expansion. An increase in seizures by itself, for example, could be the result of improved law enforcement capacity and not necessarily the result of a market expansion; as well, trends in the number of people who use drugs are affected by reporting capacity, while hikes in cultivation and production may be linked to local incentives rather than to external demand. Nevertheless, the triangulation of data and concomitant increases in all indicators, combined with the reports of an overall

decrease in purity-adjusted drug prices in some key drug markets, indicate a likely expansion of the global drug market.

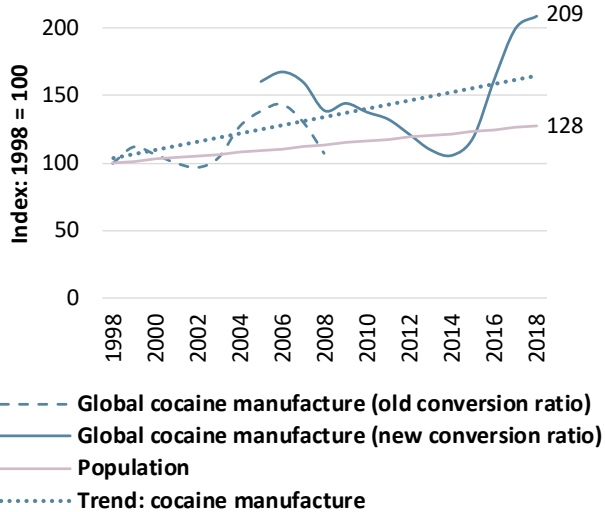
An expansion of the global drug market could be partly explained by the increase in the global population over the past two decades, but market growth seems to be due to more than just population dynamics. Identifying the drivers of this expansion, beyond the population effect, is challenging, because a number of measurable and unmeasurable factors related to individuals, communities and countries may have influenced the size and dynamics of the global drug market. National, regional and global drug policies and the capacity of national institutions to address drug-related matters can influence trends in drug markets and, as was analysed in the *World Drug Report 2016*,¹ social, economic, environmental and governance conditions can influence, and be influenced by, drug market dynamics; analysing that complexity in full is beyond the scope of the present report. Hence, this chapter describes three of the main macro-dynamics that have had a

FIG. 1 Global illicit opium production and global population, 1998–2018



Sources: *World Drug Report 2019*, and editions of previous years; and United Nations, *World Population Prospects: The 2019 Revision*.

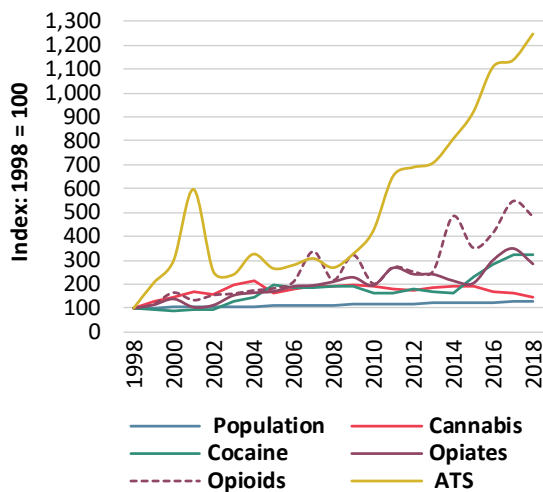
FIG. 2 Global illicit manufacture of cocaine and global population, 1998–2018



Sources: UNODC, coca cultivation/cocaine manufacture estimates; and United Nations, *World Population Prospects: The 2019 Revision*.

1 United Nations publication, Sales No. E.16.XI.7, chap. 2, pp. 63–107.

FIG. 3 Quantities of drugs seized (based on kilogram equivalents) and population growth, 1998–2018



Sources: *World Drug Report 2019*; and World Bank, DataBank, World Development Indicators.

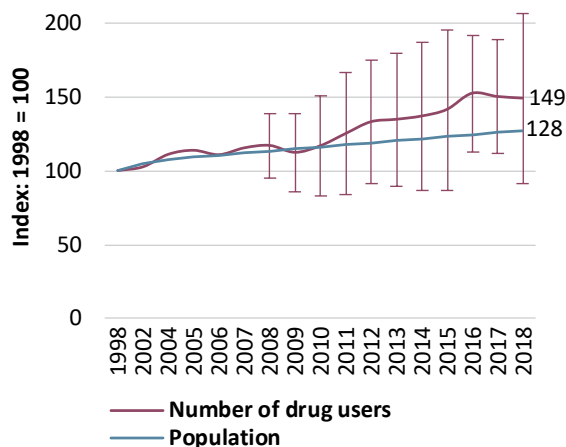
global effect over the past two decades – population growth, urbanization and income – and discusses how drug markets are affected by those dynamics.

Population growth

One factor that is likely to have contributed to the expansion of the global drug market over the past two decades is population growth. Even if there were no increase in the global prevalence of drug use, population growth by itself would lead to an increase in global demand for drugs.

Population growth has been uneven around the globe, with the greatest growth being in developing countries: between 2000 and 2018, the population grew by 7 per cent in developed countries and by 28 per cent in developing countries. The chronic lack of reliable data on drug use in developing countries – in particular those in Africa – makes it difficult to measure trends in drug use in developing countries and determine to what extent those trends reflect population growth. However, the qualitative information reported by national experts on perceived trends suggests that drug use increased far more over the period 2000–2018 in the combined group of developing countries and countries with economies in transition than in developed countries,

FIG. 4 Drug use and population growth at the global level, 1998–2018



Sources: UNODC estimates based on data from responses to the annual report questionnaire, *World Drug Report 2019*, and editions of previous years; and United Nations, World Population Prospects: The 2019 Revision.

reflecting, among other things, the difference in population growth between developing and developed countries.

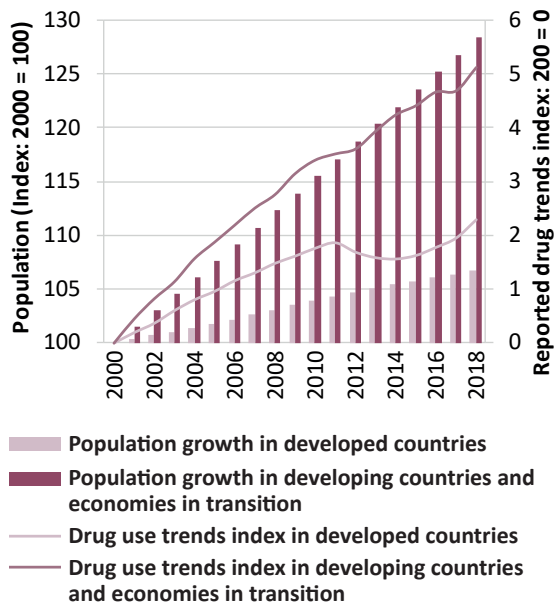
As a further factor, in most countries the highest prevalence of drug use is found among adolescents and young adults, in particular those aged 18–25. Over the period 2000–2018, the population in that age group grew significantly in developing countries – by 18 per cent, thus raising the overall vulnerability to drug use in those countries. In developed countries, by contrast, the population in that young age group decreased by 10 per cent over the same period.²

Urbanization

Population growth within countries has been uneven, growing much faster in urban areas than in rural areas. Over the period 1995–2020, the global population living in urban areas grew by 40 per cent, far more than population growth in rural areas, which grew by 7.5 per cent. Over the decades, the proportion of people worldwide living in urban areas has gradually grown, from 34 per cent in 1960 to 45 per cent in 1995, and reaching 56 per cent in

² United Nations, *World Population Prospects: The 2019 Revision*.

FIG. 5 Population growth and reported drug use trends in developed countries as compared with developing countries and countries with economies in transition, 2000–2018



Sources: UNODC, responses to the annual report questionnaire; and United Nations, *World Population Prospects: The 2019 Revision*.

Note: The drug use trends index is based on qualitative information on trends in drug use reported by Member States. The trend line is computed on the basis of the number of countries reporting increases minus the number of countries reporting decreases (2 points for “strong increase”, 1 point for “some increase”, 0 points for stable, -1 point for “some decline”, -2 points for “strong decline”).

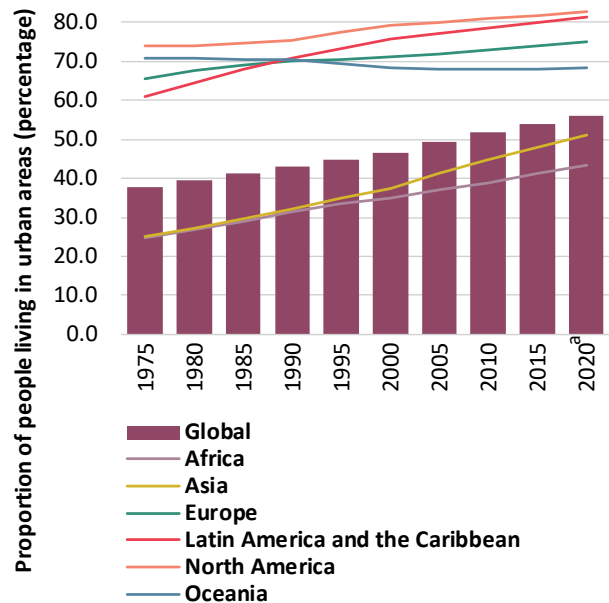
2020, with the fastest growth occurring in developing countries.³

The lack of disaggregated data makes it impossible to obtain a global overview of drug use as distributed between urban and rural areas and to analyse interacting global trends in urbanization and drug markets. From the information available, it seems that drug use is more prevalent in urban areas than in rural areas, in both developed and developing countries, with the exception of some major rural drug-producing areas. Urbanization has also been found to be a general risk factor for drug use;⁴ for

3 United Nations, Department of Economic and Social Affairs, *World Urbanization Prospects: The 2018 Revision*.

4 World Health Organization, *Substance Use Among Young*

FIG. 6 People living in urban areas, by region and subregion, 1975–2020^a



Source: United Nations, Department of Economic and Social Affairs, *World Urbanization Prospects: The 2018 Revision*.

^a Data for 2020 are still preliminary estimates.

example, data from school surveys in Colombia and Mexico show the prevalence of use of some drugs being up to 60 per cent higher in urban areas than in rural areas.^{5, 6}

Data on drug law offences including possession and trafficking of drugs in Germany⁷ and Austria⁸ confirm the same patterns with main cities showing higher per capita offences than the national average (typically around 50 per cent higher in 2018).

People in Urban Environments (Geneva, Switzerland, and Kobe, Japan, 2005).

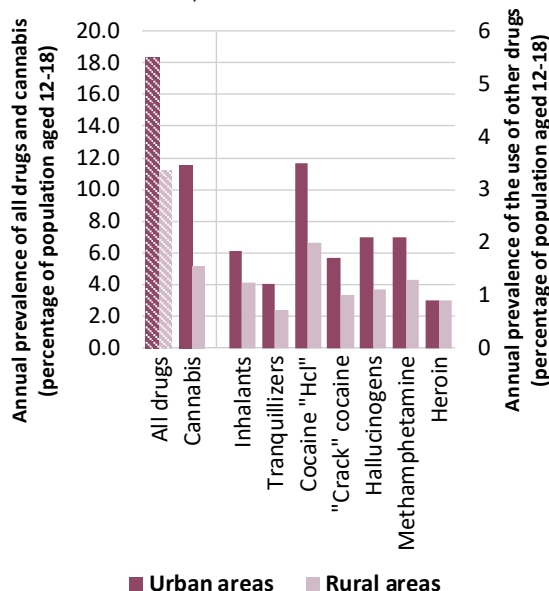
5 Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Comisión Nacional contra las Adicciones, “El consumo de drogas en estudiantes de México: tendencias y magnitud del problema”, *Salud Mental*, vol. 39, No. 4 (México, July-August 2016)

6 Observatorio de Drogas de Colombia, *Estudio Nacional de Consumo de Sustancias Psicoactivas en Población Escolar Colombia – 2016*.

7 Bundeskriminalamt, *Bundeslagebild Rauschgift 2018* (Wiesbaden 2019).

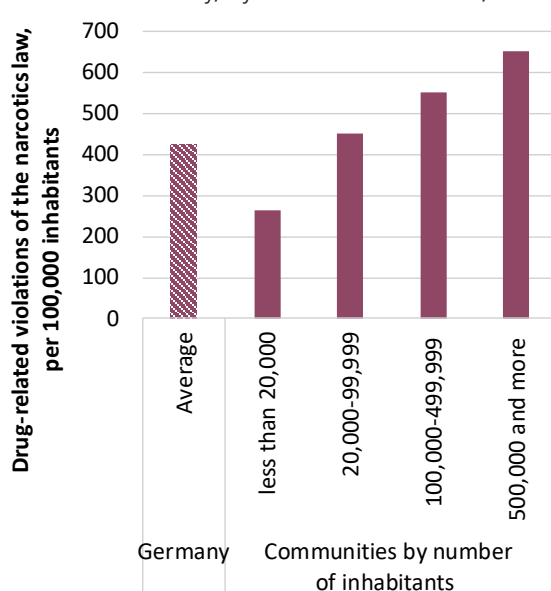
8 Bundeskriminalamt, *Drug-related Crime Annual Report 2018* (Vienna 2018).

FIG. 7 Drug use among students aged 10–18, Mexico, 2016



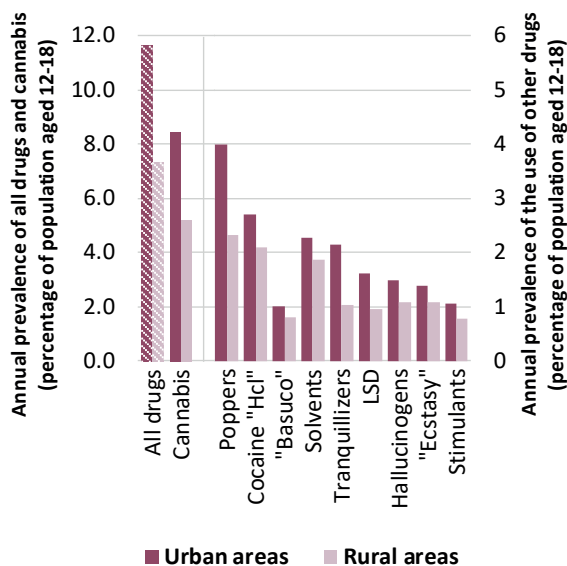
Source: Jorge A. Villatoro Velázquez and others, "El consumo de drogas en estudiantes de México: tendencias y magnitud del problema", *Salud Mental*, vol. 39, No. 4, (July-August 2016).

FIG. 9 Reported drug law offences in Germany, by size of communities, 2018



Sources: UNODC calculations based on Bundeskriminalamt, *Polizeiliche Kriminalstatistik 2018*, Jahrbuch, Band 4, and Statistisches Bundesamt, *Bevölkerung*, Wiesbaden, 2019.

FIG. 8 Drug use among pupils aged 12–18, Colombia, 2016



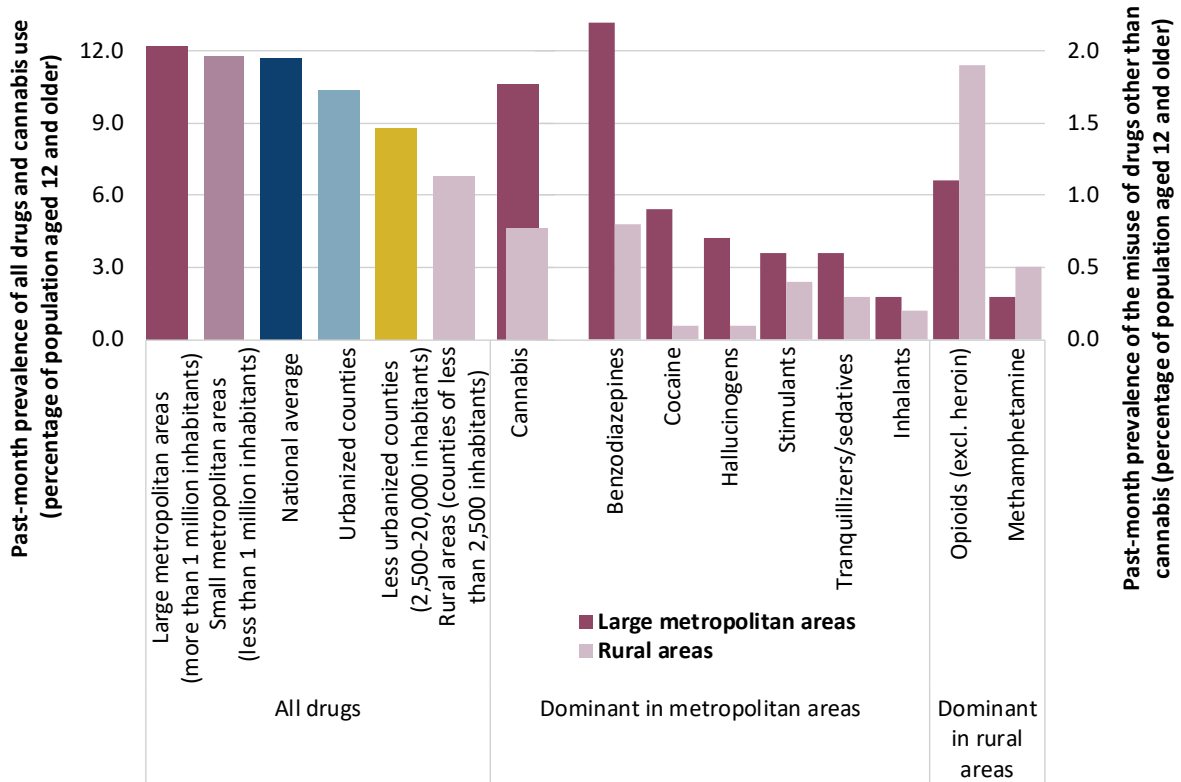
Source: Colombian Drug Observatory, National Study of the Consumption of Psychoactive Substances among the School Population: Colombia 2016 – Final Report.

A study conducted in India in the Chandigarh area, that city being the capital of the two neighbouring States of Punjab and Haryana, also suggested there are higher levels of drug use in urban slum areas than in rural areas.⁹ If this information were to be validated across all countries, the rapid urbanization of the past decade could be an element that explains, at least partially, the growth in the global drug market. In this context, urbanization becomes a crucial element when considering future dynamics in drug markets, in particular in developing countries, where growth in urbanization is more pronounced than in other countries.

Data on the annual prevalence of drug use among adults in Australia, the United States of America

⁹ The study suggested that 3.1 per cent of the population in rural areas fulfilled dependence criteria on ICD-10 for problems related to alcohol and drug use, while in the urban slum areas investigated this proportion turned out to be more than three times as high (10.7 per cent of the population aged 15 and older). Sudarshan B. Chavan and others, "Prevalence of alcohol and drug dependence in rural and slum population of Chandigarh: a community survey", *Indian Journal of Psychiatry*, vol. 49, No. 1 (March 2007), pp. 44–48.

FIG. 10 Use of selected drugs, metropolitan versus rural areas, United States, 2018



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2018 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, 2019).

and the United Kingdom of Great Britain and Northern Ireland, for example, show there is much higher drug use in urban areas than in rural areas, with the divide being even more pronounced among frequent users in the United States, where, in 2018, past-month prevalence of drug use was almost 80 per cent higher in large metropolitan areas than in rural areas.^{10, 11, 12}

10 United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2018 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, August 2019).

11 Alcohol and Drug Foundation, “Alcohol and other drugs in regional and remote areas”, 12 April 2019, based on Gary C. K. Chan and others, “Rural and urban differences in adolescent alcohol use, alcohol supply, and parental drinking”, *Journal of Rural Health*, vol. 32, No. 3 (June 2016), pp. 280–286.

12 United Kingdom, Home Office, *Drug Misuse: Findings from the 2018/19 Crime Survey for England and Wales*,

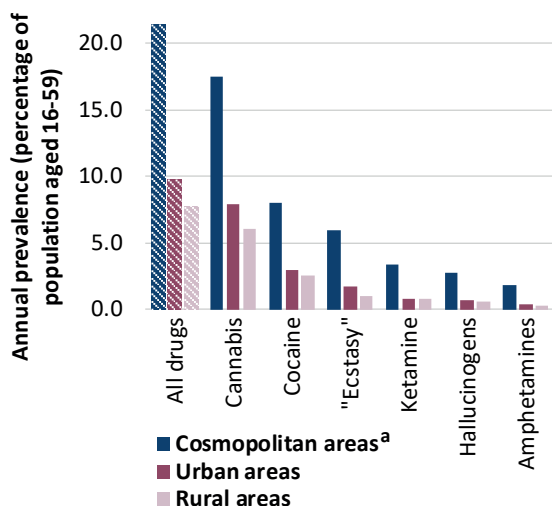
The exception seems to be the non-medical use of opioids in the United States and methamphetamine use in both the United States and Australia, for which prevalence rates are higher in rural areas.

Elsewhere, a study based on the analysis of wastewater in China in 2018 suggested that the country as a whole had a slightly lower methamphetamine consumption than in the 22 urban centres investigated, reflecting, the authors argued, the migration of adults from rural to urban areas for work reasons, to the extent that “most people who stay in rural areas are children under 15 years old and elderly people over 65 years old”.¹³

Statistical Bulletin, No. 21/19 (London, 2019), appendix tables.

13 Xue-Ting Shao and others, “Methamphetamine use in typical Chinese cities evaluated by wastewater-based epidemiology”, *Environmental Science and Pollution Research*, vol. 27, No. 8 (January 2020).

FIG. 11 Use of selected drugs, by population density, in England and Wales, 2018/19



Source: United Kingdom, Home Office, *Drug Misuse: Findings from the 2018/19 Crime Survey for England and Wales*, Statistical Bulletin, No. 21/19 (London, 2019), appendix tables.

^a According to the output area-classification, as reflected in the 2011 Area Classification for Local Authorities, the cosmopolitan areas include (i) the City of London/Westminster, (ii) Hackney, (iii) Hammersmith and Fullham, (iv) Haringey, (v) Islington, (vi) Kensington and Chelsea, (vii) Lambeth, (viii) Southwark, (ix) Tower Hamlets and (x) Wandsworth, i.e. all London boroughs, mostly located in the high population density areas of Inner London; overall drug use in Greater London is substantially lower, at 10.3 per cent in 2018/19, i.e. close to the average of urban areas in England and Wales (9.8 per cent).

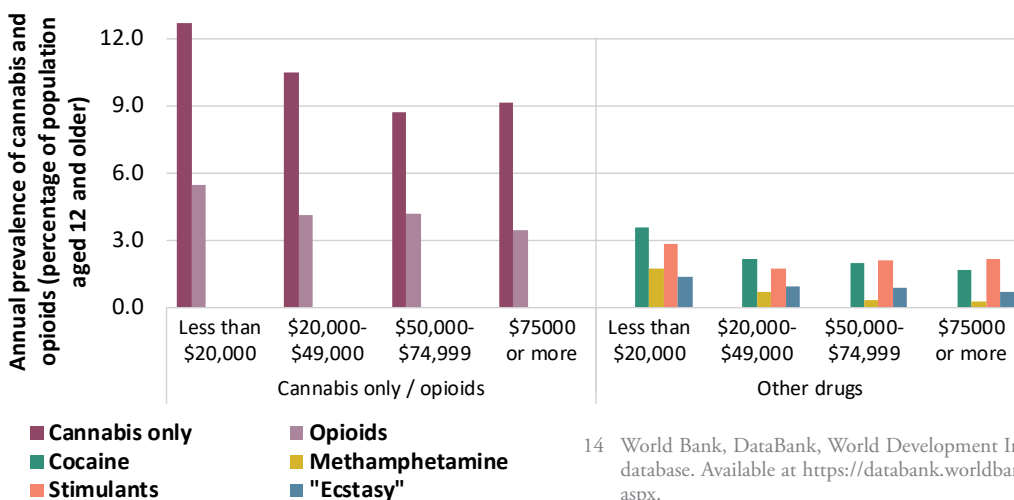
Income

Adjusted net national income per capita, as expressed in constant 2010 dollars, has risen significantly over the past two decades: the global average net national income per capita grew from less than \$6,400 per inhabitant in 1998 to \$8,700 in 2017, equivalent to an increase of 37 per cent over the past two decades.¹⁴ How this trend has affected the global drug market is unclear since income levels can influence drug markets in different ways.

At the macro level, drug use seems to be associated with the capacity to purchase drugs. Cross-country comparisons¹⁵ suggest that annual drug use is more widespread in developed countries than in developing countries, with use of some drugs, such as cocaine, being associated with higher levels of per capita GDP.

Within individual countries, however, data on drug use and income level, although limited, may show a different pattern. Annual drug use and data on drug dependence can have a different association with income levels, with people with a low income being particularly vulnerable to drug dependence. Micro level studies have also documented the greater vulnerability of the more disadvantaged socioeconomic sectors of the population to moving from drug use to drug dependence.¹⁶

FIG. 12 Drug use and annual family income in the United States, 2017

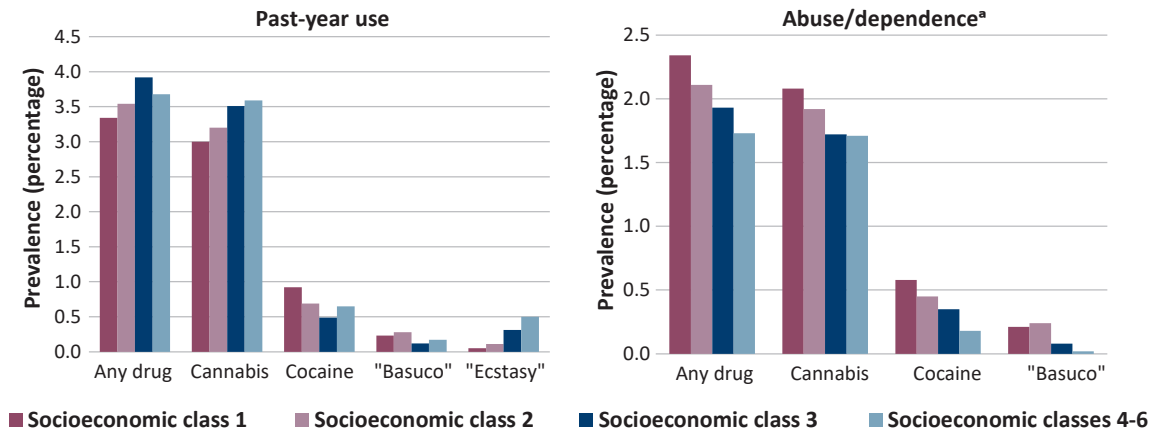


Source: United States, Substance Abuse and Mental Health Data Administration, National Survey on Drug Use and Health, 2017.

14 World Bank, DataBank, World Development Indicators database. Available at <https://databank.worldbank.org/home.aspx>.

15 *World Drug Report 2016*.

16 *World Drug Report 2018* (United Nations publication, Sales No. E.18.XI.9).

FIG. 13 Past-year drug use and drug abuse or dependence^a in Colombia, by socioeconomic class,^b 2013

Source: Observatorio de Drogas de Colombia, Estudio Nacional de Consumo de Sustancias Psicoactivas en Colombia – 2013, June 2014.

^a "Dependence" is defined according to the ICD-10 criteria of the World Health Organization, and "abuse" is defined according to the DSM-IV criteria of the American Psychiatric Association.

^b The socioeconomic classes were ranked so that class 1 was the least wealthy and class 6 the wealthiest.

While the available evidence points to an association between income and the drug markets, it is not clear how and if changes in income and distribution have been affecting the expansion of the global drug market.

Poorer members of society tend to be more vulnerable to drug dependence

Past studies have suggested a kind of inverse J-type distribution of drug-use prevalence rates across the world, with the poorer members of society facing a higher level of drug use, followed by a lower prevalence among the middle classes and then, again, a higher level among the wealthy.^{17, 18} More recent data, although only related to a handful of countries, point to a shift towards a clearer association between drug use and low income, in particular for frequent and more problematic drug use. There is a clear shift over time from an inverted J-shape to a linear association between drug use and income in the historical data for England and Wales and the United States.

A study conducted in Colombia in 2013 identified an unexpected association between drug use and

income. It found that the higher socioeconomic classes had a higher annual prevalence of drug use, while the lower socioeconomic classes had higher rates of drug dependence. This suggests that while people with higher socioeconomic status may have a greater propensity to experiment, it is among the lower socioeconomic classes that the most negative impact of the onset of recreational drug use is found, with a higher proportion of people becoming dependent. This suggests that poverty is associated with drug use disorders. Indeed, poor people living on the margins of society tend to be more vulnerable to slipping from recreational drug use into full-scale drug abuse and drug dependence because treatment facilities for intervening at an early stage in a drug career are often unavailable or unaffordable for such population groups. In this context, drug use itself may exacerbate poverty and marginalization, thus creating the potential for a vicious cycle.^{19, 20}

Growing complexity of drug markets

Over the past two decades, drug markets have become increasingly complex in terms of variety and combinations of substances used and trafficked,

17 United Nations Drug Control Programme, Economic and Social Consequences of Drug Abuse and Illicit Trafficking, UNDCP Technical Series, No. 6 (Vienna, 1998).

18 Report of the International Narcotics Control Board for 2002 (E/INCB/2002/1).

19 *World Drug Report 2016*.

20 For a more comprehensive discussion, see booklet 5 of the present report.

manufacturing processes and the organizational structure of drug trafficking organizations. There has been a rapid emergence of new substances, as well as new mixes of controlled and non-controlled substances, with an increasing misuse of pharmaceuticals, which poses new challenges for both drug demand and supply control efforts at the national, regional and global levels.

The difference between legal and illegal drug markets is increasingly unclear

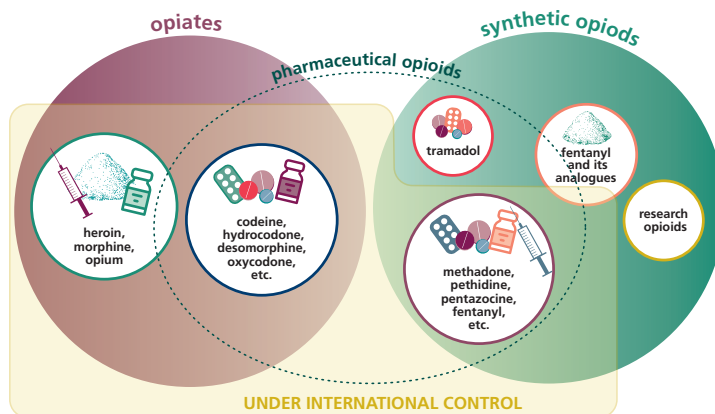
In the late 1990s, some 230 psychoactive substances were under international control, of which a handful dominated the global drug markets, most notably cannabis, cocaine, opium, heroin, amphetamines and “ecstasy”. Two decades later, the situation has changed, as there are now far more substances on the market. A number of synthetic NPS (i.e. psychoactive substances that mimic the properties of substances already under international control) emerged on the drug markets in the past decade, including synthetic cannabinoids, cathinones, phenethylamines, piperazines and various fentanyl analogues, resulting in a new wave of scheduling of such substances at the international level, with the total number of substances under international control rising from 234 in 2014 to 282 in 2018.²¹ At

the same time, the number of NPS rose from 166 substances over the period 2005–2009 to 950 substances by the end of 2019.²² Worldwide, in recent years authorities have identified more than three times as many NPS as there are psychoactive substances under international control.

Given the speed of emergence of new substances, national control systems have placed an increasing number of substances under control. Thus, a number of these substances have had their legal status changed in a short period of time.

Beyond internationally controlled substances, the legal status of many substances in the market differ from country to country, and sometimes within countries. This creates quite complex production and trafficking patterns in which some substances are under national control in some countries but not in others, leaving ample opportunities for producers and traffickers of the substances to select countries depending on the legal status of those substances in the respective jurisdictions, while also quickly adjusting to new controls wherever and whenever they may occur. The multiplicity of substances currently in the market challenges the effectiveness of national and international interventions because the elimination of one substance from the market easily leads to replacement by another.

FIG. 14 Opioids for medical and non-medical purposes



Source: UNODC, *World Drug Report 2019*.

21 International Narcotics Control Board, “List of narcotic drugs under international control (“Yellow List”)", 58th ed. (August 2019), and editions of previous years; and “List of psychotropic substances under international control (“Green List”)", 29th ed. (May 2018), and editions of previous years.

22 UNODC, Early warning advisory on new psychoactive substances.

The situation is particularly complex for the opioids group, as both legally and illegally produced substances satisfy the non-medical demand for opioids. While illegally produced opiates, such as heroin, used to dominate the non-medical demand for opioids, the illicit opioid markets in many countries have become far more diversified over the past two decades, with a number of pharmaceutical opioids that have started to cover a substantial part of the market for opioids for non-medical purposes.

This is creating an additional challenge for drug use prevention because, unlike the traditional hard drugs such as heroin, pharmaceuticals are often not perceived as harmful. In terms of drug control, this requires a careful equilibrium between maximizing accessibility for medical use while minimizing availability for non-medical use. It should be noted that the use of pharmaceuticals for non-medical purposes is not limited to opioids. There is also a substantial market for stimulant pharmaceuticals for non-medical use, particularly in Latin America and the Caribbean.²³

Although in the past most of the pharmaceuticals used for recreational purposes were legally produced and diverted into illicit channels only at a later stage, nowadays some pharmaceutical opioids are also illegally produced.

Increasing use of pre-precursors and “designer precursors” in the manufacture of synthetic drugs

The growing complexity of drug markets can be also seen in the manufacturing processes of synthetic drugs. In the past, a limited number of precursor chemicals was used to manufacture synthetic drugs, such as amphetamine (manufactured mostly from P-2-P), methamphetamine (manufactured mostly from ephedrine and pseudoephedrine, or from P-2-P in North America) and “ecstasy” (mainly manufactured from 3,4-MDP-2-P).

This has changed over the past two decades. As the key precursors mentioned above are all under international control, traffickers have been looking for alternatives. Over the years, different strategies have been adopted by traffickers to overcome controls,

using as alternative precursors substances that were not equally well controlled in all countries, non-controlled pre-precursors and so-called “designer precursors”, that is, chemicals specifically designed to circumvent existing precursor control systems. Pharmaceutical preparations containing controlled precursor chemicals have also been used to supply precursors because, although controlled, they are exempt from a number of control mechanisms such as the system of pre-export notifications.²⁴

The description of how the manufacture of methamphetamine has evolved over the past two decades is an example of the versatility of traffickers to change strategy in order to overcome controls. Similar shifts have also taken place in the use of various pre-precursors for the manufacture of MDMA (“ecstasy”).²⁵

Organization and specialization of criminal groups in specific areas

The growing complexity of drug markets can be also observed in the organizational structure of the actors involved. There has been a general trend over the past two decades towards an increasing fragmentation of the serious and organized crime landscape and the emergence of more groups and looser networks.²⁶ Organizations based on loose cooperation across criminal networks have proved more resilient to law enforcement interventions than other types, as a network that gets dismantled can, in general, be easily replaced by another. The landscape of the global illicit drug trade has thus become more complex, is rapidly evolving and is facilitated by new technology such as encrypted communications software and the darknet.²⁷

23 *World Drug Report 2019* (United Nations publication, Sales No. E.19.XI.8).

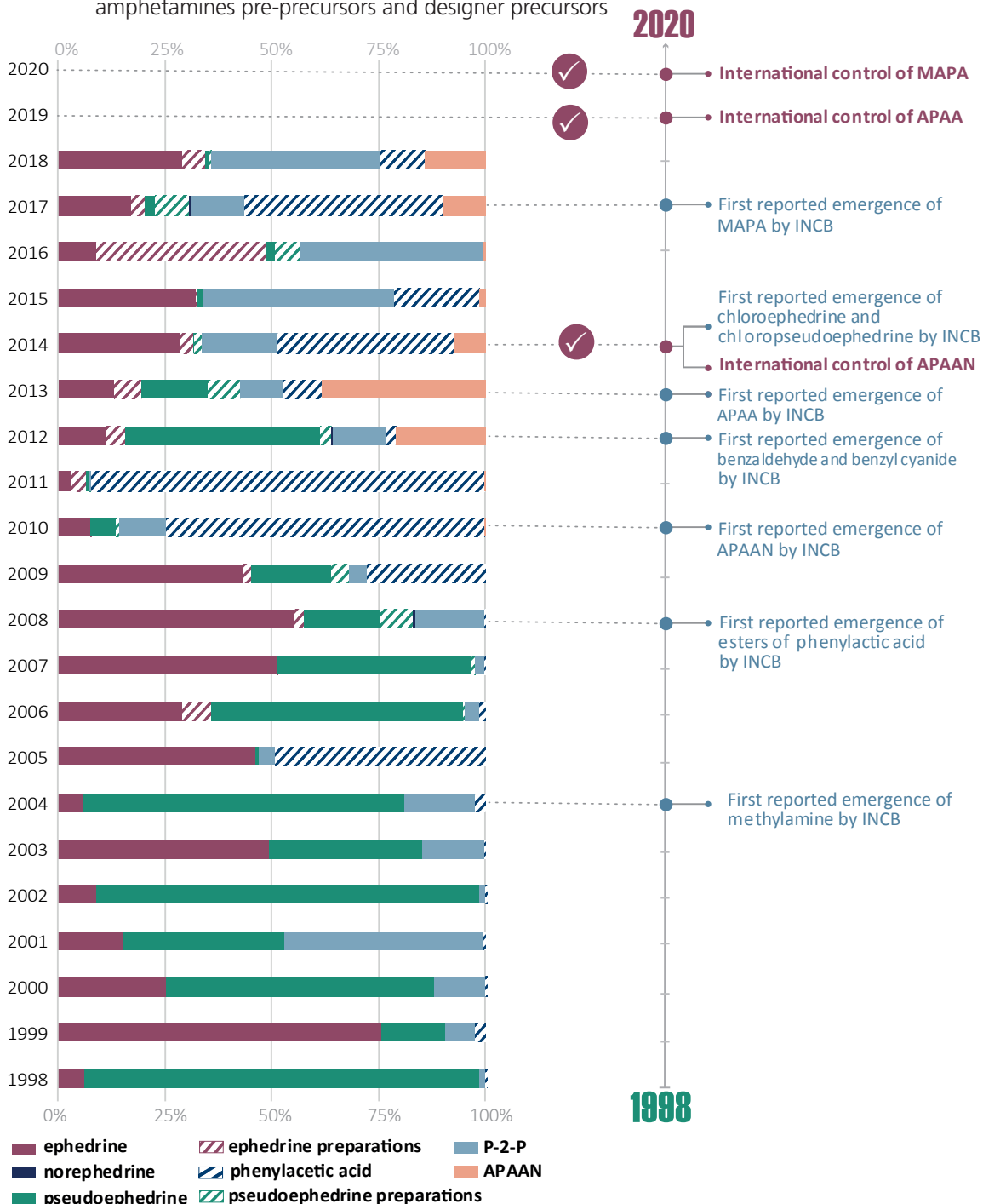
24 *Precursors and Chemicals Frequently Used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances: Report of the International Narcotics Control Board for 2018 on the Implementation of Article 12 of the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988* (E/INCB/2018/4).

25 UNODC, “Global Smart Update: the ATS market—10 years after the 2009 Plan of Action”, vol. 22 (October 2019).

26 Europol, SOCTA 2017: *European Union Serious and Organised Crime Threat Assessment—Crime in the Age of Technology* (The Hague, 2017).

27 INTERPOL, “Drug crime: global experts push for increased cooperation—Second INTERPOL Global Conference on Illicit Drugs highlights sophistication of organized crime groups”, 20 September 2019.

FIG. 15 Seizures of amphetamines chemical precursors under international control and emergence of amphetamines pre-precursors and designer precursors



Source: UNODC calculations based on INCB, *2019 Annual Report on Precursors* (E/INCB/2019/4) (and previous years) and United Nations Commission on Narcotic Drugs, *Report on the sixty-third session* (2-6 March 2020), C.CN.7/2020/15 (and previous years)

Note: The x-axis shows the proportion of seized internationally controlled amphetamines precursors converted into amphetamines equivalents. The substances seized were not necessarily the starting material, but may well have been substances found in the process of manufacturing.

Although hierarchically structured organized crime groups continue to dominate traditional criminal markets, some 30 to 40 per cent of the organized crime groups operating on an international level in the European Union in recent years were estimated by Europol to have been loose network structures.²⁸ The previously identified trend towards network-type structures²⁹ thus appears to be continuing.

The shift away from purely hierarchically organized crime groups, characterized by an extensive division of labour within such organizations, also entails the emergence of new groups engaged in specific activities, covering only limited aspects of drug manufacture and logistics or specific areas such as money-laundering and the investment of drug proceeds. Moreover, a number of new groups have emerged in recent years, bypassing many of the traditional actors, purchasing and selling drugs online through the darknet to end users. They make use of private or public postal services to transport drugs to anonymous post office boxes from which they are collected by the end users. The payment is made in parallel by means of cryptocurrency transactions on the darknet.³⁰

The way drug trafficking organizations operate has been influenced by the growth of licit international trade and by the emergence of new ways of transporting goods. Notably, the use of containers has increased, and GPS devices have helped to retrieve the drug cargo within the multitude of containers. In a few cases, organized crime groups have even succeeded in hacking the computers of shipping companies to have containers redirected to locations where the drugs could be more easily removed from the container.³¹

In parallel, technological innovation has also enabled drug trafficking groups to acquire semi-submersibles to transport drugs, such as cocaine, from South America to Central and North America and, more recently, even to Europe, without being easily detectable. Moreover, drones are being used by drug

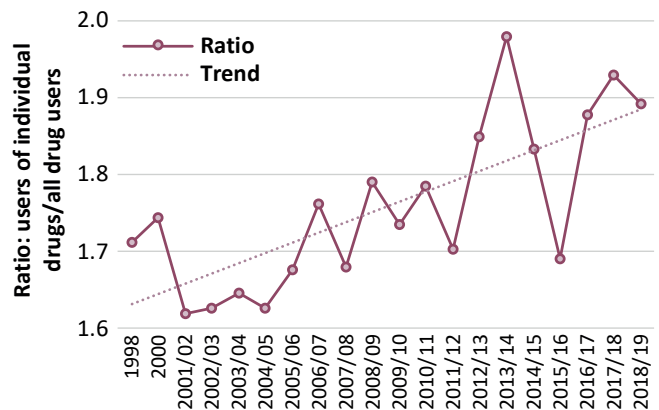
trafficking groups to assist them in the shipment of drugs across borders.³²

Another technological advance that has facilitated the connection of criminal groups is the emergence of encrypted messaging applications for mobile telephones, which have helped drug dealers to stay connected while maintaining a high degree of anonymity.

Polydrug use

Polydrug use is not a recent trend. It remains a public health concern because the use of multiple drugs potentially increases risks and exacerbates dependence. The management of polydrug use remains a complex and challenging task because treatment is often less successful for individuals who use multiple substances.³³ Moreover, it is difficult to find evidence to address the question about whether the complexity of the drug markets has increased over the past two decades in terms of the number of substances and combinations involved in polydrug use.

FIG. 16 Polydrug use in England and Wales, 1998–2018/19



Source: United Kingdom, Home Office, *Drug Misuse: Findings from the 2018/19 Crime Survey for England and Wales: Data Tables* (September, 2019).

Note: The ratio represented is the aggregated number of users of individual drugs divided by the total number of all (non-medical) drug users, based on annual prevalence.

28 Europol, SOCTA 2017: *European Union Serious and Organised Crime Threat Assessment*.

29 Europol, SOCTA 2013: *Serious and Organised Crime Threat Assessment* (The Hague, 2013).

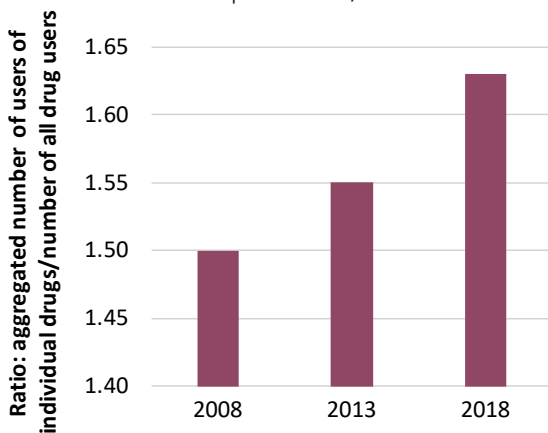
30 *World Drug Report 2019*.

31 *World Drug Report 2018*.

32 United States, Department of Justice, DEA, *2018 Drug Threat Assessment* (October 2018).

33 EMCDDA, "Policy and practice briefings: responding to polydrug use". Available at http://www.emcdda.europa.eu/best-practice/briefings/responding-polydrug-use_en.

FIG. 17 Polydrug use as reflected in the United States household survey, based on annual prevalence, 2008–2018



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2018 National Survey on Drug Use and Health: Detailed Tables*; and the results of that survey in previous years.

There is evidence that the number of polydrug users has increased in the United States³⁴ and in the United Kingdom because in both countries the ratio of the aggregated number of users of individual drugs compared with the total number of drug users has followed an upward trend. It is still difficult, however, to assess the actual impact of this trend in terms of health consequences.

Polydrug trafficking

Polydrug trafficking, i.e. trafficking in more than one drug, and its potential growth, definitely contributes to the growing complexity of drug markets as successes in reducing drug flows in one market can be easily compensated by supplying increasing quantities of other drugs. Polydrug trafficking may also require connections with different criminal groups as the supply chains for the various drugs may differ.

Evidence in Europe points to an increasing trend in polydrug trafficking organizations operating in the region as the majority of organized criminal groups

involved in the distribution of illicit drugs are already dealing in multiple types of drugs.³⁵

However, polydrug trafficking is not limited to Europe and can also be found in other regions and subregions, including North America, South America, Asia, Oceania and Africa.³⁶ For a number of years, for example, polydrug trafficking organizations have been dismantled in the United States. A recent example was the dismantlement in July 2019 of an organization involving more than 50 people selling counterfeit oxycodone pills (containing fentanyl), methamphetamine, cocaine, heroin and benzodiazepine pills, as well as various types of weapons.³⁷

Almost all major drug trafficking organizations operating in the United States appear to deal with more than one drug. For example, all the Mexican cartels operating in the United States (Sinaloa, Jalisco New Generation, Juárez, Gulf, Los Zetas and the Beltrán-Leyva Organization) engage in the trafficking of multiple substances, including methamphetamine, marijuana, cocaine, heroin and fentanyl.³⁸ While Colombian transnational crime organizations are mostly involved in cocaine trafficking and, to a far lesser extent, also of heroin, other groups such as Dominican transnational criminal organizations dominate the mid-level distribution of cocaine, white powder heroin and fentanyl in major drug markets in the United States. Asian transnational criminal organizations are more specialized in the trafficking of marijuana, MDMA and, to a lesser extent, cocaine and methamphetamine.³⁹

In Australia, a study found that polydrug trafficking was characterized by the larger quantities of drugs seized and polydrug traffickers by their larger networks, longer criminal histories and greater involvement in other types of serious crime compared with mono-drug traffickers. In the period 2009–2012, the substances found to be most

34 United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2018 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, August 2019).

35 Europol, SOCTA 2011: *European Union Serious and Organised Crime Threat Assessment* (The Hague, 2011).

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

37 United States Department of Justice, DEA, “Large-scale poly drug trafficking organization dismantled in Colorado”, 2 July 2019.

38 United States Department of Justice, DEA, *2018 National Drug Threat Assessment*.

39 Ibid.

involved in polydrug trafficking were amphetamines, followed by cocaine, precursor chemicals and heroin, while in the earlier period 1999–2008, the substances most frequently trafficked by polydrug trafficking groups included MDMA as well as precursor chemicals. On the basis of a number of assumptions and extrapolations, the authors of the study estimated that between 5 and 35 per cent of all drug imports crossing the Australian border may have involved polydrug trafficking groups. The number of drugs trafficked by polydrug traffickers was found to have increased over the period 1999–2012.⁴⁰

A 2007 study of imprisoned drug traffickers⁴¹ in the United Kingdom suggested that about a third of them dealt in more than one drug, mostly heroin and cocaine.⁴² Another study, based on middle-market drug traffickers, mostly involved in the sale of amphetamine, “ecstasy” and cocaine, found that 38 per cent of them were involved in dealing in more than one drug.⁴³

Even a higher proportion of traffickers were found to be polydrug traffickers in a Canadian study of 2011. Of almost 2,000 drug traffickers, it was found that 43 per cent were involved in polydrug trafficking – mainly of cannabis and cocaine.⁴⁴

Data obtained from the analysis of court proceedings against organized crime groups in Germany suggested an overall increase in polydrug trafficking:⁴⁵ about 35 per cent of all court proceedings against organized crime groups involved in drug

trafficking were of groups involved in polydrug trafficking in 2017, up from 25 per cent in 2013.⁴⁶

Apart from the involvement of traditional criminal groups and networks in polydrug trafficking, the emergence of platforms on the darknet may have also favoured polydrug sales. Most vendors on these platforms offer not only one drug but a range of drugs for sale. Thus, drug sales on the darknet are characterized by polydrug sales.⁴⁷

Drug market dynamics

The dynamics that have driven the expansion and increased the complexity of the current global drug market are multifaceted. Expressed simply, they can be defined as primarily (a) demand driven, (b) supply driven or (c) control driven. Some market evolutions clearly belong to one of those categories of triggers, but it is probably all three types that have characterized the major changes of the past two decades.

Demand-driven dynamics of drug markets are the result of changing patterns of drug use and the desire of users to experiment with new substances, which may lead to an increasing number of users starting a new habit. The establishment of the tramadol market for recreational use in certain regions may have initially been generated by an increased demand based on the supply available for medical use. But once a demand was generated, a new supply-driven phenomenon further expanded the market with illicitly manufactured products that were not part of the medical market.

Increases in drug use have at times also been supply driven, as users react to growing supply and the attendant falling prices by increasing their consumption of those drugs. This was the case with cocaine in recent years, among other drugs. Some of the recent changes in drug markets, such as the opioid crisis in North America and the rapid emergence of a synthetic drug market in the Russian Federation and Central Asia, can also be defined as supply-driven phenomena. The expansion of the synthetic

40 Caitling Elisabeth Huges and others, “Poly-drug trafficking: estimating the scale, trends and harms at the Australian border”, *International Journal of Drug Policy*, vol. 31, (May 2016), pp. 80–89.

41 This study was based on interviews of 222 imprisoned high-level drug traffickers (primarily imports and wholesale distributors).

42 Matrix Knowledge Group, *The Illicit Drug Trade in the United Kingdom*, 2nd ed., London (London, Home Office, 2007).

43 Geoffrey Pearson and Dick Hobbs, *Middle Market Drug Distribution*, Home Office Research Study, No. 227 (London, Home Office, 2001).

44 Aili Malm and Gisela Bichler, “Networks of collaborating criminals: assessing the structural vulnerability of drug markets” *Journal of Research in Crime and Delinquency*, vol. 48, No. 2 (February 2011), pp. 271–297.

45 Germany, Bundeskriminalamt, *Organisierte Kriminalität: Bundeslagebild 2017* (Wiesbaden, 2018).

46 Germany, Bundeskriminalamt, *Organisierte Kriminalität: Bundeslagebild 2018* (Wiesbaden, 2019), and editions of previous years.

47 Europol and EMCDDA, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*, (Luxembourg: Publications Office of the European Union, 2017).

drugs market in the Russian Federation seems to be mainly linked to the Hydra darknet platform. While there may now be an established user-based demand for synthetic drugs, the initial trigger was new suppliers. The rise of fentanyl in North America was not defined by a new demand either but was the result of opportunities seized by drug suppliers to reduce costs and thus increase profit margins.

Finally, there have also been some expansions of the drug markets that were basically control driven, as successful action by drug control authorities to restrict any specific substance prompted users to look for alternatives. Thus, some of the expansion of the NPS market over the last decade can be linked to the successes of law enforcement agencies in limiting the manufacture of “ecstasy” (mainly through improved precursor control).

Evolution of the primary drugs affecting people with drug use disorders

The evolution of drug markets over the past decade is not only related to an expansion. The types of most harmful drugs affecting regions and subregions has also changed over that period.

While the main drug treatment interventions in Asia and Europe continue to be linked primarily to opiates, in Africa to cannabis, and in South America to cocaine, in North America there has been a shift over the past decade from the predominance of cocaine to an increasing importance of opioids.

Marked shifts in the main drug for which patients receive drug treatment can also be observed at the subregional level. In a number of countries in East and South-East Asia, for example, methamphetamine has emerged as the predominant drug; in the Near and Middle East, “captagon” tablets (amphetamine), and along the eastern coast of Africa, heroin, have emerged as the predominant drugs.

Although in Europe opioids continue to be the predominant main drug for which people seek drug treatment, cocaine has become more common in Spain and methamphetamine remains the main drug of concern in Czechia.

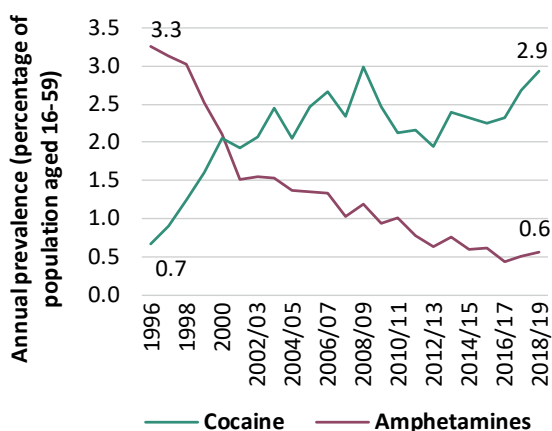
Within the amphetamines group, different patterns have developed in different subregions. For example, amphetamine continues to be the primary ATS of concern in Europe and in the Middle East, while

methamphetamine has emerged as the primary ATS of concern in East and South-East Asia and in North America.⁴⁸

Changes in stimulant markets

Within the shifts that have occurred over the past two decades in single drug markets, the most dynamic changes can be observed in the stimulant markets. The examples of individual countries show two possible evolutions in stimulant markets with different stimulants, showing either competing or parallel trends.

FIG. 18 Use of stimulants in England and Wales, 1996–2018/19



Source: United Kingdom, Home Office, *Drug Misuse: Findings from the 2018/19 Crime Survey for England and Wales: Data Tables* (September, 2019).

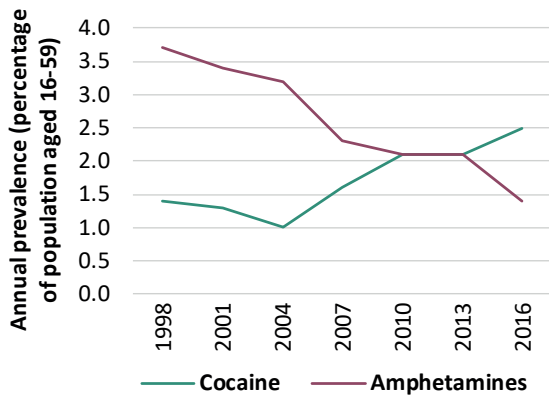
England and Wales and Australia are examples of places where cocaine and amphetamines have competed for their share of the stimulant market over the past 20 years.⁴⁹ Germany and the United States are examples of places where cocaine and amphetamines have together led the changes in the stimulant market.

There are no obvious reasons that explain the different dynamics related to stimulant substances in the same market, but one area to be explored is the stage of the market. If the market is saturated,

⁴⁸ UNODC, responses to the annual report questionnaire.

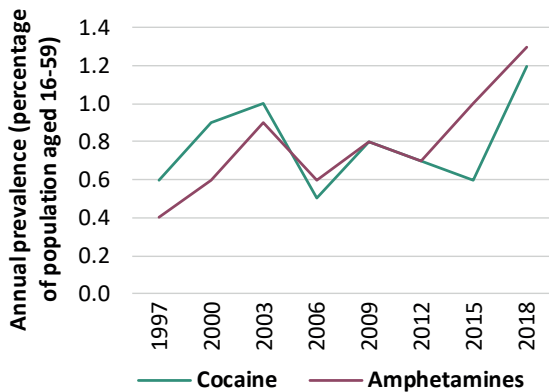
⁴⁹ United Kingdom, Home Office, *Drug Misuse: Findings from the 2018 to 2019 Crime Survey for England and Wales*, Statistical Bulletin 21/19 (London, September 2019).

FIG. 19 Use of stimulants in Australia, 1998–2016



Source: Australian Institute for Health and Welfare, *National Drug Strategy Survey 2016: Detailed Findings*, (Canberra, 2017); and that survey in previous years).

FIG. 20 Use of stimulants in Germany, 1997–2018

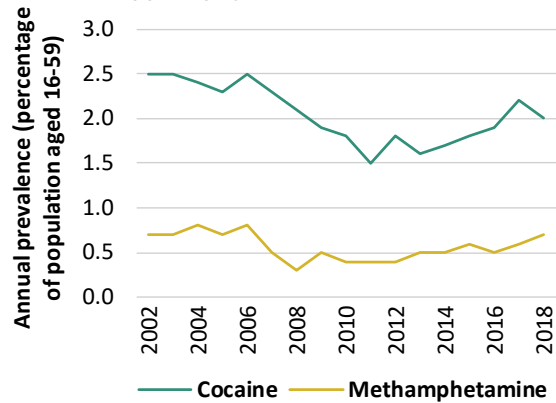


Source: Beobachtungsstelle für Drogen und Drogensucht, *Reitox Jahresbericht für Deutschland 2018* (Munich, 2019).

different substances may compete for the same share and, depending on supply conditions (price, availability), one prevails over the other. If the market is still expanding, both substances can push growth. Another area to be explored in order to understand the two different patterns is user preference and the flexibility of users to move from one substance to another.

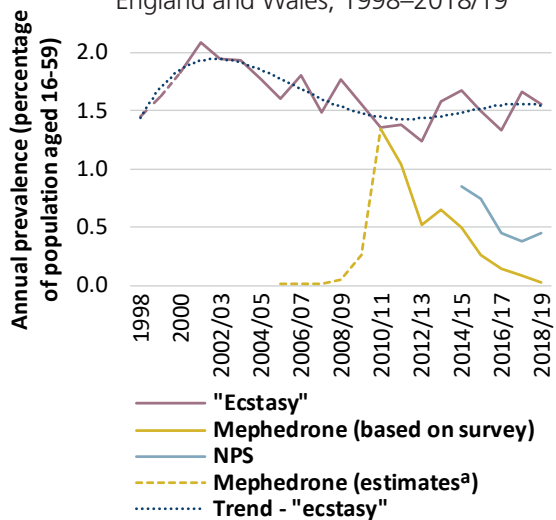
Within the stimulant markets, there are also examples of substitution effects in the “ecstasy” market. In England and Wales, for example, trend data on the use of “ecstasy”, mephedrone and NPS in the

FIG. 21 Use of stimulants in the United States, 2002–2018



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the 2018 National Survey on Drug Use and Health: Detailed Tables* (Rockville, Maryland, 2019).

FIG. 22 Use of “ecstasy”, mephedrone and new psychoactive substances in England and Wales, 1998–2018/19



Source: United Kingdom, Home Office, *Drug Misuse: Findings from the 2018/19 Crime Survey for England and Wales: Data Tables* (September, 2019).

^a Estimates derived from the British Crime Survey in 2010/11 and Forensic Science Service seizure statistics.

period 2005–2019 suggest that first mephedrone and later NPS filled the market space left by the decreasing supply of “ecstasy”, mainly due to a supply shortage, until 2012. Once “ecstasy” started to regain its previous share, the other substances declined sharply.

Rapid evolution in some subregional drug markets

In the context of the long-term dynamics of the global drug market, there are many different changes that have affected selected geographical areas. Within the past two decades some regions have seen a gradual transformation of their drug markets: methamphetamine has become the predominant drug in South-East Asia, amphetamine (“captagon”) in the Middle East, North America has been confronted with the opioid crisis, Africa has seen an expansion of its domestic heroin market, and countries in North and West Africa are now facing a tramadol crisis. More recently, two subregions, the Near and Middle East/South-West Asia and the Russian Federation/Central Asia, appear to have been affected by rapid changes in their drug markets, with new drugs taking a substantial share of the drug market.

Emergence and spread of methamphetamine in Near and Middle East/South-West Asia

In the past few years, the manufacture and use of methamphetamine have emerged in the Near and Middle East/South-West Asia, subregions that until

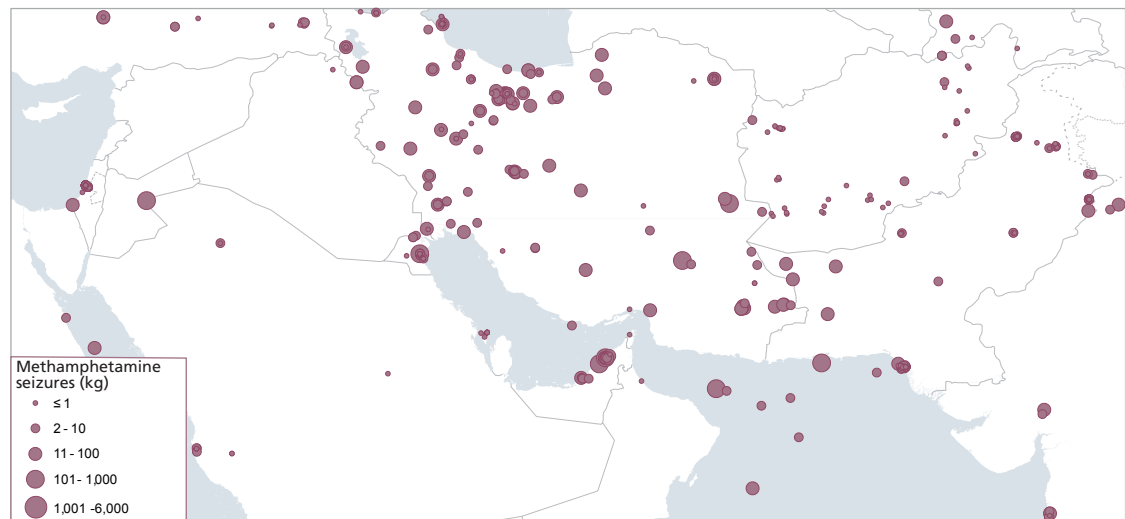
recently were dominated by use of “captagon”. Methamphetamine manufacture and consumption used to be largely unknown in those subregions.

Initially reported by only one country in the subregion (Israel), the number of countries reporting seizures of methamphetamine has increased in subsequent years. Overall, eight countries in the Near and Middle East/South-West Asia reported seizures of methamphetamine in the period 2000–2009, rising to 14 countries in the period 2010–2018. The bulk of the methamphetamine seized, however, continued to be seized by the Islamic Republic of Iran.

Much of the methamphetamine production in these subregions was originally intended for exports to the rapidly growing markets of East and South-East Asia, but domestic markets also appear to have started to emerge in the Near and Middle East/South-West Asia in recent years. Of 15 reporting countries in these subregions, 12 countries reported the use of methamphetamine by 2018 (or the latest year for which data are available).

In the absence of scientific data for the Near and Middle East/South-West Asia, qualitative information on trends in methamphetamine use reported

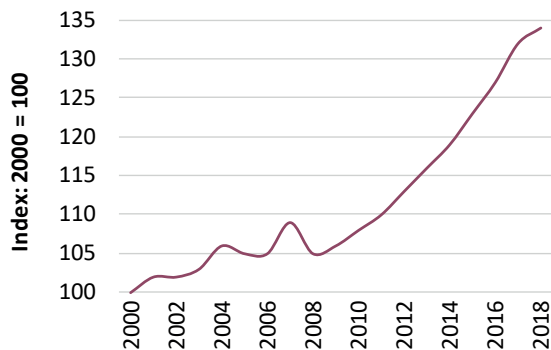
MAP 1 Significant individual seizures of methamphetamine, January 2012–December 2019



Source: UNODC, Drugs Monitoring Platform.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. 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.

FIG. 24 Reported trends in methamphetamine use in countries in the Near and Middle East/South-West Asia, 2000–2018



Source: UNODC, responses to the annual report questionnaire.

Note: The drug use trends index is based on qualitative information on trends in drug use reported by Member States. The trend line is computed on the basis of the number of countries reporting increases minus the number of countries reporting decreases (2 points for “strong increase”, 1 point for “some increase”, 0 points for stable, -1 point for “some decline”, -2 points for “strong decline”). Based on information from 13 countries (Afghanistan, Bahrain, Iran (Islamic Republic of), Israel, Jordan, Kuwait, Lebanon, Pakistan, Qatar, Saudi Arabia, State of Palestine, United Arab Emirates and Iraq).

by national authorities to UNODC give an indication of the threat experienced by the region. National authorities have reported a clear upward trend in methamphetamine use in those subregions.

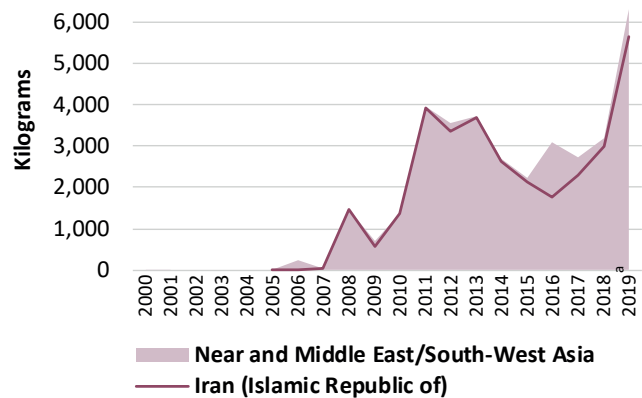
Methamphetamine appears to have emerged in the Near and Middle East/South-West Asia as the main ATS used in the Islamic Republic of Iran (2009–2018) as well as in Iraq (2016 and 2017), Lebanon (2014–2017), Bahrain (2016), Afghanistan (2015 and 2016), Israel (2014 and 2015) and Kuwait (2003, 2009, 2013).⁵⁰

The emergence of methamphetamine use in Iraq was reported in 2012, when, on the basis of data from medical and psychiatric hospitals, outpatient clients, health centres, surveys of medial patients and prisoners and law enforcement reports, the primary drugs of concern in Iraq were found to be “captagon”, crystalline methamphetamine and tramadol.⁵¹ A study conducted in 2015 reported

50 UNODC, responses to the annual report questionnaire.

51 Nesif Al-Hemiary and others, “Drug and alcohol use in Iraq: findings of the Inaugural Iraqi Community Epidemiological Workgroup”, *Substance Use and Misuse*, vol. 49, No. 13 (November 2014), pp. 1759–1763.

FIG. 23 Quantities of methamphetamine seized in the Near and Middle East/South-West Asia, 2000–2019^a



Sources: UNODC, responses to the annual report questionnaire; Sub-commission on Illicit Drug Traffic and Related Matters in the Near and Middle East, Country Report: Islamic Republic of Iran (UNODC/SUBCOM/54/CRP.8); Report of the International Narcotics Control Board for 2019 (E/INCB/2019/1).

^a First six months of 2019.

that drug users in Iraq thought that cannabis was “very difficult” to obtain while “captagon” and methamphetamine were “very easy” to obtain.⁵² Both official and media sources report a recent rapid increase in methamphetamine use in Iraq.^{53, 54}

Initially, law enforcement sources in Iraq suggested that methamphetamine was mainly smuggled into the country from the neighbouring Islamic Republic of Iran, across the long shared border, being smuggled to Basra in the south in particular.⁵⁵ However, there have been reports of the clandestine manufacture of methamphetamine inside Iraq.⁵⁶ In November 2016, for example, the Iraqi National Security Agency discovered methamphetamine laboratories in Basra and in the south-eastern province of Maysan.⁵⁷ In this context, INCB raised concerns

52 United States, Department of State, Bureau of International Narcotics and Law Enforcement Affairs, *Survey of Substance Abuse in Iraq: Final Report* (August 2015).

53 Noor Ali, “Combating illicit drug trafficking and treating drug abusers in Iraq”, *1001 Iraqi Thoughts*, 26 June 2018.

54 Alissa J. Rubin, “Iraq Faces a New Adversary: Crystalline Meth”, *New York Times*, 14 September 2019.

55 Al-Hemiary and others, “Drug and alcohol use in Iraq”.

56 E/INCB/2018/4.

57 Avinash Tharoor, “Meth Misuse and Production on the Rise in Iraq”, *Talking Drugs*, 18 January 2017.

over large-scale exports of pseudoephedrine preparations from Jordan to the Kurdish region of northern Iraq. While the officially reported estimate of pseudoephedrine used in Iraq in 2018 was approximately 10 tons, notified shipments of pseudoephedrine preparations sent through the Pre-Export Notification Online system were three times that amount. Those shipments took place even though the national authorities objected.⁵⁸

Most of the clandestine methamphetamine manufacture in the Near and Middle East/South-West Asia has traditionally been in the Islamic Republic of Iran, being manufactured both for the local market and for export to countries in East and South-East Asia (including Indonesia, Malaysia and Thailand) as well as for export to Central Asia and the Caucasus (Azerbaijan, Georgia and Tajikistan) and to Europe (including Bulgaria, France, the Russian Federation, Turkey and the United Kingdom).⁵⁹

However, the Islamic Republic of Iran is not the main source of the methamphetamine found in other countries in the Near and Middle East/South-West Asia (with the exception of Iraq and the Syrian Arab Republic). The main source countries for other countries in this subregion seem to continue to be countries in East and South-East Asia.⁶⁰ The extent of clandestine methamphetamine manufacture in the Islamic Republic of Iran actually appears to be declining,⁶¹ while manufacturing is rapidly increasing in neighbouring Afghanistan.

Recent large seizures of methamphetamine originated in Afghanistan, and studies have suggested that methamphetamine manufacture has increased in that country since 2016.⁶² Seizures of methamphetamine in Afghanistan have continued to increase, from 9 kg in 2014 and 29 kg in 2015, to 47 kg in 2016, 127 kg in 2017, 182 kg in 2018 and 657 kg in the first six months of 2019.⁶³ In parallel,

the use of methamphetamine in Afghanistan also appears to be increasing. Similar to the situation observed earlier in the Islamic Republic of Iran, studies in Afghanistan have shown that methamphetamine is frequently used concomitantly with opiates in an attempt to manage and/or offset the negative side effects of the use opiates.⁶⁴

Clandestine manufacture of methamphetamine appears to have begun in Afghanistan in 2014. One of the centres of that clandestine manufacture is the province of Herat, most notably the district of Ghoryian, located halfway between the provincial capital and the border with the Islamic Republic of Iran. This area is characterized by high levels of unemployment and a high proportion of residents who have been either refugees or guest workers in the neighbouring Islamic Republic of Iran, which has enabled some of them to acquire the necessary know-how for the clandestine manufacture of methamphetamine.⁶⁵

The main destination country of the methamphetamine manufactured in Afghanistan is the Islamic Republic of Iran. In 2018, Iranian authorities reported Afghanistan as the main source country for methamphetamine found on its territory.⁶⁶ INCB also raised concerns about the pseudoephedrine estimates submitted by the authorities of Afghanistan, which had to be seen “against the backdrop of a limited pharmaceutical industry, as well as of several reports of illicit methamphetamine laboratories in that country”.⁶⁷

The sudden spread of methamphetamine manufacture in Afghanistan seems to have prompted sharp price increases for cold and flu remedies containing pseudoephedrine in locations where methamphetamine manufacture is taking place.⁶⁸ Reports also indicate that the ephedra plant has been used as a

58 E/INCB/2018/4.

59 UNODC, responses to the annual report questionnaire.

60 Ibid.

61 Ibid.

62 David Mansfield, Organization for Sustainable Development and Research, and Alex Sonderholm, “Long read: the unknown unknowns of Afghanistan’s new wave of methamphetamine production”, website of London School of Economics, United States Centre, 30 September 2019.

63 *Report of the International Narcotics Control Board for 2019*

(E/INCB/2019/1).

64 UNODC, “Global Smart Update: Methamphetamine continues to dominate synthetic drug markets”, vol. 20 (September 2018).

65 Alim Latifi and Morteza Pajhwok-Karimi, “How narcotics brought meth labs to Afghanistan”, *TRTWorld*, 17 December 2018.

66 UNODC, responses to the annual report questionnaire.

67 E/INCB/2018/4.

68 Latifi and Pajhwok-Karimi, “How narcotics brought meth labs to Afghanistan”.

raw material for the production of ephedrine, one of the main precursors, instead of pseudoephedrine preparations as used in the Islamic Republic of Iran.⁶⁹ The ephedra plant appears to grow wild in the central province of Ghoriyan in Afghanistan, and traders from several parts of the country, including from the Provinces of Farah and Helmand, have started to purchase ephedra plants in various districts of Ghoriyan province. In addition, ephedra is now also reported to be grown in mountainous areas of other provinces, including Bamyán, Daykundi, Herat, Ghazni, Helmand, Kabul, Oruzgan and Wardak.⁷⁰ INCB also noted seizures by the Afghan authorities of locally grown ephedra in 2018.⁷¹

Shifts from opioids to stimulants in the Russian Federation and Central Asia

Significant changes have also taken place in the drug markets of the Russian Federation and Central Asia over the last few years, where synthetic drugs have emerged rapidly and apparently obtained a substantial market share, while the use of plant-based opiates has declined.

Data for the Russian Federation and Central Asian countries indicate a significant decline in both the use of and trafficking in opiates over the period 2008–2018. Seizures of opiates (expressed in heroin equivalents) fell in the Russian Federation by close to 80 per cent from 2008 to 2018, to less than 800 kg.

By contrast, quantities of stimulants seized rose twentyfold over the period 2008–2018, in particular seizures of ATS, which rose to almost 33 times the initial level. Moreover, according to seizure data, a variety of substances (internationally controlled or not) are now present in the synthetic drugs market: methamphetamine and various cathinones, including mephedrone and *alpha*-PVP.⁷² Also, together with the rise in seizures, the Russian authorities

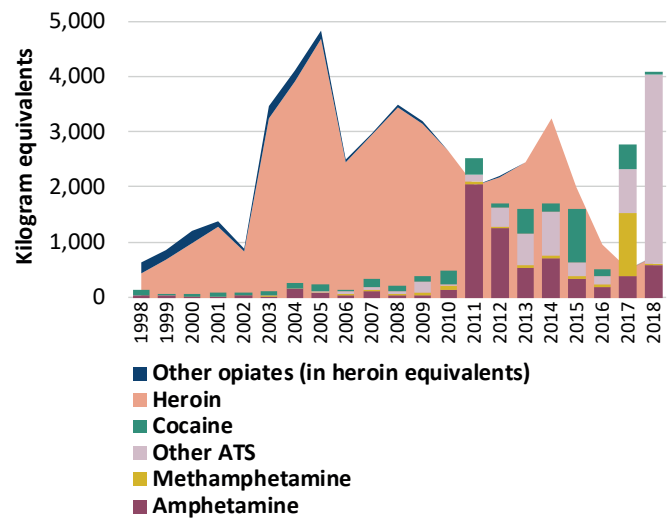
69 Ben Farmer, “Afghanistan sees boom in meth production as seizures of illegal drugs more than double”, *Telegraph*, 19 August 2019.

70 Mansfield, Organization for Sustainable Development and Research and Sonderholm, “Long read: the unknown unknowns of Afghanistan’s new wave of methamphetamine production”.

71 E/INCB/2018/4.

72 Russian Federation, official information provided to UNODC.

FIG. 25 Quantities of opiates and stimulants seized in the Russian Federation, 1998–2018



Source: UNODC, responses to the annual report questionnaire.

reported an increase in the number of dismantled clandestine laboratories manufacturing various drugs, rising from 36 in 2013 and 40 in 2015 to 68 in 2018.⁷³

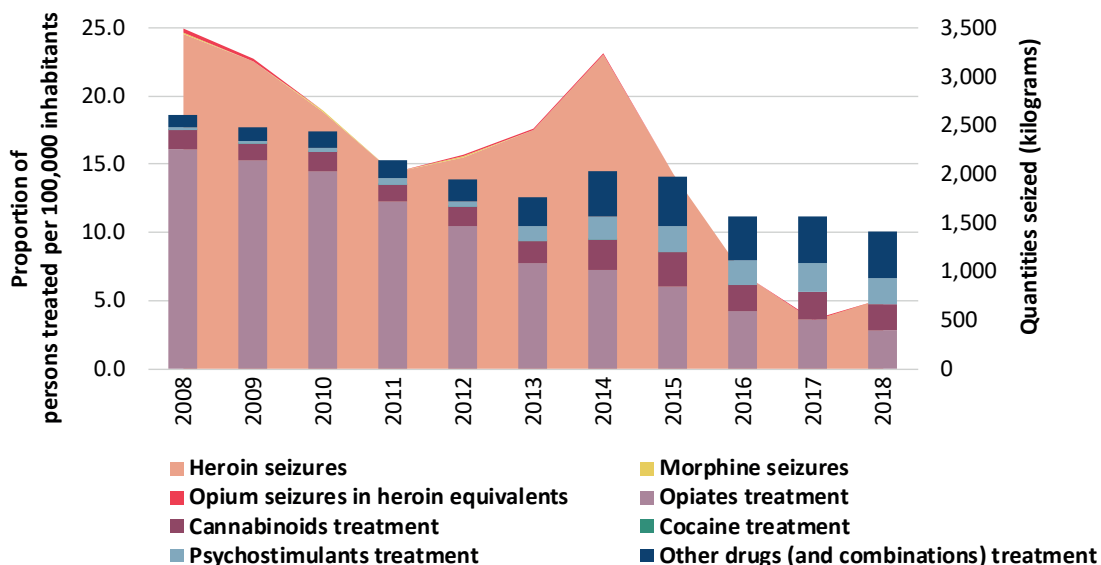
Similar patterns were also reported on the demand side. The proportion of treatment for opiates in overall first-time treatment demand fell from 87 per cent of the total in 2008 to 28 per cent in 2018, while treatment demand for the use of stimulants (mostly related to ATS) rose from 1 per cent to 19 per cent over the period 2008–2018. Despite the latter increase, overall drug treatment demand related to drug use appears to have declined by 46 per cent over the period 2008–2018.⁷⁴

The emergence of “new drugs” in the Russian Federation seems to be supply-driven as it may be, at least partly, linked to the rapid spread of the darknet in the Russian Federation. Data collected among a convenience sample of Internet users suggest that the Russian Federation may have the highest proportion worldwide of Internet users who use the

73 UNODC, responses to the annual report questionnaire.

74 Russian Federation, “Basic functioning indicators of the Narcological Service of the Russian Federation”, a set of statistical handbooks for 2008–2017, released by the National Research Centre on Addictions, branch of V. Serbsky NMRCPN.

FIG. 26 First-time drug treatment per 100,000 inhabitants and quantities of opiates seized in the Russian Federation, 2007–2018



Sources: UNODC, responses to the annual report questionnaire; and Russian Federation, “Basic functioning indicators of the Narcological Service of the Russian Federation”, a set of statistical handbooks for 2008–2017, released by the National Research Centre on Addictions, branch of V. Serbsky NMRCPN.

darknet for purchasing drugs; those who purchased drugs on the darknet represented 46 per cent of the drug users among the survey respondents in January 2018, rising to 86 per cent in January 2020.⁷⁵

These data are based on a non-representative sample and should be interpreted with caution, but they confirm evidence concerning the high penetration of the darknet in the Russian Federation linked to the emergence of the Russian-language Hydra market platform on the darknet.

An analysis of the Hydra market, based on web-scraping techniques, conducted in February 2019, revealed a total of 13,935 drug listings on the platform in one day, dominated by synthetic cathinones (39 per cent of all listings, notably *alpha*-PVP and mephedrone), cannabis, mostly marijuana (16 per cent) and hashish (14 per cent), traditional ATS, mostly amphetamine (10 per cent) and methamphetamine (1 per cent), cocaine (4 per cent), psychedelics (3 per cent), dissociatives (2 per cent) and opioids (2 per cent). The analysis also indicated

that, partly due to the increasing availability of drugs through the darknet, two thirds of the Russian population were now able to buy drugs instantly.⁷⁶ The importance of trafficking ATS through the darknet and/or through web shops is also indirectly reflected in the high proportion of ATS being shipped to end users and local retail traffickers by mail: 80 per cent in 2018 – a higher proportion than for most other drug categories in the Russian Federation.⁷⁷

⁷⁶ Alexey Knorre, Institute for the Rule of Law, European University at St. Petersburg, “Drug supply on the Russian Internet: an analysis of “Hydra” darknet cryptomarket”, presentation given at the Stockholm Criminology Symposium, International Society for the Study of Drug Policy conference, Stockholm, 10 June 2019.

⁷⁷ UNODC, responses to the annual report questionnaire.

⁷⁵ *Global Drug Survey 2020* and previous years.

THE OPIOID CRISES

Among people who use drugs, the non-medical use of opioids has always been associated with the most negative health consequences attributed to any drug type. The non-medical use of opioids has been responsible for the majority of drug-related deaths since these have been globally recorded. In the last few years, however, new threats have emerged in relation to opioids that have escalated the number of drug overdoses in some regions and rapidly increased the number of people with drug use disorders in others. This new opioid crisis is related to the non-medical use of pharmaceutical opioids. Whereas heroin remains the opioid of major concern for the great majority of countries and the population of opioids users, in some countries and regions the non-medical use of pharmaceutical opioids has triggered new health threats.

The non-medical use of pharmaceutical opioids is not a new phenomenon. It has been observed for decades as part of the polydrug use pattern among high-risk or regular opioid users. What characterizes the most recent opioid crisis is the emergence of non-medical use of pharmaceutical opioids as the main phenomenon, leading to alarming rates of dependence and overdose deaths at the national level. The subregions most affected by this crisis are North America and West, Central and North Africa, where different opioids and different dynamics are driving the threat. In North America, the introduction of fentanyl and its analogues (fentanyls) in the drug market has resulted in a syndemic of use of opioids characterized by an unprecedented increase in opioid overdose deaths. In West, Central and North Africa and the Middle East, tramadol – a pharmaceutical opioid not under international control – has emerged as a major opioid of concern. The drug, in addition to being diverted from the legal market, is mainly trafficked into those subregions in dosages higher than what is prescribed for pain management, with an increasing number of people with tramadol use disorder entering treatment.

The dynamics and the recorded consequences of tramadol in Africa and of fentanyls in North America are different. There are serious information gaps with respect to the tramadol market and its health

consequences in Africa. The rapid spread of non-medical use of tramadol is evident, but there is no measurable information on its impact on health (or on drug-related deaths and overdoses), whereas in North America the deadly consequences of the fentanyls have been well recorded and measured. Moreover, unlike tramadol, which is often chosen for use as the main compound, fentanyls are mixed in for use as adulterants in other drugs, with the result that users are often unaware that they are consuming them.

From what is known, it is possible to identify common threats and different dynamics in the two opioid crises, in Africa and in North America:

- The ease of manufacturing, easy accessibility and low-cost production make the illicit markets for tramadol and fentanyls substantially more profitable for traffickers than are other opioids such as heroin.
- The large-scale manufacture of tramadol and fentanyls for the illicit market started in a context of an absence of international regulations on tramadol and many fentanyl analogues or their precursors.
- The interchangeability (or substitution) of fentanyl and tramadol within the pharmaceutical and illicit drug markets makes it more difficult to address their misuse. Their non-medical use is also seen in the context of self-medication, and thus carries less stigma or is countered by lesser legal sanctions than is the case with other controlled drugs.

A key difference in the spread of the two opioids is that use of fentanyl is mainly supply-driven. In the case of tramadol, it is less clear. The market for non-medical use of tramadol in some areas may have started as a result of easy access in the unregulated pharmaceutical markets. Drug preference is to a large extent related to the availability of the drug more than to the individual liking of the substance used or misused, indicating that the tramadol crisis may have been mainly demand driven.⁷⁸ The health impacts of the surge in the two markets also appear

78 Mai Taha and others, “Cannabis and tramadol are prevalent among the first episode drug-induced psychosis in the Egyptian population: single center experience”, *Reports: Medic Cases, Images and Videos*, vol. 2 (June 2019), p. 16.

to be different: the emergence of fentanyl has not increased the number of persons who use opioids, but it has driven up the number of overdoses among existing users. Tramadol, on the other hand, seems to have driven use among a wider segment of the population and in an increasing number of people in treatment, more than driving up the number of deaths, although reliable information on overdoses is not available for Africa.

The following sections of this chapter look at the market development of the two opioids, fentanyl and tramadol, with the aim of improving understanding of the factors that may have contributed to their spread, some of the potential threats posed by their misuse.

Opioid crisis in North America

The opioid crisis in North America has been characterized by the triple and interlinked epidemic of non-medical use of pharmaceutical opioids, use of heroin and use of fentanyl (i.e., fentanyl and its analogues) that are mostly illicitly manufactured and are primarily sold as falsified pharmaceutical opioids or are laced with heroin or other drugs.

The opioid epidemic in the subregion has led to an increasing number of overdose in some geographical areas (western Canada and the eastern United States), although the epidemic now appears to be steadily expanding to other areas. Although geographically disconnected, the areas that were initially affected by the opioid crisis in Canada and the United States have experienced remarkably similar market dynamics, which can be broadly described in the following sequential steps:

- (a) High rates of prescriptions for pharmaceutical opioids leading to diversion and an increase in the non-medical use of pharmaceutical opioids, opioid use disorders and an increase in opioid overdose deaths
- (b) Regulations introduced to reduce diversion and non-medical use of pharmaceutical opioids (e.g., tamper-proof formulations to prevent injecting)
- (c) Partial resurgence of heroin use, resulting in an increase in heroin overdose deaths from 2010 onwards, fentanyl introduced as an adulter-

ant in heroin, and a further increase in heroin overdose deaths (from 2014 onwards), while the number of pharmaceutical opioid overdose deaths began to stabilize

- (d) Fentanyl (illicitly manufactured in clandestine laboratories) and its analogues emerge as adulterants in heroin and stimulants (cocaine and methamphetamine) and are sold as falsified pharmaceutical opioids, resulting in massive increases in deaths attributed to fentanyl
- (e) Fentanyl emerge as the dominant opioid in opioid overdose deaths, as well as contributing to overdose deaths attributed to other drugs
- (f) Overdose deaths attributed to pharmaceutical opioids and heroin (alone) stabilize or show small declines
- (g) Fentanyl-related deaths are the main contributor to total opioid overdose deaths; they continued to increase in 2018 although at a lower rate than previously

These dynamics are now gradually spreading outside the originally affected regions in both Canada and the United States. If the latest observed tail of the epidemic in some states of the United States is bringing a relative stabilization in the national total of overdose deaths, it is not yet clear whether this is a sign of the epidemic having plateaued. If similar dynamics and intensity of the epidemic, as were experienced initially in the states in the East of the United States and the Western provinces of Canada, extend to other states or provinces, the associated harm, including overdose deaths, may continue rising.

The scientific literature has attempted to understand the reasons for the sudden rise of fentanyl in pre-existing opioid markets. It seems that an interplay between a number of external factors and local market dynamics played a role in the spread of the opioid crisis in North America. Some of the factors that have led to the rise and continued presence of fentanyl include: (a) the diffusion of simpler and more effective methods of manufacture of synthetic opioids and their analogues (primarily fentanyl); (b) a lack of effective control of precursors and oversight of the manufacture industry; (c) expanding distribution networks; (d) reduced smuggling risks because of new methods of trafficking within the expanded licit trade; and (e) pre-existing market

conditions (demand for opioids and potential supply shocks).⁷⁹

What seems clear is that the fentanyl market is supply-driven. While some authors have documented a niche market of users among whom there is a conscious demand for fentanyl, most opioid or stimulant users are not looking for fentanyl specifically and are often unaware of their use as an adulterant.

Developments in the United States

Opioid overdose deaths

In the United States, there are early signs of stabilization of the opioid crisis, although misuse levels remain high. One of the major adverse health outcomes of the opioid crisis has been the unprecedented number of fatal overdose cases linked to opioids. Between 2007 and 2018, the total number of all overdose deaths in the United States nearly doubled while the number of overdose deaths attributed to opioids increased 2.5-fold, from 18,515 deaths in 2007 to nearly 47,000 deaths in 2018. It is important to keep in mind that there is more than one drug type involved in most overdose cases. Furthermore, even for opioids there is a considerable mixing of different opioids along with other drugs. For instance, in 2018 more than one third of overdose deaths involving pharmaceutical opioids and more than half of those involving heroin also involved fentanyl.

By December 2018, the number of overdose deaths had declined by 4 per cent, and overdose deaths attributed to opioids and heroin had declined by less than 2 and 3 per cent, respectively, compared with a year earlier.⁸⁰ The major decline in overdose deaths from 2017 to 2018 is clearly seen in overdose deaths attributed to pharmaceutical opioids, which declined by 12 per cent.

The decline in overdose deaths attributed to opioids could in part be attributed to the community-wide

availability of naloxone for the reversal of opioid overdose, in addition to a continued decline from 2012 to 2018 in overall opioid prescription rates. The rate of prescription of opioids in the United States fell to 51.4 prescriptions per 100 persons (a total of more than 168 million opioid prescriptions) in 2018 from a peak of 81.3 opioid prescriptions per 100 persons (or 255 million opioid prescriptions) in 2012. The opioid prescription rate in the southern United States remains high, however, with most states in the region reporting opioid prescription rates of 64 or more per 100 persons in 2018.⁸¹ A number of factors at work, including advertising by the pharmaceutical industry, physicians' prescription practices, dispensing and medical culture and patient expectations have, since the new millennium, resulted in high prescription rates and dosages of opioids given for an extended duration of care, primarily for the management of acute to chronic non-cancer pain.⁸² These practices have also enabled the diversion and misuse of pharmaceutical opioids, together with a greater risk of opioid use disorders among those with a legitimate prescription.⁸³

Nevertheless, these gains in the reduction of overdose deaths attributed to pharmaceutical opioids have been partly offset by the continuing increase in deaths attributed to synthetic opioids and, in particular, those attributed to fentanyl, which have increased by 10 per cent over the past year. In United States overdose data, for instance, fentanyl is generally designated as "illicitly manufactured fentanyl" because it is not diverted from licit channels but is either trafficked into the country or, to a lesser extent, manufactured locally in clandestine laboratories.⁸⁴ Overall, in 2018 overdose deaths attributed to synthetic opioids, comprising mainly

79 Bryce Pardo and others, *The Future of Fentanyl and other Synthetic Opioids* (Santa Monica, California, RAND Corporation, 2019).

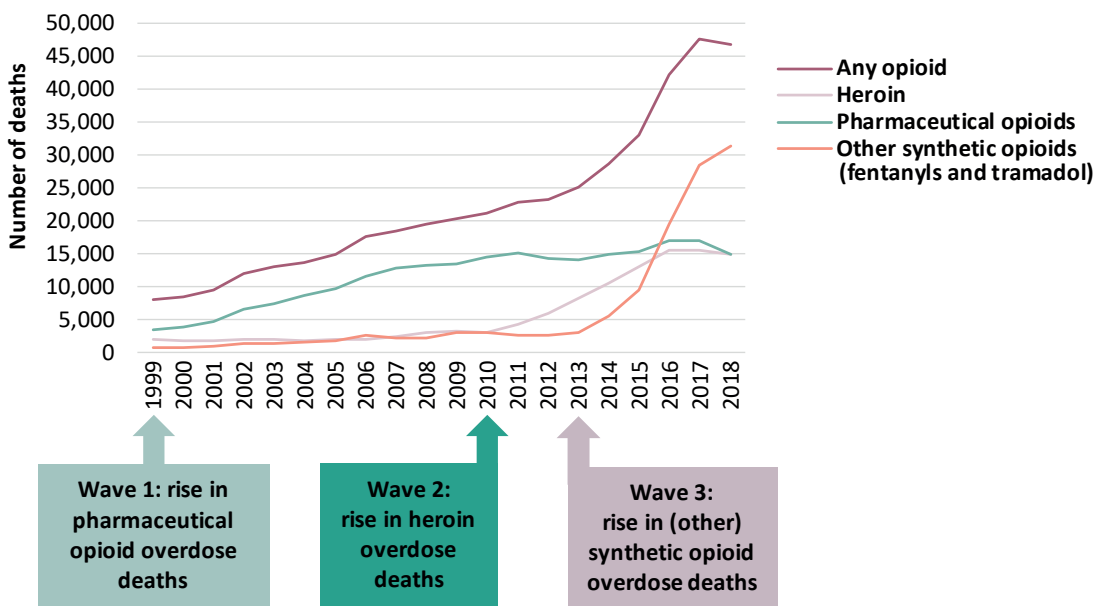
80 Holly Hedegaard and others, "Drug Overdose Deaths in the United States, 1998-2019", National Center for Health Statistics Data Brief, no 356, Centers for Disease Control and Prevention, National Center for Health Statistics, January 2020.

81 Centers for Disease Control and Prevention, US Opioid Prescribing Rate Maps. Available at <https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html>.

82 Benedikt Fischer and others, "Non-medical use of prescription opioids and prescription opioid-related harms: why so markedly higher in North America compared to the rest of the world?", *Addiction*, vol. 109, No. 2 (February 2014), pp. 177-181.

83 See also *World Drug Report 2019: Depressants* (United Nations publication, Sales No. E.19.XI.8 (Booklet 3)).

84 Fentanyl diverted from the legitimate market, prescribed in the form of transdermal patches, or lozenges, but is of only limited importance for the United States. United States, Department of Justice, DEA, *2018 National Drug Threat Assessment* (October 2018).

FIG. 27 Opioid overdose deaths in the United States, 1999–2018

Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999–2018".

fentanyl, accounted for nearly half of the total overdose deaths in the United States. Among the reasons for the high number of overdose deaths attributed to fentanyls are their often small lethal doses relative to other opioids: fentanyl, for example, is approximately 100 times more potent than morphine, and carfentanil may be as much as 10,000 times more potent than morphine for an average user. A lethal dose of carfentanil for a human can be as low as 20 micrograms.

The rapid expansion of fentanyl use in the United States is also visible in the data on seizures and the drug samples analysed, with a considerable increase since 2014 in the number of samples identified as fentanyl. In 2018, fentanyl accounted for 45 per cent of the pharmaceutical opioids that were identified in different samples, while oxycodone accounted for 14 per cent. Furthermore, while over the years fentanyl has been the predominant substance seized of the overall group of fentanyls (the structurally related opioids), those fentanyl analogues have also proliferated in the United States. As a percentage of all pharmaceutical opioid samples seized and identified in 2018, some fentanyl analogues were notable: acetylfentanyl accounted for nearly 4 per cent of

identified samples, and fluoroisobutyrylfentanyl, methoxyacetylfentanyl and cyclopropylfentanyl each accounted for less than 1 per cent.

Regional variations in opioid overdose deaths

The opioid crisis is concentrated differently across geographical regions of the United States. Opioid overdose deaths are consistently higher than the national average, which was 14.6 per 100,000 population in 2018, in the states east of the Mississippi river, including West Virginia (42.4 per 100,000 population in 2018), Maryland (33.7 per 100,000 population), New Hampshire (33.1 per 100,000 population) and Ohio (29.6 per 100,000 population), and lower than the national average in the western states of the United States.⁸⁵ This concentration of opioid overdose deaths becomes more evident in the case of overdose deaths attributed to fentanyls. Many states east of the Mississippi river, such as West Virginia (34 per 100,000), New Hampshire (31.3 per 100,000), Ohio (25.7 per 100,000),

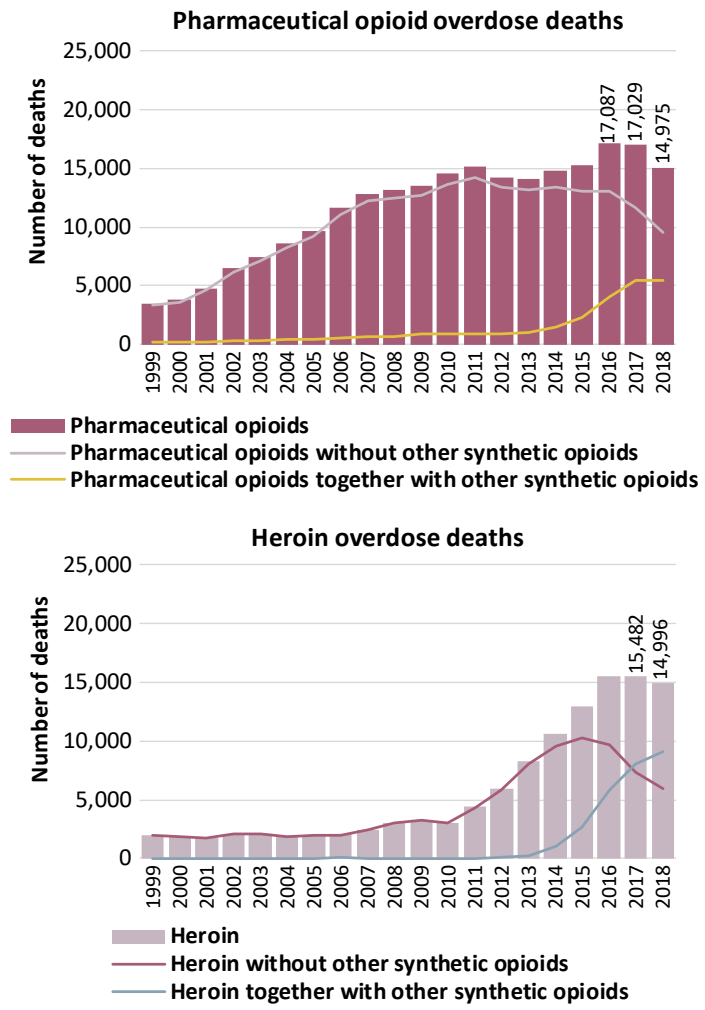
85 United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999–2018".

and the District of Columbia (22.6 per 100,000) had rates of overdose deaths attributed to synthetic opioids that were multiple times higher than the national average of 9.9 deaths per 100,000 population in 2018. In the western United States, the rates are much lower: in 2018, overdose deaths attributed to fentanyl amounted to 2.2 per 100,000 population in California and 2.9 per 100,000 population in Washington.

The synthetic opioid crisis, driven primarily by fentanyl and fentanyl analogues, appears to be migrating from the eastern states of the United States to the western states. The western states have reported the lowest overdose deaths attributed to synthetic opioids since 2011. Nevertheless, the rates of synthetic opioid overdose deaths in the western states have increased by 3.5-fold over the past five years. While the rates of overdose deaths attributed to synthetic opioids are persistently higher in the eastern states than in other parts of the country, in 2018 many of the states east of the Mississippi river that had a high prevalence of synthetic opioid use (mainly fentanyl) reported a decline in overdose deaths attributed to fentanyl. The largest decline was reported in Ohio (a decline of 21 per cent), followed by Georgia (a decline of 17 per cent), while other states such as Missouri, Tennessee, Illinois and South Carolina showed a significant increase in the number of synthetic opioid overdose deaths between 2017 and 2018. On the other hand, many states west of the Mississippi river, while still reporting low numbers of fentanyl-related overdose deaths, recorded an increase in such overdose deaths over the period 2017–2018. Arizona recorded a 93 per cent increase, followed by California (69 per cent), Washington (53 per cent) and New Mexico (46 per cent).⁸⁶

In some of the states, such as New Hampshire in the north-eastern United States, where fentanyl first appeared, mixed with other substances, fentanyl has now emerged as a standalone substance for use rather than as an adulterant. Synthetic opioids predominate overdose there despite a considerable reduction in overdose deaths attributed to pharmaceutical opioids and heroin.

FIG. 28 United States: number of overdose deaths attributed to pharmaceutical opioids and heroin, 1999–2018



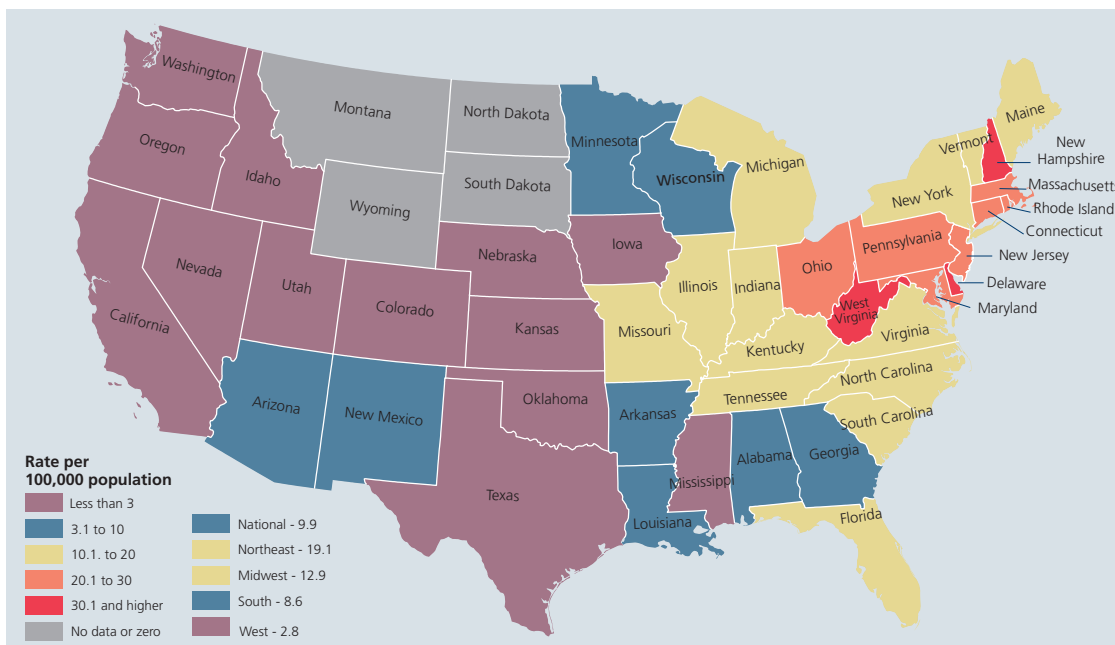
Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999–2018".

The uneven spread of fentanyl in the United States is also visible in supply indicators

The differential availability of synthetic opioids and evolution of the synthetic opioid crisis are also visible in seizure data. Data on the steady increase in fentanyl samples seized and analysed suggest that the availability and supply of fentanyl continues to be more concentrated east of the Mississippi river than west of it. In 2018, fentanyl accounted for the highest percentage of seized pharmaceutical opioid

86 Ibid.

MAP 2 Synthetic opioid overdose deaths, age-adjusted rates per 100,000 people, in the United States, 2018

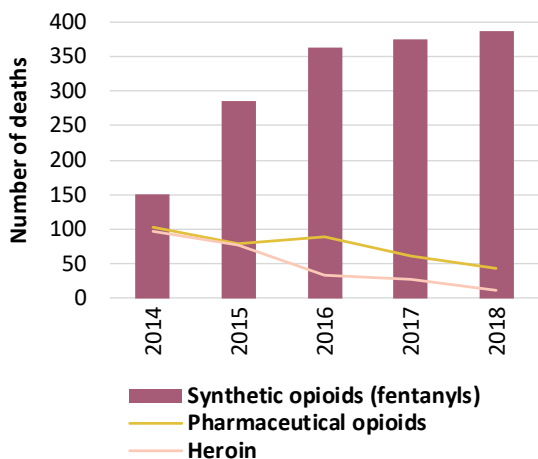


Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999–2018".

Note: Alaska and Hawaii are not shown because valid estimates do not exist for these two States.

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

FIG. 29 New Hampshire, United States: number of opioid overdose deaths, by type, 2014–2018



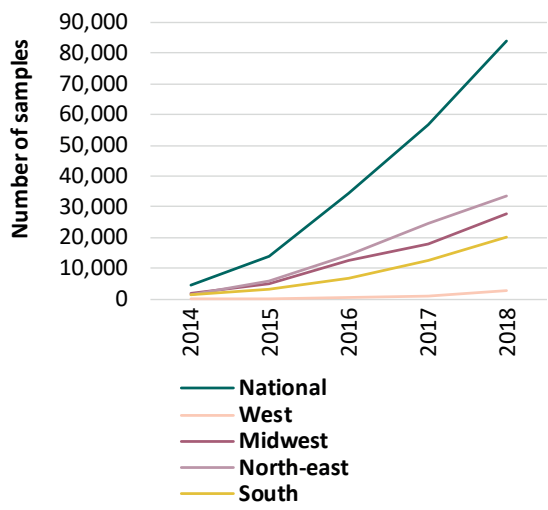
Source: United States, Centers for Disease Control and Prevention, National Center for Health Statistics, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER), "Multiple cause of death 1999–2018".

samples in the north-eastern United States and the Midwest (40 per cent and 33 per cent, respectively), which are regions of the country with a higher prevalence of heroin use and of overdose deaths attributed to synthetic opioids. Although fentanyl samples that were seized and analysed in the western parts of the country make up only 3 per cent of the total samples seized and analysed nationally, over the years those parts of the country are actually where the share has increased the most.⁸⁷

It is not clear why synthetic opioids are differentially available in the United States. It may in part be an artefact of regional differences in user preferences, or it may be a business model that is more successful in some markets than others. It has also been argued that one regional difference driving the

⁸⁷ While the reporting of the National Forensic Laboratory Information System of fentanyl samples seized and analysed are spatially concentrated in the eastern regions of the United States, this concentration may also reflect the efforts of law enforcement authorities as well as the capacity of local laboratories to analyse the seized samples.

FIG. 30 Fentanyl samples submitted to and analysed by forensic laboratories, by region, United States, 2014–2018



Source: United States, Department of Justice, DEA, Diversion Control Division, National Forensic Laboratory Information System, reports for different years.

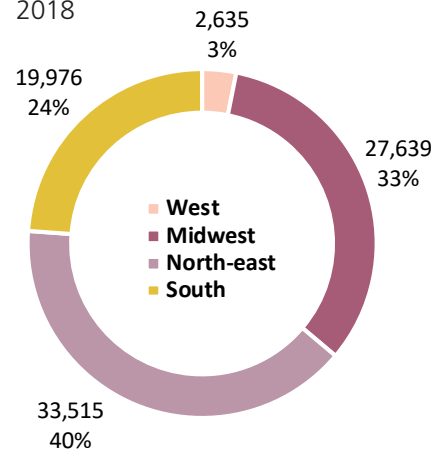
opioid crisis could be attributed to the predominant type of heroin available or supplied in the market. The western states of the United States are supplied with significant amounts of “black tar”, a dark-coloured heroin (base) which is less often adulterated with fentanyls than white the powder form of heroin (hydrochloride), which is predominant in the markets of the north-eastern United States.^{88, 89}

Overall deaths: apparent stabilization but potential for increase

Overall, the main impact of the overdose deaths in the United States, especially those due to synthetic opioids (including fentanyls), is seen in urban counties, where large fringe metro areas (i.e., counties with 1 million or more population), followed by medium-sized metro counties (those with a population ranging between 250,000 and 999,999), had the highest rates of synthetic opioid overdose deaths in 2018, at, respectively, 12.7 and 10.5 overdose deaths per 100,000 population.⁹⁰ The opioid

88 United States, Congressional Research Service, “Heroin trafficking in the United States” (Washington D.C., 14 February 2019).
 89 United States, Department of Justice, DEA, *2018 National Drug Threat Assessment*.
 90 Nana Wilson and others, “Drug and opioid-involved over-

FIG. 31 Number and percentage of fentanyl submitted to and analysed by forensic laboratories, by region, United States, 2018



Source: United States, Department of Justice, DEA, Diversion Control Division, “National Forensic Laboratory Information System: NFLIS-Drug 2018 annual report” (Springfield, Virginia, 2019).

overdose death rate continued to increase in those urban counties over the period 2017–2018

Another aspect that compounds the situation with drug overdose deaths is the contributing influence of multiple drugs, as there is more than one substance involved in most overdose deaths. The decision on which drug or drugs could have contributed to mortality is based on determining the presence of toxicologically meaningful levels of a drug or multiple drugs found during forensic examination. This is an important consideration, for example, in the western United States where psychostimulants such as methamphetamine contribute to a significant proportion of overdose deaths, while heroin-related and fentanyl-related overdose deaths are ranked second and third, respectively.⁹¹ The latter two substances also contribute to a significant number of overdose deaths attributed to psychostimulants. As is the case with heroin- and pharmaceutical opioids-related overdose deaths, the increase in overdose deaths attributed to cocaine

dose deaths – United States, 2017-2018” *Morbidity and Mortality Weekly Report*, March 2020;69 (11); pp.290–297.
 91 Holly Hedegaard and others, “Regional differences in the drugs most frequently involved in drug overdose deaths: United States 2017”, *National Vital Statistics Reports*, vol. 68, No. 12 (October 2019).

and psychostimulants (primarily methamphetamine) that has been observed across the United States is also associated, to a large extent, with the increasing co-involvement of synthetic opioids.

Over the period 2015–2018, the absolute number of overdose deaths attributed to cocaine more than

doubled, with nearly 60 per cent of cocaine overdose deaths in 2018 involving synthetic opioids; similarly, overdose deaths attributed to psychostimulants (primarily methamphetamine) also more than doubled over the same period, with more than a quarter also involving synthetic opioids. Finally, there was also an increase in overdose deaths attributed to benzodiazepines in that same period, with nearly half of those deaths involving synthetic opioids. This suggests that people using drugs other than opioids as a primary substance are increasingly exposed to fentanyl and other potent synthetic opioids.⁹²

These indicators suggest that while there are early signs of a stabilization in the number of overdose deaths in the United States, deaths involving synthetic opioids continue to pose a threat to public health and safety, particularly as the use and availability of these substances continue to make their way westward and are incorporated into the heroin and non-opioid drugs market.

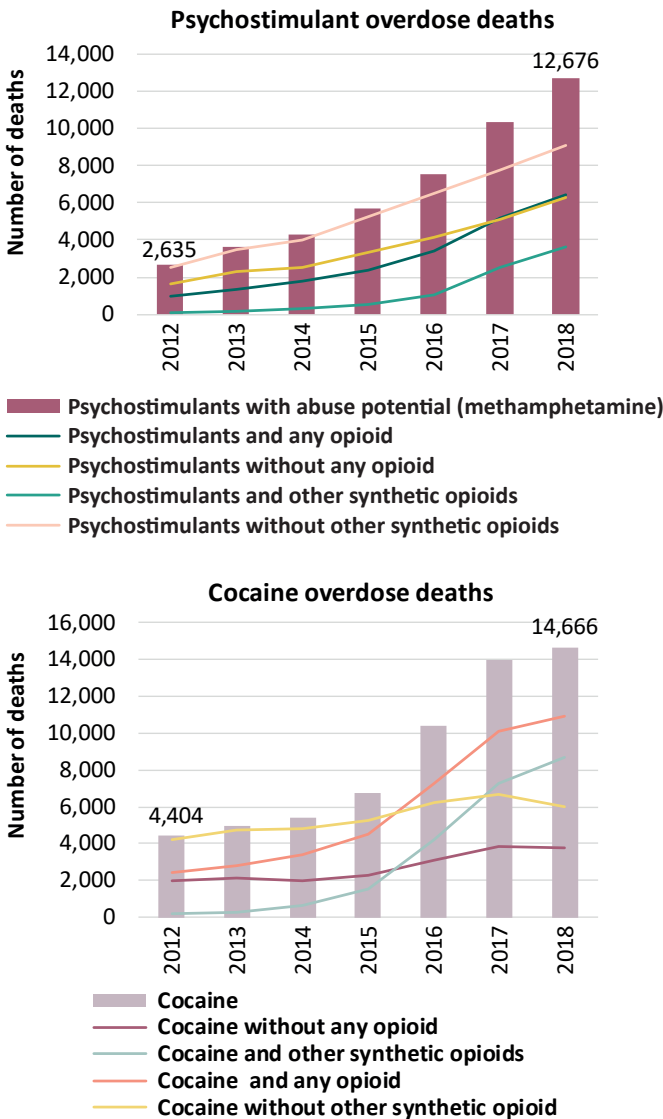
Opioids use appears to be stabilizing

In contrast to the changes observed in the number of opioid overdose deaths, the National Survey on Drug Use and Health suggests that the number of people reporting having used heroin in the past year has remained fairly stable over the past five years, while the number of people reporting past-year non-medical use of pharmaceutical opioids has declined in each of the past three years.

Among those who reported past-year non-medical use of pharmaceutical opioids in 2018, hydrocodone remained the predominant pharmaceutical opioid used, whereas about 2 per cent had misused fentanyl products (diverted from legal sources). The results of the National Survey on Drug Use and Health suggest that the demand for fentanyl by itself remains low among those using opioids. Nevertheless, given that the survey excludes the institutionalized and the homeless populations, which may have disproportionately higher rates of non-medical use of opioids, these estimates are probably an underestimate of the true extent of such use in the United States. Nevertheless, such a large discrepancy

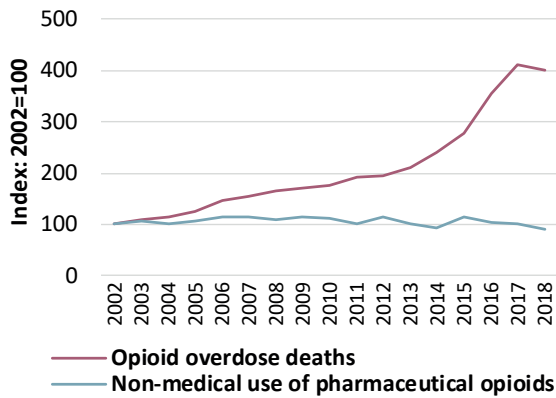
92 Bryce Pardo and others, “The synthetic opioid surge in the United States: insights from mortality and seizure data”, document No. RR-3116-RC (Santa Monica, California, RAND Corporation, 7 November 2019).

FIG. 32 United States: overdose deaths attributed to cocaine and psychostimulants, with and without opioids, 2012–2018



Source: United States, Centers for Disease Control and Prevention, Wide-ranging Online Data for Epidemiologic Research, “Multiple cause of death (Detailed mortality), 1999–2018”.

FIG. 33 Trends in non-medical use of opioids and opioid overdose deaths in the United States, 2002–2018

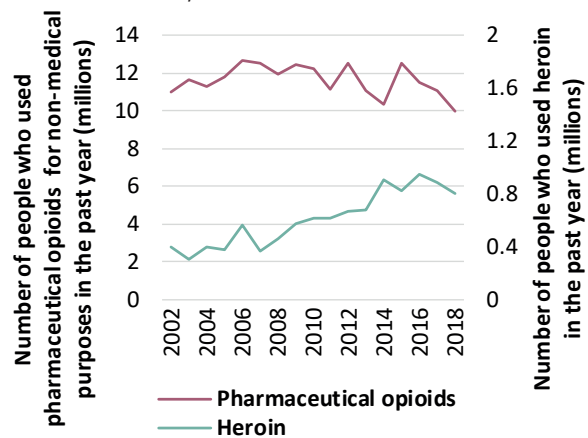


Sources: United States, Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (Rockville, Maryland, 2019); United States, Centers for Disease Control and Prevention, National Center on Health Statistics, "Provisional drug overdose death counts".

in the trend between opioid overdoses and non-medical use of opioids suggests that the opioid crisis has increased the harms associated with opioid use rather than the number of people who use them.

In 2018, approximately 10.3 million people (3.7 per cent of the population aged 12 years or older)

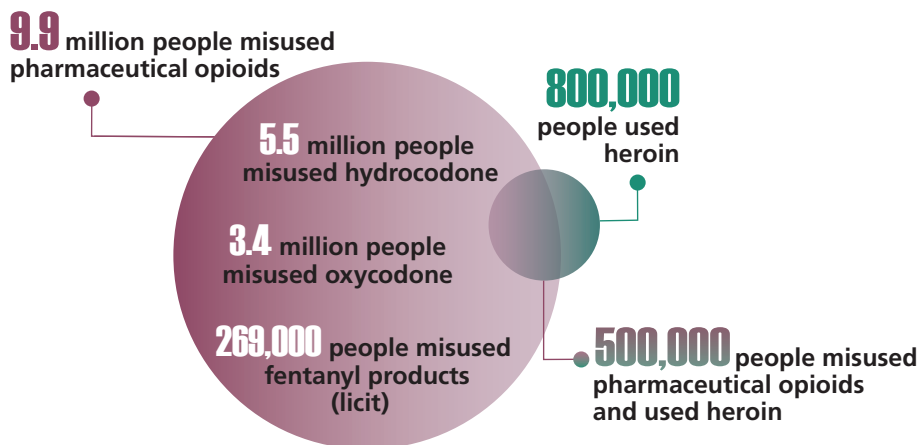
FIG. 34 Trends in use of heroin and non-medical use of pharmaceutical opioids, United States, 2002–2018



Source: United States, Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*.

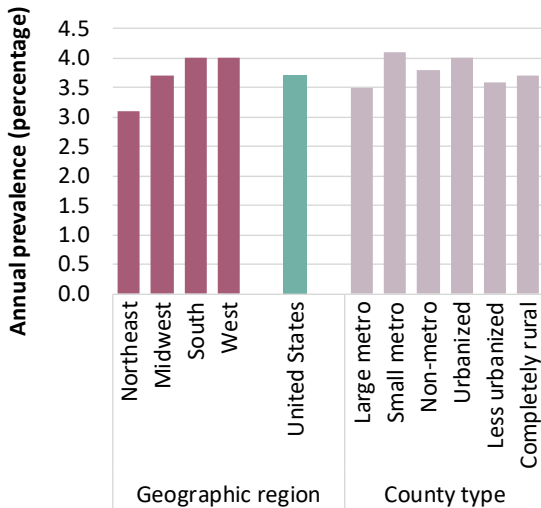
had misused opioids in the past year in the United States. Most of them, 9.9 million (3.6 per cent of the population aged 12 years and older), reported non-medical use of pharmaceutical opioids, while almost 800,000 reported past-year use of heroin (comprising just 8 per cent of the total population who reported past-year misuse of opioids).

FIG. 35 Past-year misuse of pharmaceutical opioids and heroin in the United States, 2018



Source: United States, Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*.

FIG. 36 Opioids use, by geographical region and type of county, United States, 2018



Source: United States, Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*.

What has driven the fentanyl crisis that began in 2013?

The unprecedented dynamic that has emerged in the United States is the persistence of fentanyls in the market from 2013 onwards. Local outbreaks of fentanyl use occurred in the United States and in countries in Europe, such as Bulgaria and Slovakia,⁹³ prior to 2013, but they all subsided, except in the case of Estonia (see section below). There were four localized outbreaks of fentanyl use and associated drug overdoses in the United States that could be linked, in each case, with a single supply source.⁹⁴ Those outbreaks remained limited, and once the source of fentanyl had been neutralized, the outbreak subsided. The last localized fentanyl outbreak occurred between 2005 and 2007 in Chicago, Detroit and Philadelphia, resulting in about 1,000 overdose deaths. The analyses of the samples tested showed that fentanyl (characterized as non-phar-

maceutical fentanyl that was not diverted from licit sources) was mixed with either heroin or cocaine and sold through local illicit distribution channels.⁹⁵ The source of illicit fentanyl was identified to have been linked to a Mexican drug trafficking organization, and once the source was neutralized, the outbreak subsided.⁹⁶

It is still not fully understood as to why the fentanyl outbreak in 2013 did not rapidly diminish as had happened in the past. The analysis of past outbreaks in the United States and the recent example in Sweden, suggest that the early identification and detection of the one supplier, or few suppliers, that introduced the fentanyls into the market quickly halted or reversed the spread of the substances in the market. Otherwise, as in the case of Estonia, once a market for fentanyls has been established, it tends to persist.

All factors driving fentanyl use converged from 2013 onwards in the United States and Canada, which may explain the unprecedented spread of the fentanyls in those markets: factors such as the diffusion of simpler, more effective methods of manufacture of synthetic opioids and their analogues (primarily fentanyls), assisted by the availability on the Internet of instructions for their manufacture; a shift from preparation by a limited number of skilled chemists to preparation by basic “cooks” who could simply follow the posted instructions; the discovery of ever more fentanyl analogues; a lack of effective control of precursors and oversight of the industry; expanding distribution networks that reduced the risk of detection through the use of postal services and the Internet; and increased licit trade including e-commerce.⁹⁷

There is a great incentive for trafficking organizations to expand the fentanyl market: the large associated revenues. Compared with heroin, the production costs of single-dose fentanyls are substantially lower. For instance, it may cost between \$1,400 and \$3,500 to synthesize 1 kg of fentanyl, which could bring a return of between \$1 million

⁹³ Pardo and others, *The Future of Fentanyl and other Synthetic Opioids*.

⁹⁴ These outbreaks were in California (1979–1988); Pennsylvania, one county (1988); Boston and New York (1992–1993) and Chicago, Detroit and Philadelphia (2005–2007).

⁹⁵ Centers for Disease Control and Prevention, *Morbidity and Mortality Weekly Report*, vol. 57, No. 27, 25 July 2008), pp. 793–796.

⁹⁶ Pardo and others, *The Future of Fentanyl and other Synthetic Opioids*.

⁹⁷ Ibid.

TABLE 1 Characterization of past and current fentanyl crises in the United States

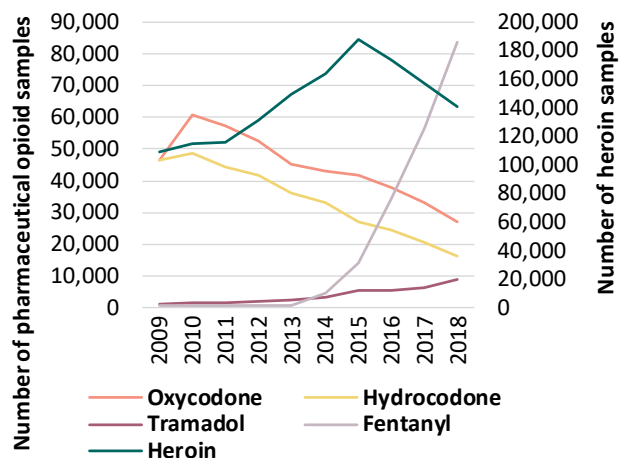
	Prior outbreaks	Current fentanyl crisis
Location	Generally localized	Not localized, although there are regional variations
Duration	Short	Nearly six years
Chemicals	Fewer fentanyl analogues (or potent analogues such as carfentanil)	Fentanyl dominates, but there are many and more potent analogues
Source	Mostly laboratories within the United States except in one case	Almost all imported, mostly from China and Mexico
Distribution	Limited; in two outbreaks traditional illicit market actors were involved	More widespread; both traditional illicit market actors and mail order or internet
Sold as...	Often sold as heroin, and in some cases appeared in cocaine	Heroin and pharmaceutical opioids, but an increasing share of cases of cocaine and psychostimulant overdose mention synthetic opioids

Source: Pardo and others, *The Future of Fentanyl and other Synthetic Opioids*.

and \$1.5 million from street sales.⁹⁸ For comparison, 1 kg of heroin purchased from Colombia may cost \$5,000 to \$7,000,⁹⁹ around \$53,000 at the wholesale level in the United States and around \$400,000 at the retail level in the United States.¹⁰⁰ With fentanyls, the logistics for supply are also more flexible because fentanyls can be manufactured anywhere and are not subject to the climatic conditions or the vulnerable conditions required for the large-scale cultivation of opium poppy.

The current crisis of fentanyls appears to be more supply-driven than earlier waves of increases in the use of pharmaceutical opioids or heroin. Fentanyls are being used as an adulterant of heroin, are used to make falsified pharmaceutical opioids, such as falsified oxycodone and hydrocodone – and even falsified benzodiazepines – which are sold to a large and unsuspecting population of users of opioids and other drugs; users are not seeking fentanyl as such.^{101, 102}

FIG. 37 Substances submitted to and analysed by forensic laboratories, by type of drug identified, United States, 2009–2018

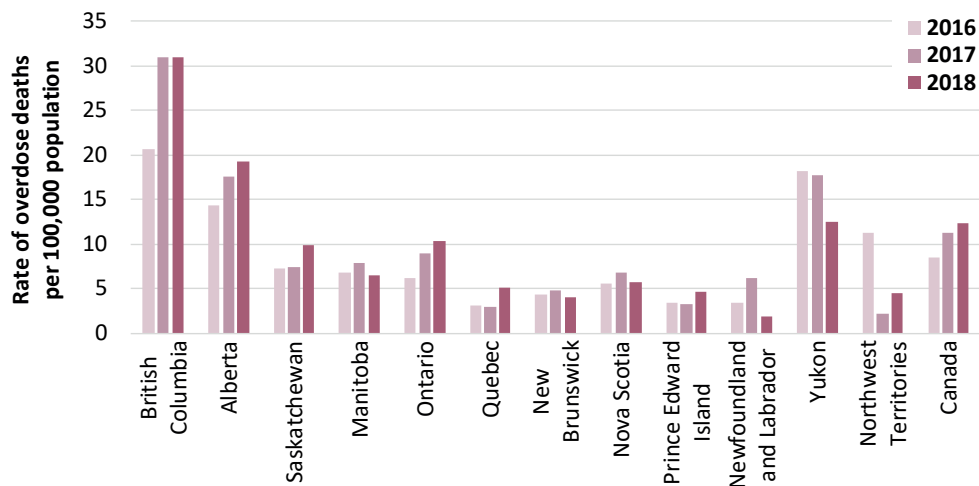


Source: United States, Department of Justice, DEA, National Forensic Laboratory Information System, reports for different years.

It seems that some local distributors are not able to distinguish between heroin, fentanyl and fentanyl-laced heroin, nor between diverted pharmaceutical opioids and falsified opioids containing fentanyl.¹⁰³ A general problem with fentanyls is dosing by non-professional “pharmacists”, where small mistakes can lead to lethal results. Furthermore, as the overdose death data suggest, even people using cocaine and psychostimulants, such as methamphetamine, are also exposed – probably unintentionally – to

98 Scott Stewart, “The fentanyl epidemic will spread far beyond America’s shores”, *Stratfor*, 16 July 2018.
 99 United States, Department of Justice, DEA, *2017 National Drug Threat Assessment* (October 2017).
 100 UNODC, heroin retail and wholesale prices in the United States, 2018, elaborated by the Office of National Drug Control Policy and reported in the annual report questionnaire for 2019.
 101 Patil Armenian and others, “Fentanyl, fentanyl analogs and novel synthetic opioids: a comprehensive review”, *Neuropharmacology*, vol. 134, part A (May 2018), pp. 121–132.
 102 United States, Department of Justice, DEA, *2018 National Drug Threat Assessment*.

103 Ibid.

FIG. 38 Opioid overdose deaths in Canada, by province and territory, 2016–2018

Source: Canada, Public Health Agency, Special Advisory Committee on the Epidemic of Opioid Overdoses, “National report: apparent opioid-related deaths in Canada (January 2016 to March 2019)”, September 2019.

fentanyl or other potent synthetic opioids mixed with those substances.

Developments in Canada

In Canada, the opioid crisis is driven by the use of pharmaceutical opioids, both those diverted from licit channels and those originating in the illicit market, and an increasing number of opioid overdose deaths have been attributed to fentanyl since 2016.^{104, 105} In Canada, the per capita consumption of opioids, such as hydromorphone and oxycodone, is the second highest in the world, after the United States.¹⁰⁶ In 2017, an estimated 12 per cent of the Canadian population aged 15 or older (3.5 million people) had used pharmaceutical opioids in the past year, of whom around 2 per cent reported non-medical use of pharmaceutical opioids.¹⁰⁷

The number of opioid overdose deaths in Canada has increased by 50 per cent in the past three years, from 3,023 deaths (8.4 deaths per 100,000 population) in 2016 to 4,398 deaths (11.9 deaths per 100,000 population) in 2018. The majority (75 per cent) of overdose deaths are of young men. Overall, 26 per cent of total overdose deaths in 2018 were among those aged 30–39.¹⁰⁸ Various studies suggest that men are more likely than women to consume drugs alone, which puts them at risk of not receiving emergency assistance if they experience an overdose or other health complications.¹⁰⁹

The geographical spread of overdose deaths is also uneven in Canada. In contrast to the United States, however, where north-eastern states are those most affected by the misuse of fentanyl and related overdose deaths, the concentration in Canada is mostly in the western parts of the country: British Columbia (31.2 overdose deaths per 100,000 population), Alberta (19.7 overdose deaths per 100,000 population) and Yukon in the north (12.3 deaths per 100,000 population). Those two provinces and

104 Opioid overdose data for Canada is available from 2016.

105 Lisa Belzak and Jessica Halverson, “The opioid crisis in Canada: a national perspective,” *Health Promotion and Chronic Disease Prevention in Canada*, vol. 38, No. 6 (June 2018).

106 Ibid.

107 Health Canada, “Canadian Tobacco, Alcohol and Drugs Survey (CTADS): summary of results for 2017”, December 2017.

108 Canada, Public Health Agency, Special Advisory Committee on the Epidemic of Opioid Overdoses, “National report: apparent opioid-related deaths in Canada (January 2016 to March 2019)”, September 2019.

109 Martha Bebinger, “Fentanyl-linked deaths: the U.S. opioid epidemic’s third wave begins”, NPR, 21 March 2019.

Factors contributing to the fentanyl crisis in the United States

A number of factors have contributed to the current fentanyl crisis in the United States – factors that could be having an effect in other countries and regions. Over the past decade, there has been a rediscovery and proliferation of fentanyl and its analogues, as well as other research opioids such as U-47700, and a rediscovery of the relative ease with which these opioids can be synthesized.^a The appearance of fentanyl and other research opioids seems to be supply-driven because – although they are serving an existing population of opioid users – most users do not seem to be actively seeking those substances.^b These substances have either displaced a previously used opioid or filled a supply gap – as in the case of Estonia and Finland – but, overall, did not lead to a notable increase in the size of the opioid-using population.

The comparatively low cost of synthesizing opioids and the potential profit margin are a further incentive for drug trafficking organizations. The high potency of fentanyl and its analogues makes it convenient to synthesize and smuggle small amounts with relative ease. Trafficking 1 kg of fentanyl would be the equivalent of smuggling 50 kg of heroin, as 5 g of fentanyl is the equivalent to 150–250 g of heroin in terms of morphine-equivalent doses; 5 g of fentanyl is considered to be a wholesale quantity because it can serve a large number of users but it can be easily mailed in a small envelope.^{c, d} Other technological advances such as the growth in e-commerce and sales of chemicals, among other goods sold, over the Internet, the darknet and use of alternative currencies such as bitcoin offer people with a computer and an Internet connection

the possibility of maintaining their privacy while making transactions for those items with a perception of anonymity and safety. Given that only a small quantity of fentanyls are needed, mail orders and the use of small packages sent through postal services are another factor that has facilitated the spread of fentanyls in the United States and other markets. Finally, the relatively lax or poor regulations relating to the industrial manufacture of pharmaceutical, chemical and chemical precursors in some countries may have contributed to the proliferation and spread of synthetic opioids in the United States and other regions.^e

^a Pardo and others, *The Future of Fentanyl and other Synthetic Opioids*.

^b Ibid.

^c Stewart, “The fentanyl epidemic will spread far beyond America’s shores”.

^d Pardo and others, *The Future of Fentanyl and other Synthetic Opioids*.

^e Ibid.

territory in Canada have experienced the highest burden with regard to opioid overdose deaths.

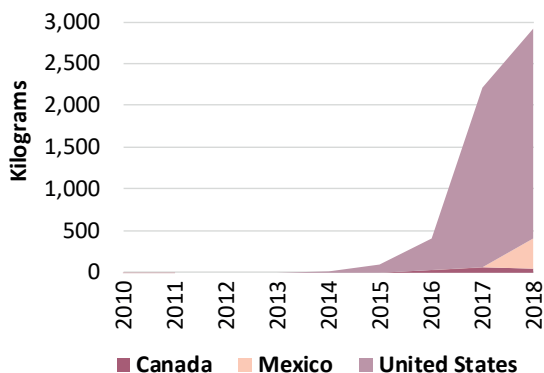
About 80 per cent of the overdose deaths in Canada involved fentanyl or its analogues, although three out of four overdose deaths also involved non-opioid substances. Between January 2012 and September 2017, 50 per cent of heroin samples analysed in Canada contained fentanyl or its analogues – carfentanyl, furanylfentanyl and acetylfentanyl – while 2 per cent each of cocaine and methamphetamine samples also contained fentanyls.¹¹⁰

110 Belzak and Halverson, “The opioid crisis in Canada”.

Trafficking of fentanyls into and across North America

Together with rapid increases in overdose deaths, the opioid crisis in North America was also characterized by rapidly rising seizures of fentanyls over the period 2010–2018, notably since 2014. Fentanyls are the most seized synthetic opioids in North America. Nonetheless, the upward trend in 2018 was far less pronounced than in previous years. Quantities of fentanyl seized in the United States continued to increase in 2018, although at a clearly slower pace than in previous years (showing a 32 per cent increase in 2018 following a fourfold increase in 2016 and a sixfold increase in 2017). Seizures of fentanyl increased in Mexico, but they declined by 36 per cent in Canada in 2018 after a

FIG. 39 Quantities of fentanyl seized in North America, 2010–2018



Source: UNODC, responses to the annual report questionnaire.

74 per cent increase in 2017.¹¹¹ In the same year, 32 NPS, including two fentanyl analogues, were scheduled by Chinese authorities, which brought the total number of controlled fentanyl analogues in that country to 25 in 2018.¹¹²

According to United States authorities, most of the fentanyls destined for the North American market have been manufactured in China in recent years, from where they were either shipped directly to the United States, mostly through postal services, or were first shipped to Mexico and, to a lesser extent, Canada and then smuggled into the United States.¹¹³

However, after the introduction by China in May 2019 of drug controls based on generic legislation with regard to the fentanyls, which effectively brought more than 1,400 known fentanyl analogues under national control in China,¹¹⁴ early signs suggest that fewer fentanyls were smuggled from China to North America. At the same time, attempts to manufacture fentanyl and its analogues inside North America are increasing, notably in Mexico, by means of a method using precursor chemicals smuggled into the subregion from East Asia and South Asia.¹¹⁵

111 UNODC, responses to the annual report questionnaire.

112 United States, Department of Justice, Bureau for International Narcotics and Law Enforcement Affairs, *International Narcotics Control Strategy Report, vol. I, Drug and Chemical Control* (Washington D.C., March 2019).

113 United States, Department of Justice, DEA, *2018 National Drug Threat Assessment 2018*.

114 E/INCB/2019/1.

115 INCB, “Experts and industry strategize next steps in imple-

There has, in fact, been some manufacture of fentanyls in North America for some time. The United States reported one clandestine fentanyl laboratory dismantled in 2013, three in 2015 and nine in 2018, and the clandestine manufacture of fentanyl was the only type of clandestine manufacture of synthetic drugs on United States soil reported to have increased in 2018. Canada reported one fentanyl laboratory dismantled in 2012, one in 2016, one in 2017 and two in 2018.¹¹⁶

In Mexico, authorities seized a fentanyl laboratory in Culiacán, the state capital of Sinaloa,¹¹⁷ in November 2017, and in September 2018 counter-narcotics authorities seized a laboratory in Baja California, Mexico, manufacturing fentanyl and carfentanil,¹¹⁸ arresting two suspected associates of the Sinaloa Cartel. The laboratory was producing falsified tablets that were shipped to the north-eastern United States for sale. Moreover, in December 2018, the Office of the Attorney General of Mexico reported the dismantlement of a clandestine fentanyl laboratory in Mexico City.¹¹⁹ In April 2019, the Mexican authorities reported the dismantling of a fentanyl laboratory in Culiacán.¹²⁰ The authorities seized some 33,000 fentanyl tablets as well as five containers containing heroin.¹²¹ In June 2019, the authorities reported the dismantling of a clandestine laboratory in Nuevo León involved in the manufacture of chemical precursors for the manufacture of fentanyl, and which was possibly also manufacturing fentanyl.¹²² Most of the larger Mexican drug

menting INCB’s list of fentanyl-related substances with no legitimate uses”, 4 September 2019.

116 UNODC, responses to the annual report questionnaire.

117 Steven Dudley and others, “Mexico’s role in the deadly rise of fentanyl” (Washington D. C., Wilson Center Mexico Institute, 2019).

118 Bureau for International Narcotics and Law Enforcement Affairs, *International Narcotics Control Strategy Report, vol. I*.

119 Dudley and others, “Mexico’s role in the deadly rise of fentanyl”.

120 Mexico, Sinaloa, Secretaría de Seguridad Pública, “Comunicación SSPE/141/2019: Policía Estatal Preventiva y Fuerzas Armadas aseguran presumiblemente el primer laboratorio de fentanilo a nivel nacional”.

121 Mexico, Fiscalía General de la República, “Comunicado FGR 183/19: FGR asegura en Sinaloa más de 33 mil pastillas de fentanilo, heroína y ácido clorhídrico”, 17 April 2019.

122 Mexico, Fiscalía General de la República, “Comunicado FGR 294/19: FGR asegura en Nuevo León laboratorio posiblemente utilizado para elaborar fentanilo”, 16 June 2019.

trafficking groups are already involved in the trafficking of fentanyls from Mexico to the United States, most notably the Sinaola Cartel and the Jalisco New Generation Cartel.¹²³

The clandestine manufacture of fentanyls within North America is thus not really a new phenomenon and has the potential to increase in importance following the recent control of fentanyls substances in China. Moreover, the clandestine manufacture of fentanyl has already spread beyond North America to neighbouring subregions, as a clandestine fentanyl laboratory was dismantled in the city of Santiago, Dominican Republic, in 2017.¹²⁴

At the same time, there is a risk that other countries with a large and thriving pharmaceutical sector may become involved in the clandestine manufacture of fentanyls. In 2018, for example, authorities of India reported two relatively large seizures of fentanyl destined for North America.¹²⁵ Furthermore, according to United States authorities, in September 2018, the Directorate of Revenue Intelligence of India, in cooperation with DEA of the United States Department of Justice, dismantled the first known illicit fentanyl laboratory in India and seized approximately 11 kg of fentanyl.¹²⁶

Opioids in Europe: are there indications of a fentanyl-led crisis?

In the European market, fentanyls have started to be detected in seizures and overdose deaths, and attempts to gain a share of the illicit opioid market with these drugs have been detected and suppressed in Sweden and the United Kingdom, for example. So far, there is no indication of an established market for fentanyls as an adulterant or as a main substance in Europe, with the exception of Estonia, where fentanyl has developed an isolated niche market

since 2013. There are, however, signs of an increase in the medical use of opioids in Europe as seen in the prescription rates for opioids for pain management.

In Western and Central Europe, there are an estimated 1.3 million high-risk opioid users¹²⁷ (0.4 per cent of the population aged 15–64). Heroin remains the main opioid used in the subregion, with recent estimates in many countries suggesting an increase in the use of the drug, in a context in which its purity is reported as relatively high and its price relatively low. Over the past five years, there has also been an increase in drug overdose deaths, with 8 or 9 deaths of every 10 overdose deaths in the European Union involving heroin.¹²⁸

The health-care and social needs of an ageing and increasingly vulnerable cohort of long-term opioid users continues to grow; and data on overdose deaths reflect the fact that older high-risk opioid users may be at the greatest risk of overdose death (the current average age of people dying of overdose is 39 years).¹²⁹

There are also indications that other opioids such as methadone, buprenorphine, fentanyl, codeine, morphine, tramadol and oxycodone are being increasingly misused in the European Union. For instance, one of every five people entering drug treatment for an opioid-related problem in 2018 reported a synthetic opioid as their main problem drug instead of heroin.¹³⁰

In the European Union, since 2012 more than 30 fentanyl analogues have been detected and reported.¹³¹ These are available on the Internet, through the darknet and at street level. They are sold as heroin, other illicit opioids and cocaine but also as a substitute for pharmaceutical drugs such as

123 Dudley and others, “Mexico’s role in the deadly rise of fentanyl”.

124 *Report of the International Narcotics Board for 2018* (E/INCB/2018/1).

125 Bryce Pardo, “Illicit supply of fentanyl and other synthetic opioids: transitioning markets and evolving challenges”, RAND Corporation Testimony Series (Santa Monica, California, RAND Corporation, 25 July 2019).

126 Bureau for International Narcotics and Law Enforcement Affairs, *International Narcotics Control Strategy Report*, vol. I.

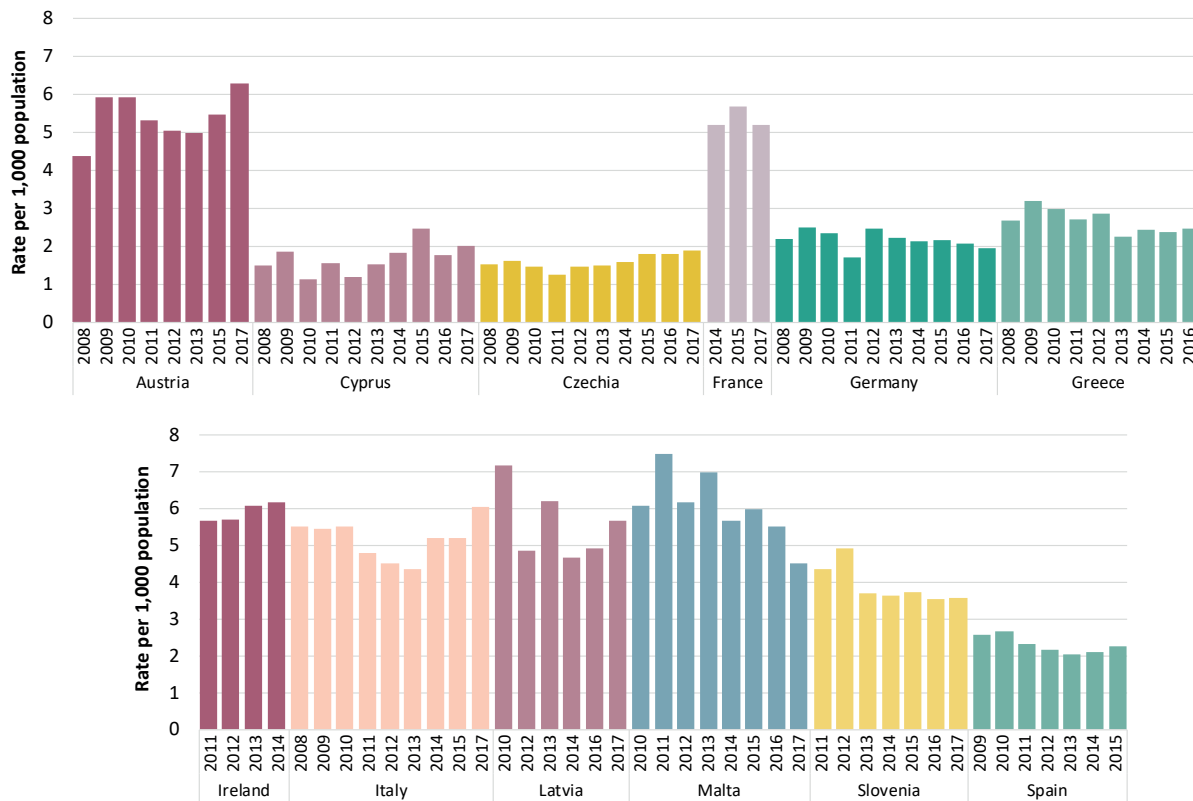
127 As defined by EMCDDA, high-risk opioid use is the recurrent use of opioids or other drugs that is causing actual harms (negative consequences, including dependence, but also other health, psychological or social problems) to the person, or is placing the person at a high probability/risk of suffering such harms.

128 EMCDDA, *European Drug Report 2019: Trends and Developments* (Luxembourg, Publications Office of the European Union, 2019).

129 Ibid.

130 Ibid.

131 Ibid.

FIG. 40 Trends in high-risk opioid use in countries in Western and Central Europe

Source: EMCDDA, Statistical Bulletin 2019.

Note: High-risk opioid use is defined by EMCDDA as recurrent drug (opioid) use that causes actual harms (negative consequences) to the person (including dependence, but also other health, psychological and social problems) or places the person at a high probability/risk of suffering such harms.

Xanax.¹³² Although the total number of fentanyl-related overdose deaths in Europe is not available, the number of deaths remains much lower in Europe than in North America. In the European Union, over 2017 and 2018, the fentanyl analogue cyclopropylfentanyl was involved in 78 deaths, carfentanyl in 61 deaths and acryloylfentanyl in 47 deaths.¹³³ However, while outbreaks of deaths related to fentanyl and its analogues have been reported in many countries, their number is probably underestimated in Europe. Moreover, despite the threat, the current capacity to detect and report on the availability, use and consequences of synthetic opioids appears to remain limited in the European Union.¹³⁴

¹³² Ibid.

¹³³ Ibid.

¹³⁴ Ibid.

Nevertheless, there are developments in different European countries that are worth observing.

In Norway, there has been a shift in the relative importance of heroin, as just 20 per cent of overdose deaths in 2017 were attributed to heroin, which is significantly below the figure for 2006, when approximately half of overdose deaths were attributed to the drug. Methadone, buprenorphine and fentanyls are identified as the main substances involved in overdose deaths in Norway.¹³⁵

In England, post-mortem reports and drug seizures in the second quarter of 2017 suggested that fentanyl and its analogues had been introduced into the heroin supply in the north of the country. Law enforcement authorities dismantled a laboratory that may have been the site where the mixing of

¹³⁵ Ibid.

fentanyl with heroin was taking place. Investigations suggested that some 26 fentanyl-related deaths in urban areas of northern England could be linked with that laboratory. There were an additional five cases in the north-east and three cases in other regions of the country.¹³⁶ In 2017, however, there were a total of 75 fentanyl-related deaths recorded in the United Kingdom. There are signs of attempts to introduce fentanyl in the United Kingdom opioids market, but so far these attempts appear sporadic, geographically limited or linked to a single source of supply. Effective monitoring of the emergence of fentanyl-related deaths in Europe requires further investigation and detection of the multiple substances that may be involved in drug-related deaths.

Increasing rates of opioid prescriptions show different outcomes in the non-medical use of the drugs and in overdose deaths in Germany and the Netherlands

While the illicit opioid market is diversifying, heroin remains the main opioid used for non-medical purposes among opioids users in most European countries, but the medical use of opioids is substantially increasing.

At the global level, Germany was the second largest consumer of opioid pain relievers, with an estimated 28,862 S-DDD per million population per day for medical use in 2017, followed by Austria, Belgium and Switzerland.¹³⁷ In Germany, the number of pharmaceutical opioids overall and the number of people receiving opioid treatment have increased over the past few decades;¹³⁸ in most instances, prescriptions were given for non-chronic cancer pain.¹³⁹ A review of scientific literature from Germany published between 1985 and 2016 showed that out of the 12 studies reviewed, 6 studies reported a prevalence for patients with medical use of any opioid¹⁴⁰

¹³⁶ Ibid.

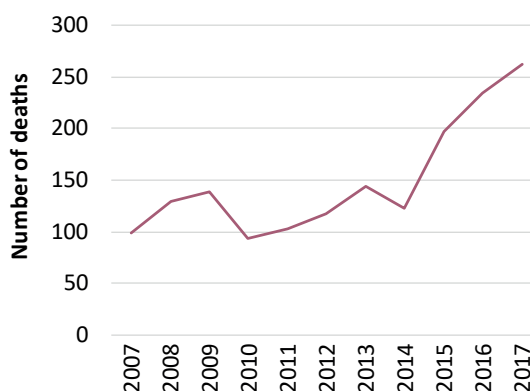
¹³⁷ *Narcotic Drugs: Estimated World Requirements for 2019–Statistics for 2017* (E/INCB/2018/2), p. 250.

¹³⁸ Bastian Rosner and others, “Opioid prescription patterns in Germany and the global opioid epidemic: systematic review of available evidence”, *PLoS ONE*, vol. 14, No. 8 (August 2019).

¹³⁹ Ibid.

¹⁴⁰ This reflects the proportion of population who had a

FIG. 41 Trend in overdose deaths in the Netherlands, 2007–2017



Source: EMCDDA, Statistical Bulletin 2019.

for long-term treatment of non-cancer chronic pain ranging from 0.54 to 5.7 per cent, while four studies reported a prevalence for patients with medical use of opioids at 0.057 to 1.39 per cent of the population.

With respect to heroin users and non-medical users of opioids in Germany, the extent of high-risk opioid use has remained stable over the past decade. In 2016, it was estimated that 3.05–3.11 persons per 1,000 population aged 15–64 were engaged in high-risk opioid use (between 164,794 and 167,794 people),¹⁴¹ while the number of overdose deaths – the majority attributed to opioids – has declined in Germany. In 2018, 629 overdose deaths – half of the total number of overdose deaths in Germany – were attributed to opioids (heroin and other opioids) alone or in combination with other drugs, and 53 deaths were attributed to fentanyl (compared with 110 deaths in 2017).¹⁴² Furthermore, data show that in Germany there were more deaths related to fentanyl than to fentanyl analogues. In 2018, the authorities reported 25 cases of poisoning deaths linked to fentanyl only, and five cases linked to fentanyl analogues only. Similarly, in cases of

prescription for opioids for long-term opioid treatment, for chronic non-cancer pain.

¹⁴¹ Ludwig Kraus and others, “Estimation of the number of people with opioid addiction in Germany”, *Deutsches Ärzteblatt International*, vol. 116, No. 9 (March 2019), pp. 137–143.

¹⁴² Germany, Bundeskriminalamt, “Rauschgiftkriminalität: Bundeslagebild 2018” (September 2019).

drug-related deaths caused by multiple opioids, there were 28 deaths that involved fentanyl and only one case involving a fentanyl analogue.¹⁴³ It is interesting to note that the decline in fentanyl-related deaths in 2018 was more pronounced for fentanyl analogues than for fentanyl as such.

In the Netherlands, a retrospective multi-source database study reported that between 2008 and 2017, the overall number of medical users of opioids nearly doubled, from 4,109 per 100,000 population to 7,489 per 100,000 population over the 10-year period.¹⁴⁴ The main increase was attributed to the number of oxycodone users, which quadrupled from 574 to 2,568 per 100,000 population in the same period.

The negative consequences of opioid use also seem to have increased in the Netherlands, although this may be a combination of medical and non-medical use. The number of opioid-related hospital admissions tripled from 2.5 to 7.8 per 100,000 inhabitants, and between 2008 and 2015 the number of people in drug treatment for opioid use disorders other than heroin also increased, from 3.1 to 5.6 per 100,000 population. Drug overdose deaths attributed to opioids, which had remained stable between 2008 and 2014 at 0.21 deaths per 100,000 population, increased thereafter to 0.65 per 100,000 population in 2017. This increase in opioid overdose deaths is attributed to the increase in overdose deaths involving pharmaceutical opioids, which had remained stable earlier (in the period 2008–2014), at an average of 0.091 deaths per 100,000 (15 cases) and increased to 0.49 deaths per 100,000 (83 people) in 2017. By contrast, overdose deaths attributed to heroin, methadone and opium remained stable in the period 2008–2017.

Sweden and Estonia show a decline in fentanyl-related overdose deaths

In Sweden, the overall opioid market was dominated by heroin until 2014. In 2006, diverted fentanyl patches appeared in the drug market and stayed, although their market share remained relatively

limited.¹⁴⁵ Fentanyl analogues were introduced into the drug market in Sweden in 2014, through online sales of fentanyl analogues, mainly in the form of nasal sprays but also tablets, powder and capsules.¹⁴⁶

Although the quantities of fentanyls seized in Sweden did not decline in 2018 (they actually rose marginally, from 4.4 kg in 2017 to 4.6 kg in 2018),¹⁴⁷ the overall threat emerging from fentanyls was considered to have declined in 2018, following the dismantling of the country's main distribution network. According to Swedish authorities, that network was mainly selling nasal sprays containing fentanyl analogues that originated in China, sold through the Internet to customers in Sweden. This led, mainly due to problems with correct dosing, to a significant number of fentanyls overdose deaths in Sweden in recent years.¹⁴⁸

Sweden generally reports one of the highest overdose rates in Europe and has experienced overdose deaths attributed to the use of opioids, including heroin, fentanyl and fentanyl analogues. A total of 539 overdose deaths were reported in 2017 (9.5 per 100,000 population), of which opioids accounted for over 90 per cent. Since 2015, fentanyl analogues have resulted in an increasing number of overdose deaths. However, these overdose deaths declined considerably in 2018, in line with the dismantling of the main fentanyl distribution network, with only 18 deaths attributed to fentanyl and 11 attributed to fentanyl analogues; however, the majority of those deaths involved more than one substance.¹⁴⁹ Overall, most fentanyl analogue deaths in 2017 and 2018 were attributed to cyclopropylfentanyl, while in 2018 four deaths were attributed to methoxyacetylfentanyl as well. In 2018, people who died from a fentanyl overdose were older on average (median age of 44.6 years) than those whose overdose was

143 Ibid.

144 Gerard Arnoldus Kalkman and others, "Trends in use and misuse of opioids in the Netherlands: a retrospective, multi-source database study", *Lancet Public Health*, vol. 4, No. 10 (August 2019).

145 Pardo and others, *The Future of Fentanyl and other Synthetic Opioids*.

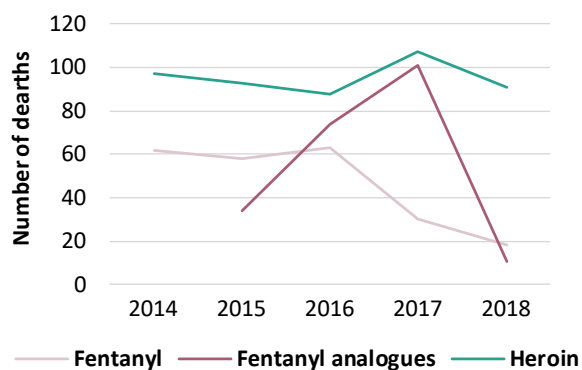
146 Swedish Police Authority, National Operations Department, "Swedish National Threat Assessment on fentanyl analogues and other synthetic opioids" (October 2018).

147 UNODC, responses to the annual report questionnaire.

148 For a more in-depth analysis of the Swedish market for fentanyl and its analogues, see Swedish Police Authority, "Swedish National Threat Assessment on fentanyl analogues and other synthetic opioids".

149 Ibid.

FIG. 42 Trends in opioid overdose deaths in Sweden, 2014–2018



Source: Sweden, National Board of Forensic Medicine, 2019.

caused by fentanyl analogues (median age of 32.9 years).^{150, 151}

Estonia and Finland are two countries where two synthetic opioids, fentanyl (in the case of Estonia) and buprenorphine (in the case of Finland), completely replaced heroin and established themselves in the opioid market). In Finland, after the heroin shortage and disruption of the heroin market beginning in 2001, the proportion of clients entering treatment for non-medical use of buprenorphine increased from 3 per cent in 1998 to more than one third in 2008¹⁵² and as of 2018 accounted for almost all opioid users in treatment.¹⁵³ There are an estimated 13,800 high-risk drug users in Finland and quite common among them is the concurrent use of amphetamines and opioids.¹⁵⁴ In 2018, there were 200 drug overdose cases registered, a slight increase compared with 2016 (194 deaths). Toxicological data indicate that buprenorphine, in combination with alcohol or benzodiazepines, was involved in the majority of drug overdose cases in Finland.¹⁵⁵

150 Sweden, National Board of Forensic Medicine.

151 EMCDDA, *Drug-related Deaths and Mortality in Europe*.

152 Hanna Uosukainen and others, “Twelve-year trend in treatment seeking for buprenorphine abuse in Finland”, *Drug and Alcohol Dependence*, vol. 127, Nos. 1–3 (January 2013), pp. 207–214.

153 EMCDDA, “Finland: Finland drug report 2018” (Helsinki, June 2018).

154 EMCDDA, “Finland: Finland country drug report 2019” (Helsinki, June 2019).

155 Ibid.

Following a decline in heroin availability in Estonia, 3-methylfentanyl first appeared on the drug market in 2002. By 2005, 3-methylfentanyl and 3-methylfentanyl/fentanyl mixtures accounted for the majority of opioids seized and had replaced heroin use in the country.¹⁵⁶ Although national estimates of opioid use are not available for Estonia, the majority of people who inject drugs (estimated at about 8,600 people) in that country reportedly inject 3-methylfentanyl and, since 2015, other fentanyl analogues such as furanylfentanyl, acrylfentanyl, carfentanil and ocfentanil.¹⁵⁷

Estonia has also recorded a high rate of opioid overdose deaths (13 deaths per 100,000 population) attributed to the use of fentanyls. After a peak in the number of opioid overdose deaths in 2012 (170 deaths), the rate decreased steadily until 2015 then increased in 2016 (114 deaths, or 13.4 deaths per 100,000 population) and declined again in 2017. The results of toxicological examinations attributed the majority of those deaths to synthetic opioids, mainly 3-methylfentanyl and other fentanyls such as carfentanyl, furanylfentanyl and acrylfentanyl.¹⁵⁸

Trafficking of fentanyls in Europe

Overall seizures of fentanyls reported in Europe are still very small compared with those reported in North America, reflecting a far smaller market for the substances. While countries in North America reported overall seizures of fentanyl and its analogues of 5,396 kg in the period 2014–2018, seizures of those substances reported by countries in Europe totalled 138 kg in the same period, which is the equivalent of a mere 3 per cent of the amount of fentanyls seized in North America.

Nonetheless, the trafficking of fentanyls appears to be spreading in Europe as well, with a total of 15 European countries reporting seizures of fentanyls in the period 2014–2018, up from five countries in the period 2009–2013.

Most of the quantities of fentanyls seized in Europe in the period 2014–2018 were reported by countries

156 Ilkka Ojanperä and others, “An epidemic of fatal 3-methylfentanyl poisoning in Estonia”, *International Journal of Legal Medicine*, vol. 122, No. 5 (September 2008), pp. 395–400.

157 EMCDDA, “Estonia: Estonia drug report 2018” (June 2018).

158 Ibid.

FIG. 43 Trends in fentanyl overdose deaths in Estonia, 2008–2017



Source: EMCDDA, Statistical Bulletin 2019.

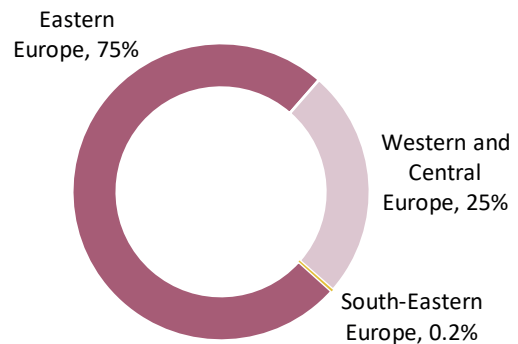
in Eastern Europe (103 kg), mainly reflecting the significant seizures of 3-methylfentanyl (98 kg) reported by the Russian Federation in 2015. Seizures reported by the Russian Federation accounted for over 99 per cent of all fentanyl seizures in Eastern Europe in that five-year period, with seizures by Ukraine accounting for the remainder. In addition to 3-methylfentanyl and fentanyl, the Russian Federation also seized carfentanyl, furanylfentanyl, crotonylfentanyl, acetylfentanyl and *N*-(1-benzylpiperidin-4-yl)-*N*-phenylpropionamide (benzylfentanyl) in 2018.¹⁵⁹

In Western and Central Europe, the seizure of 34 kg of fentanyl was reported in the period 2014–2018. Most of it was fentanyl itself (92 per cent of all fentanyl seizures), followed by carfentanyl (1 per cent), fluranylfentanyl (0.8 per cent) and 3-methylfentanyl (0.3 per cent). In South-Eastern Europe, fentanyl was reported as being seized only by Bulgaria, in 2015 (0.3 kg).

However, seizures of pharmaceutical opioids, as a broad category, were more prominent and had a different distribution. An analysis of the reported broader categories of pharmaceutical opioids, other illicit opioids and non-specified opioids shows significant annual variations of a few hundred kilograms

¹⁵⁹ Presentation given by the General Administration for Drug Control, Ministry of Internal Affairs of the Russian Federation, at the international conference on “Combating suspects dealing in drugs on the Internet: prosecution and prevention”, organized by the Bavarian Landeskriminalamt and the Austrian Bundeskriminalamt, Landshut, Germany, 6–8 May 2019.

FIG. 44 Distribution of the quantity of fentanyl seized in Europe, by subregion, 2014–2018



Source: UNODC, responses to the annual report questionnaire. Note: Distribution calculated on the basis of a total of 138 kg of fentanyl seizures over 2014–2018.

from 2009 until 2016, when totals for this reporting category increased to 3 tons, and later peaked at over 6 tons in 2017 before declining to just under 2 tons in 2018. At the same time, data indicate that in recent years, notably since the period 2016–2018, such seizures were dominated by opioid seizures reported in Western and Central Europe.

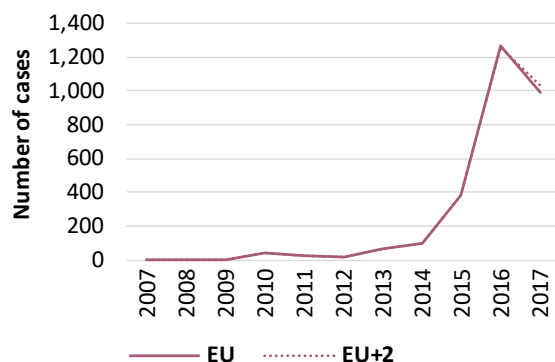
While the overall importance of fentanyl in the quantities of opioids seized and in the number of seizure cases in Europe has been modest to date, the situation is different with new opioids: around 70 per cent of the seizure cases of new opioids seized in the European Union in 2017 concerned fentanyl analogues. The most frequently seized new synthetic opioid in 2017 was carfentanyl (318 cases), followed by furanylfentanyl (183 cases), cyclopropylfentanyl (131 cases) and ocfentanyl (55 cases).¹⁶⁰

There have been much more erratic annual seizure patterns with respect to the quantities of fentanyl seized. While the overall trend in Western and Central Europe appears to show an increase, data for 2018 show a significant decline, which is possibly linked to the improved availability of heroin across Europe, in combination with improved controls of exports of fentanyl from China.¹⁶¹

¹⁶⁰ EMCDDA and Europol, *EU Drug Markets Report 2019* (Luxembourg, Publications Office of the European Union, 2019).

¹⁶¹ Ibid.

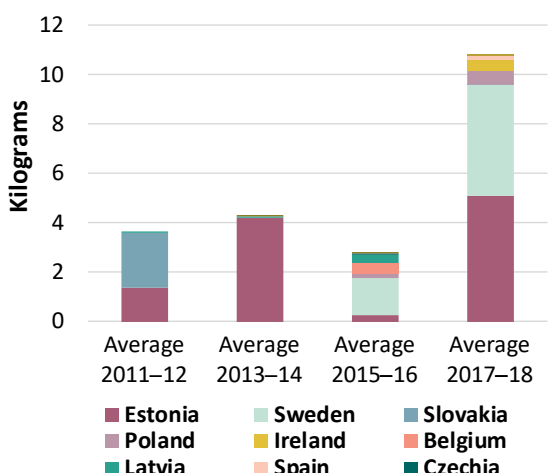
FIG. 45 Seizures of new opioids, European Union, 2007-2017



Source: EMCDDA and Europol, *EU Drug Markets Report 2019* (Luxembourg, Publications Office of the European Union, 2019).

Note: Seizures of new opioids reported to the EU Early Warning System (excluding tramadol); “EU” designates 28 European Union member States as at November 2018; “EU+2” designates 28 European Union member States plus Norway and Turkey.

FIG. 47 Quantities of fentanyl(s) seized in Western and Central Europe, 2011–2018

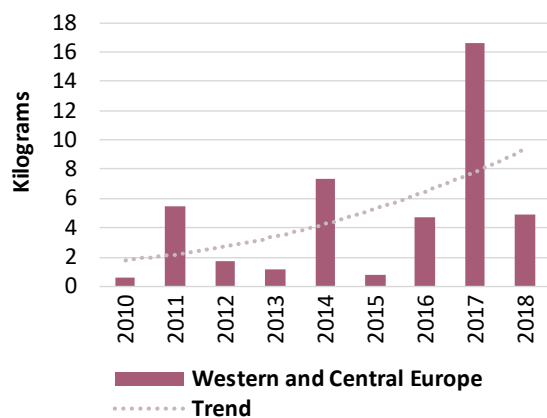


Source: UNODC, responses to the annual report questionnaire.

The main source country of the fentanyl(s) detected in the countries of the European Union appears to be China.^{162, 163} Most quantities are seized in Estonia and Sweden. Fentanyl(s) are purchased throughout the European Union through online platforms on

162 UNODC, responses to the annual report questionnaire.
163 EMCDDA and Europol, *EU Drug Markets Report 2019*.

FIG. 46 Quantities of fentanyl(s) seized in Western and Central Europe, 2010–2018



Source: UNODC, responses to the annual report questionnaire.

the surface web and the darknet.¹⁶⁴ However, most notable have been the shifts reported in recent years by Estonia: whereas fentanyl found on the market used to be sourced in the Russian Federation, as of 2017 new fentanyl analogues found on the market mainly originated in China and were mostly ordered online.¹⁶⁵ While Estonia reported record seizures of fentanyl(s) to UNODC in 2017, seizures of fentanyl appear to have declined significantly in 2018. Estonia indicated difficulties faced by law enforcement in detecting small shipments of drugs arriving by postal services in the country.¹⁶⁶

Non-medical use of tramadol: the other opioid crisis

Tramadol, a pharmaceutical opioid currently not controlled under international drug control conventions, has been used for the management of moderate to severe pain. Tramadol’s potency is comparable to that of codeine but is only about 10 per cent the potency of morphine. It is also mentioned as an analgesic in the World Health Organization guidelines for cancer pain relief and is listed in several national essential medicines lists, most notably in low- and middle-income countries.¹⁶⁷ Nevertheless,

164 Ibid.
165 EMCDDA, “Estonia: Estonia country drug report 2019”.
166 Ibid.
167 World Health Organization, “Critical review report: tramadol”, Forty-first Meeting of the Expert Committee on Drug Dependence, Geneva, 12–16 November 2018.

in the past few years tramadol has increasingly been used for non-medical purposes and has raised public health concerns, in particular in West, Central and North Africa. The non-medical use of tramadol is also reported by many countries in the Middle East, West Asia, South and South-East Asia, Europe and North America.

Many young people and some categories of workers misuse tramadol to boost their energy, to be able to work long hours at physically demanding and tedious jobs, or for “sexual ecstasy and performance”, perceived euphoria, attentiveness and self-medication, and to relieve pain.^{168, 169} However, concerns about the non-medical use of tramadol have also arisen as there is an increasing number of people entering treatment for tramadol use disorders.

Non-medical use of tramadol remains a major public health concern in West, Central and North Africa

Many countries in West, Central and North Africa report the non-medical use of tramadol as one of the main threats in drug use, although quantitative information on the actual size of the population using tramadol non-medically is not available for most countries.

Nigeria, the only country in Africa to have conducted a population survey on drug use, shows the magnitude of the problem. In Nigeria, around 3 million men (6 per cent of the male population) and 1.6 million women (3.3 per cent of the female population) aged 15–64 reported the non-medical use of pharmaceutical opioids (mainly tramadol) in the past year in 2018.¹⁷⁰ (For comparison, the past-year prevalence of non-medical use of pharmaceutical opioids in the United States was 3.6 per cent, while that of tramadol was 0.5 per cent of the population aged 12 and older in 2018).¹⁷¹ The prevalence of

the non-medical use of pharmaceutical opioids in Nigeria was above the national average (which was 4.7 per cent) in the south-western (7.8 per cent) and the north-eastern (6.5 per cent) parts of the country. While there was no age group among which it was low, it was particularly high among people in the age brackets 35–39 and 60–64. One of every five persons reporting the non-medical use of pharmaceutical opioids was suffering from opioid-related disorders.

The drug use survey in Nigeria reveals tramadol to be a more accessible opioid than heroin, although it is still relatively costly if used frequently. While use of tramadol appears to cost about one third the price of heroin (\$3.60 versus \$10 per day of use in the past 30 days), in a country where the minimum wage of a full-time worker is around \$57 per month, regular tramadol use still poses a considerable financial burden on users and their families.

There is no information on the prevalence of drug use in other West African countries, but treatment data reveal tramadol to be the main drug of concern for people with drug use disorders. Tramadol ranks highly among the substances for which people were treated in West Africa in the period 2014–2017. This was particularly the case in Benin, Mali, the Niger, Nigeria, Sierra Leone and Togo.¹⁷²

The non-medical use of tramadol is of particular concern among young people in many countries in that subregion. For example, a cross-sectional study among 300 young people in western Ghana found that while the majority (85 per cent) of respondents knew someone who misused tramadol, more than half of the young people interviewed had used tramadol themselves for non-medical purposes, and one third of the users reported misusing 9–10 doses of tramadol per day.¹⁷³ Another qualitative study from Ghana reported curiosity, peer pressure and iatrogenic addiction as the three main factors for initiation and continuing non-medical use of

168 *World Drug Report 2019: Depressants.*

169 Yasna Rostam-Abadi and others, “Tramadol use and public health consequences in Iran: a systematic review and meta-analysis”, *Addiction*, (March 2020). Available at <https://doi.org/10.1111/add.15059>.

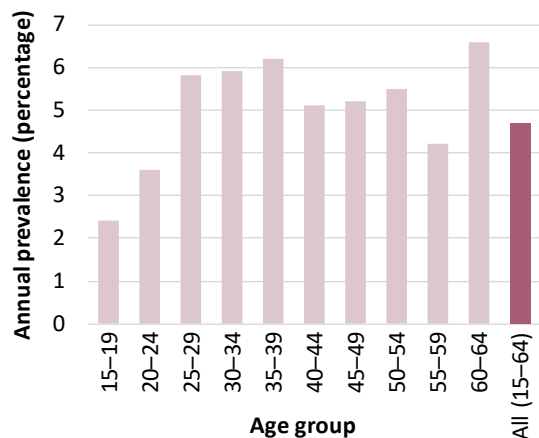
170 National Bureau of Statistics and UNODC, *Drug Use Survey in Nigeria 2018 (Funded by the European Union)* (Vienna, 2019).

171 United States, Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators: Results from the 2018 National Survey on Drug Use and Health* (Rockville, Maryland, 2019).

172 UNODC, European Union and Economic Community of West African States, *West African Epidemiology Network on Drug Use (WENDU) Report: Statistics and Trends on Illicit Drug Use and Supply 2014–2017* (2019).

173 Erik Kwasi Elliason and others, “Abuse and misuse of tramadol among the youth in the Wassa Amenfi West Municipality in the western region of Ghana”, *Psychology and Psychological Research International Journal*, vol. 3, No. 7 (September 2018).

FIG. 48 Non-medical use of pharmaceutical opioids (mainly tramadol) by age group, in Nigeria, 2018



Source: National Bureau of Statistics and UNODC, *Drug Use Survey in Nigeria 2018*.

tramadol, while perceived euphoria, attentiveness, relief from pain, physical energy and aphrodisiac effects were mentioned as some of the reasons for continuing non-medical use of tramadol.¹⁷⁴

In North Africa, tramadol is reported as the main opioid used non-medically in Egypt, where scientific literature about tramadol misuse is more available than elsewhere in the subregion. An estimated 3 per cent of the adult population misused tramadol in 2016, the latest year for which data are available, while 2.2 per cent were diagnosed with tramadol dependence.¹⁷⁵ In drug treatment, tramadol was also the main drug, accounting for 68 per cent of all people treated for drug use disorders in 2017.¹⁷⁶

A cross-sectional study conducted over the period 2012–2013 among 1,135 undergraduate college students in Egypt showed that 20.2 per cent of male and 2.4 per cent of female students had misused tramadol at least once during their lifetime, resulting in an overall lifetime prevalence of 12.3 per cent.

174 Abdul-Ganiyu Fuseini and others, “Facilitators to the continuous abuse of tramadol among the youth: a qualitative study in northern Ghana”, *Nursing Open*, vol. 6, No.4 (October 2019), pp. 1388–1398.

175 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).

176 Ibid.

The average age of initiation of non-medical use of tramadol was around 17 years. Polydrug use was also quite common, with the majority of respondents (85 per cent) reporting use of either tobacco, alcohol or cannabis with tramadol. Among those who had misused tramadol, 30 per cent were assessed to be tramadol dependent.¹⁷⁷

Another study in 2014 among patients in a psychiatric facility in Egypt showed that psychiatric disorders were substantially higher among those with an opioid use disorder related to tramadol than among those who did not have opioid use disorder (49 per cent versus 24 per cent). Among those with tramadol use disorder, most had borderline personality disorders and anxiety disorders, suggesting that people with tramadol use disorder are also likely to have a high prevalence of psychiatric comorbidity.¹⁷⁸

Similarly, another study reported that cannabis and tramadol were the two most prevalent substances among patients presenting with first-episode drug-induced psychosis in a psychiatric facility in Egypt.¹⁷⁹ The authors concluded, however, that the prevalence of cannabis use and non-medical use of tramadol among those presenting with drug-induced psychosis might be related to environmental and economic factors, in which the most available substances are the most frequently encountered, and that drug preference is related to a larger extent to drug availability rather than an individual liking of the substance used or misused.

In the Sudan, while population-based estimates of the extent of substance use are not available, research suggests that the drug scene has rapidly changed, especially with the increasing non-medical use of pharmaceutical drugs among young people, including tramadol, benzodiazepines, cough syrups and

177 Medhat Bassiony and others, “Opioid use disorders attributed to tramadol among Egyptian university students”, *Journal of Addiction Medicine*, vol. 12, No. 2 (March/April 2018), pp. 150–155.

178 Medhat Bassiony and others, “Psychiatric comorbidity among Egyptian patients with opioid use disorders attributed to tramadol”, *Journal of Addiction Medicine*, vol. 10, No. 4, (July/August 2016), pp. 262–268.

179 Taha and others, “Cannabis and tramadol are prevalent among the first episode drug-induced psychosis in the Egyptian population”, p. 16.

antihistamines, trihexyphenidyl, anticonvulsants and neuropathic pain agents such as pregabalin and gabapentin.¹⁸⁰

Context of lack of access to opioid pain medication under international control in many countries where tramadol is used

The trafficking and availability of tramadol for its non-medical use is a public health concern, but limited distribution of tramadol for medical use would also pose a public health concern, in particular in Africa, where there is a chronic shortage of pain medications. There are no data on the availability and use of tramadol for medical purposes, but data on internationally controlled substances clearly highlight the gaps in the accessibility of pain medications. The general lack of access to opioid-related pain medications under international control is a specific problem for developing countries, which is even more pronounced in countries in West and Central Africa than in other parts of the world.

INCB data show that the licit use of internationally controlled opioids amounted to just 174 S-DDD per million inhabitants per day in Africa in the period 2015–2017, much lower than in other regions and subregions (for comparison, Asia: 317 S-DDD per million inhabitants per day; Central America and the Caribbean: 408 S-DDD; South America: 735 S-DDD; Europe: 8,812 S-DDD; Oceania: 12,563 S-DDD; and North America: 30,814 S-DDD), and the equivalent of just 5 per cent of the licit per capita use of internationally controlled opioids at the global level.¹⁸¹ The situation is further aggravated in West and Central Africa as most West African countries show licit per capita use of internationally controlled opioids even below the already extremely low African average of 174 S-DDD, including, in descending order, Cabo Verde, Ghana, Benin, Togo, Burkina Faso, Côte d'Ivoire, Chad, Nigeria and Sierra Leone. Data for the period 2015–2017 suggest that half of West African countries were using less than 4 S-DDD of internationally

controlled opioids per million inhabitants over the period 2015–2017.¹⁸²

Against this background of a de facto non-availability of internationally controlled opioids for pain medication for large sections of the population in West and Central Africa, tramadol – even though it is under national control in some West African countries – is in fact a widely available opioid in those countries, used for both medical purposes (including outside prescription) and for non-medical purposes.

Tramadol use is also reported in countries in Asia

The non-medical use of tramadol among other pharmaceutical drugs is reported by several countries in South Asia: Bhutan,¹⁸³ India,¹⁸⁴ Nepal¹⁸⁵ and Sri Lanka. In 2017, 130,316 capsules containing tramadol and marketed under the trade name “Spasmo Proxyvon Plus (‘SP+’)” were seized in Bhutan.¹⁸⁶ In Sri Lanka, about 0.2 per cent of the population aged 14 and older are estimated to have misused pharmaceutical drugs in the past year.¹⁸⁷ Among them, the non-medical use of tramadol is the most common, although misuse of morphine, diazepam, flunitrazepam and pregabalin have also been reported in the country. The misuse of more than one pharmaceutical drug (including tramadol) is also a common pattern among heroin users who may use them to potentiate the effects of heroin or compensate for its low level of availability.¹⁸⁸ Recent seizures of tramadol suggest the existence of a market for the drug: in April and September 2018, 200,000 and 1.5 million tablets of tramadol were respectively seized by customs in Sri Lanka.¹⁸⁹

182 Ibid.

183 UNODC, Regional Office for South Asia, *Misuse of Prescription Drugs: A South Asia Perspective* (New Delhi, 2011).

184 For example, see Siddharth Sarkar and others, “Tramadol dependence: a case series from India”, *Indian Journal of Psychological Medicine*, vol. 34, No. 3 (July 2012), pp. 283–285.

185 UNODC, *Misuse of Prescription Drugs: A South Asia Perspective*.

186 E/INCB/2018/1, chap. III.

187 Sri Lanka, National Dangerous Drugs Control Board, “National survey on drug use, 2019”.

188 Sri Lanka, National Dangerous Drugs Control Board, “Psychotropic substance abuse, 2019”.

189 E/INCB/2018/1, chap. III.

180 Mohamed El Mahi, “Substance use problem in Sudan: elephant in the room”, *British Journal of Psychiatry International*, vol. 15, No. 4 (November 2018), pp. 89–91.

181 *Estimated World Requirements for 2020: Statistics for 2018* (E/INCB/2019/2).

The 2019 drug use survey in India estimated that nearly 1 per cent of the population aged 10–75 had misused pharmaceutical opioids in the past year and that an estimated 0.2 per cent of the population (2.5 million people) were suffering from drug use disorders related to pharmaceutical opioids.¹⁹⁰ Although the breakdown by type of pharmaceutical opioids misused in India is not available, buprenorphine, morphine, pentazocine and tramadol are the most common opioids misused in the country.^{191, 192}

In the Islamic Republic of Iran, a recent study estimated that about 7 persons per 1,000 population, or over 200,000 people aged 15–49 in urban centres had misused tramadol in the past year (2017), most of whom were young people.¹⁹³ An earlier study in 2012, which used a different methodology, estimated past-year prevalence at 11 per cent and past-month prevalence at 9.5 per cent for the non-medical use of tramadol among university students in one province in the country.¹⁹⁴ A systematic review of tramadol misuse and public health consequences in the Islamic Republic of Iran reported the past 12-month pooled prevalence of non-medical use of tramadol as 4.9 per cent among men and 0.5 per cent among women in the general population.^{195, 196} The same study estimated the past 12-month pooled prevalence of non-medical use of tramadol among male university students at 4.8 per cent and 0.7 per cent among female students.

In recent years, cases of tramadol intoxication and fatal overdose, especially among young people who have a history of substance use disorder and

psychiatric comorbidity, have been reported as a major cause of admission to emergency departments in Islamic Republic of Iran.^{197, 198} Among these cases, tramadol had been misused with other substances, especially benzodiazepines. Some of the main conditions of tramadol intoxication that have been reported in the county include drug-induced seizures, depression of the central nervous and respiratory systems, and renal dysfunction.^{199, 200} Another study that looked at tramadol overdose cases in the period 2013–2017 reported hypertension, tachycardia and seizures as the three main complications of tramadol intoxication and overdose.²⁰¹ The median age for tramadol overdose cases in the study was 41 years (range: 16–69) and the median tramadol dose resulting in intoxication was found to be 1,500 mg (range: 500–4,000 mg). The pooled prevalence of drug-induced seizures among tramadol-poisoning patients in the Islamic Republic of Iran was estimated at 35 per cent, ranging from 12.0 per cent to 69.3 per cent in different studies from 2005 to 2017.²⁰² Tramadol was also found to be the cause of death in around 6 per cent of the total drug overdose death cases in the Islamic Republic of Iran reported in different studies from 2006 to 2017.²⁰³

The non-medical use of tramadol is also reported by countries in East and South-East Asia, in some cases used in combination with other substances. In Indonesia, around 0.3 per cent of the adult population (10–59 years), or over half a million people, were estimated to have had past-year non-medical

190 Atul Ambekar and others, *Magnitude of Substance Use in India 2019* (New Delhi, Ministry of Social Justice and Empowerment, 2019).

191 Ibid.

192 Sarkar and others, “Tramadol dependence”.

193 Naser Nasiri and others, “Population size estimation of tramadol misusers in urban population in Iran: synthesis of methods and results”, *Addiction Health*, vol. 11, No. 3 (July 2019), pp. 173–182.

194 Saeed Bashirian, Majid Barati and Yadollah Fathi, “Prevalence and factors associated with tramadol abuse among college students in west of Iran: an application of the theory of planned behaviour”, *Avicenna Journal of Neuropsychophysiology*, vol. 1, No.1 (August 2014), pp. 26–30.

195 The studies reviewed by the authors from which the pooled prevalence was estimated covered the period 2006–2018.

196 Rostam-Abadi and others, “Tramadol use and public health consequences in Iran: a systematic review and meta-analysis”.

197 Omid Mehrpour and others, “Epidemiological and clinical profiles of acute poisoning in patients admitted to the intensive care unit in eastern Iran (2010 to 2017)”, *BMC Emergency Medicine*, vol. 18, No. 30 (September 2018).

198 Paria Habibollahi and others, “Severe complications of tramadol overdose in Iran”, *Epidemiology and Health*, vol. 41 (June 2019).

199 Samira Alinejad and others, “A narrative review of acute adult poisoning in Iran”, *Iranian Journal of Medical Sciences*, vol. 42, No. 4 (July 2017), pp. 327–346.

200 Hossein Hassanian-Moghaddam and others, “Tramadol-induced apnea”, *American Journal of Emergency Medicine*, vol. 31, No. 1 (January 2013), pp. 26–31.

201 Habibollahi and others, “Severe complications of tramadol overdose in Iran”.

202 Rostam-Abadi and others, “Tramadol use and public health consequences in Iran: a systematic review and meta-analysis”.

203 Ibid.

use of tramadol in 2017, while the past-year prevalence of non-medical use of tramadol among school students was 4.8 per cent.²⁰⁴

In Thailand, although population level data on the prevalence of non-medical use of tramadol is not available, the national treatment centre has reported an increasing number of people accessing treatment for opioid use disorders related to tramadol; they increased from 5 cases in 2014 to 46 cases in 2016 for tramadol only, and from 50 cases to 114 cases, over the same period, for those using a cocktail containing boiled kratom leaves, a cola-type soft drink, cough syrups containing codeine or diphenhydramine and tramadol or other anxiolytic drugs.²⁰⁵ A retrospective study of patients aged 10–26 with drug-induced seizures who were admitted to emergency room departments in Bangkok from September 2011 to November 2013 found that the majority (90 per cent of the total of 56 cases) had used tramadol for non-medical purposes, with a median dose of 400 mg. Most of the patients (80 per cent) examined were male with a median age of 17 years. While nearly half of the patients with drug-induced seizures had used tramadol only, the other half had misused it in combination with promethazine (25 per cent), hydroxyzine (16 per cent) and diphenhydramine (5 per cent).²⁰⁶

Is the non-medical use of tramadol and other pharmaceutical opioids emerging in Europe?

Recent data on treatment, drug-related deaths and seizures indicate that the non-medical use of tramadol is emerging in Europe. Although the current drug monitoring system at EMCDDA is limited in its capacity to detect and report on the availability, use and consequences of synthetic opioids, there are indications of an evolving threat of non-medical use

of pharmaceutical and synthetic opioids in member States of the European Union.²⁰⁷

In the Netherlands, between 2008 and 2017 the rates of medical use of pharmaceutical opioids increased from 4,109 per 100,000 population in 2008 to 7,489 per 100,000 population. Of those, the number of tramadol users initially increased from 2,736 per 100,000 population in 2008 to 3,830 per 100,000 population in 2013 and declined to 3,494 users per 100,000 population in 2017.²⁰⁸ Although not specified by substances, during the same period hospital admissions related to opioid intoxication also increased, as did the number of people in treatment of drug use disorders related to pharmaceutical opioids.²⁰⁹

A series of national surveys conducted in parallel in 2014 in Denmark, Germany, the United Kingdom, Spain and Sweden looked at the non-medical use of pharmaceutical drugs, including opioids.²¹⁰ Findings showed a past-year prevalence of non-medical use of pharmaceutical opioids ranging from 6.8 per cent in Spain to 2.9 per cent in Germany. The overall levels of non-medical use of pharmaceutical opioids in four countries, other than Germany, appeared to be at levels comparable to those in the United States.

Treatment demand related to opioids other than heroin is increasing

Data on treatment demand reported by EMCDDA show that in recent years the proportion of clients entering treatment for opioid use disorders other than heroin was 22 per cent of all primary opioid clients in treatment. Opioids other than heroin reported by treatment entrants included non-medical use of methadone, buprenorphine, fentanyl, codeine, morphine, tramadol and oxycodone.

204 UNODC, responses to the annual report questionnaire submitted by Indonesia.

205 As reported in Tulaya Potaros and Suwimon Yeepu, "Recognition of tramadol abuse, dispensing practices, and opinions about its control policy among community pharmacists in Bangkok, Thailand", *Asian Biomedicine*, vol. 12, No.2 (April 2019), pp 91–99.

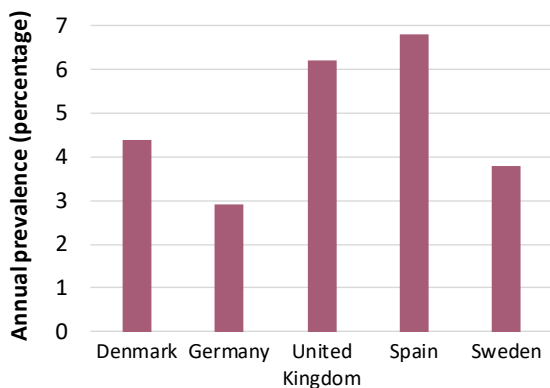
206 R. Othong and W. Srisang, "Tramadol-induced seizures in adolescents and young adults in Bangkok: clinical features and emergency management", *Journal of the Medical Association of Thailand*, vol. 101, No. 8 (January 2018).

207 EMCDDA, *European Drug Report 2019*.

208 Gerard Arnoldus Kalkman and others, "Trends in use and misuse of opioids in the Netherlands: a retrospective, multi-source database study", *Lancet Public Health*, August 2019; 4: e498–505.

209 Arnoldus Kalkman and others, "Trends in use and misuse of opioids in the Netherlands".

210 Scott P. Novak and others, "Nonmedical use of prescription drugs in the European Union", *BMC Psychiatry* (2016) 16: 274.

FIG. 49 Non-medical use of pharmaceutical opioids in the European Union, 2016

Source: Scott P. Novak and others, "Nonmedical use of prescription drugs in the European Union".

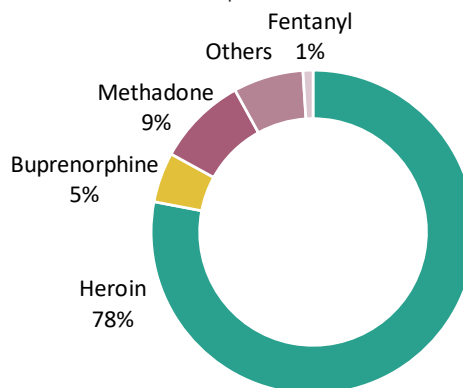
The non-medical use of pharmaceutical opioids, in particular tramadol, is also seen as an emerging problem among young people seeking treatment for opioid use disorder in Sweden. In a study among 73 treatment-seeking adolescents and young adults in an outpatient facility in Sweden, one third were found positive for tramadol misuse.²¹¹ The adolescents also reported high rates of cannabis use and were also diagnosed with high rates of concurrent psychiatric problems.

Increasing threat of tramadol in Europe: overdose deaths attributed to tramadol on the increase in some countries

Overdose deaths attributed to tramadol are also reported by some countries in Western and Central Europe, including Latvia, Slovakia, Slovenia and the United Kingdom. In the European Union, at least 300 drug-related deaths were reported in 2017 in which tramadol was either present or implicated. In Latvia, in two thirds of the 27 deaths investigated by the State Centre for Forensic Medical Examination in 2017, the presence of opioids, primarily tramadol, morphine and methadone, was reported.²¹² Similarly, in Slovakia, of the 19 drug overdose deaths reported in 2017, 15 were linked to opioids,

211 Martin O. Olsson and others, "High rates of tramadol use among treatment-seeking adolescents in Malmö, Sweden: a study of hair analysis of nonmedical prescription opioid use", *Journal of Addiction*, vol. 2017 (December 2017).

212 EMCDDA, "Latvia country drug report 2019" (Riga, June 2019).

FIG. 50 Distribution of treatment demand for opioid use disorders in Western and Central Europe, 2018

Source: EMCDDA, *European Drug Report 2019*.

primarily tramadol, and four to amphetamine or methamphetamine. The majority of overdose cases were among men aged 30 or older.²¹³ Slovenia, which reported a higher rate of drug related deaths than the European average in 2017 (a rate of 32 deaths per 100,000 population) than the European average in 2017 (2.3 deaths per 100,000 population), also reported overdose deaths attributed to tramadol for the first-time.²¹⁴

In Sweden, the overdose deaths attributed to opioids are quite diverse; in the distribution of opioid overdose deaths, after morphine there was a more or less equal share of other pharmaceutical opioids such as tramadol.

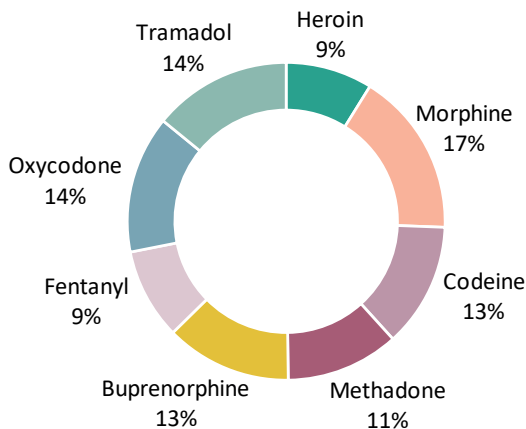
In Scotland, the total number of drug overdose deaths has increased considerably over the past 10 years, from 574 deaths in 2008 to 1,187 in 2018 (16 deaths per 100,000 population), when drug-related deaths increased by a quarter on the previous year. Out of those drug overdose deaths, nearly 80 per cent were attributed to opioids. Although small in number when compared with heroin overdose deaths, there was also a considerable increase in overdose deaths attributed to tramadol.²¹⁵

213 EMCDDA, "Slovakia country drug report 2019" (Bratislava, June 2019).

214 EMCDDA, "Slovenia country drug report 2019" (Ljubljana, June 2019).

215 Tramadol was put under national control in Scotland in June 2014.

FIG. 51 Distribution of opioid overdose deaths in Sweden, 2016



Source: Håkan Leifman, Drug-related Deaths in Sweden: Estimations of Trends, Effects of Changes in Recording Practices and Studies of Drug Patterns, CAN Rapport No. 158 (Stockholm 2016).

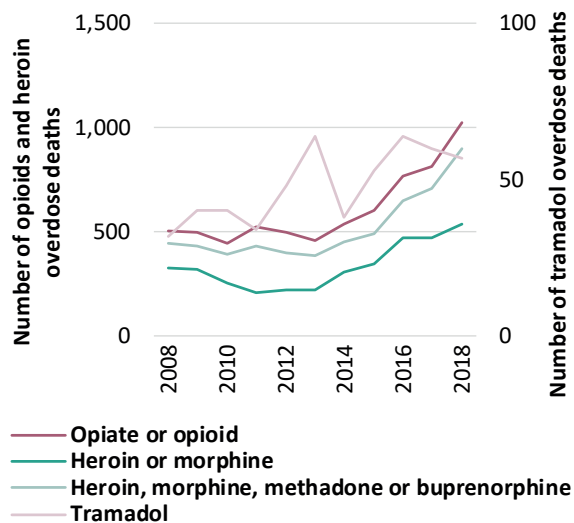
The number of opioid overdose deaths has also doubled in Northern Ireland over the past decade, with the main increase seen in the absolute number of drug overdose deaths attributed to tramadol, which increased threefold from 2007 to 2017. However, the number of deaths attributed to fentanyl increased 6.5-fold and to oxycodone, 3.5-fold, over the same period.

Seizures of tramadol declined sharply in 2018 but remained concentrated in Africa and the Near and Middle East

Given that tramadol is widely used for medical purposes, it is challenging to define the magnitude of global trafficking of this substance because the non-medical market may be supplied through different channels: legitimate sales, diversion from legal trade and illicit manufacturing. Trafficking per se is also difficult to estimate due to its illicit nature. Data on seizures can give an indication of possible trafficking patterns, although they may be a result of changes in law enforcement priorities and/or capacities rather than changes in actual supply.

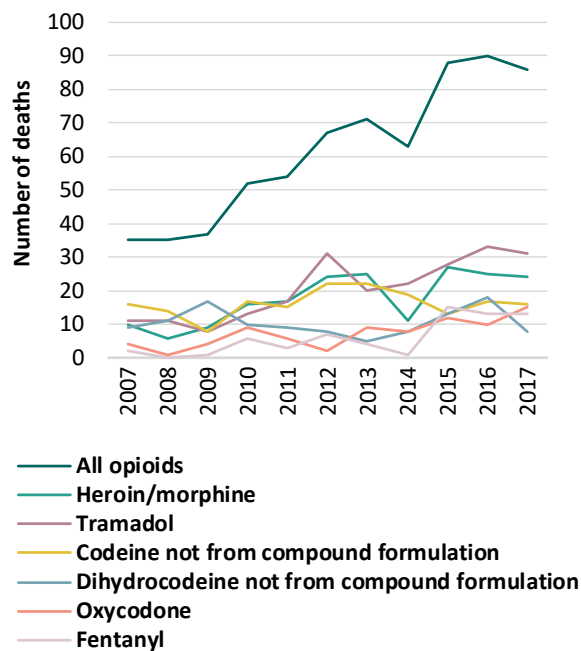
Rarely reported before, the quantities of tramadol seized have increased markedly since 2012, reaching a peak of over 125 tons intercepted globally in 2017

FIG. 52 Trends in opioid overdose deaths in Scotland, 2008–2018



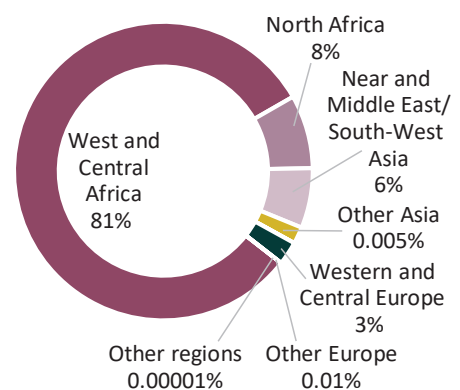
Source: United Kingdom, Office for National Statistics, Scotland.

FIG. 53 Opioid overdose deaths in Northern Ireland, 2007–2017



Source: Northern Ireland Statistics and Research Agency, “Drug-related and drug misuse deaths 2007–2017”, 4 March 2019.

FIG. 54 Regional distribution of the quantity of tramadol seized, 2014–2018



Source: UNODC, responses to the annual report questionnaire.

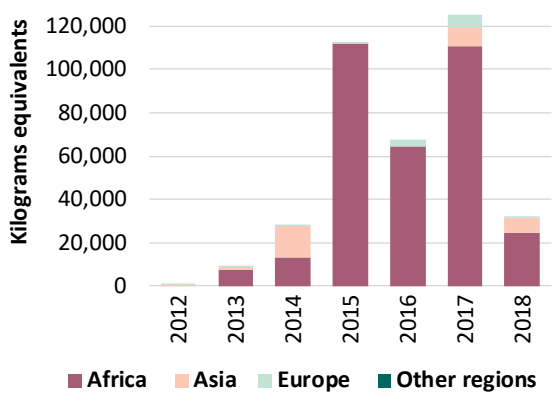
before declining drastically (-75 per cent) in 2018. The bulk of tramadol seized in the period 2014–2018 was seized in West and Central Africa (notably in Nigeria, Benin, Côte d’Ivoire and the Niger), followed by North Africa (notably Egypt, Morocco and the Sudan) and the Near and Middle East (notably Jordan and the United Arab Emirates). In some instances, countries in Western and Central Europe (notably Malta and Greece) have been used as transit countries for tramadol destined for North Africa (Egypt and Libya), although some of the tramadol seized in Europe (in particular Sweden) was also intended for the local market.

For the first time ever, significant seizures of tramadol were reported in South Asia (India) in 2018, accounting for 21 per cent of the global total that year, which reflects the fact tramadol was put under the control of the Narcotic Drugs and Psychotropic Substances Act of India in April 2018.^{216, 217}

A decline in the quantities of tramadol seized at the global level, of 75 per cent compared with a year earlier, was seen in 2018, reflecting reductions in Africa, including in West and Central Africa (-77 per cent) and North Africa (-84 per cent) as well as in Asia, notably in the Near and Middle East/South West Asia (-99 per cent) and in Europe (-99 per

216 *Times of India*, “‘ISIS drug’ tramadol comes under narcotics law regulation”, 29 April 2018.
 217 UNODC, “At the crossroads of tramadol and other pharmaceutical opioids trafficking in West Africa” (July 2019), draft.

FIG. 55 Global quantities of tramadol seized, 2012–2018



Source: UNODC, responses to the annual report questionnaire.

cent). Although the reasons for a decline in drug seizures may be manifold, the fact that such marked declines happened uniformly across regions and sub-regions suggests that it was likely the result of a decrease in supply. As the full-scale scheduling of tramadol in India took place in 2018,²¹⁸ and India had been the main source for (illegal) tramadol shipments, the decline in seizures outside India in 2018 may have been the result of a disrupted market. By contrast, and probably as a result of the control in India, seizures of tramadol in that country increased greatly in 2018, and thus in South Asia as a whole (more than 1,000-fold compared with a year earlier).

Signs of a temporary shortage of tramadol in parallel drug markets in West and Central Africa in 2018–2019

A recent study on the trafficking of tramadol and other pharmaceutical opioids in West Africa has suggested a shortage of tramadol in the second half of 2018 and the first half of 2019, which was apparently linked to the scheduling of tramadol in India, and resulted in fewer shipments to West and Central Africa.²¹⁹ The new regulation in India in 2018 may have initially created a temporary increase in tramadol shipments to Africa, as companies cleared their stocks, followed by a sharp decline in the availability

218 *World Drug Report 2019* (United Nations publication, Sales No. E.19.XL.8).
 219 UNODC, “At the crossroads of tramadol”, draft.

of tramadol on some illegal markets in West Africa, which went hand in hand with marked rises in the price of tramadol on those markets.²²⁰ However, 59 tons of tramadol and 15.5 tons of falsified diclofenac were seized in Benin from January to 31 May 2019,²²¹ which would suggest that large-scale tramadol trafficking continues in the region.

Another consequence of changes in the supply of tramadol has been the arrival of tablets in a parallel West African drug market, which were reportedly smuggled into the subregion from South Asia and sold there as “tramadol” but contained another painkiller, diclofenac. This substance, a non-steroidal anti-inflammatory drug, also known under the trade names Voltaren or Cataflam, is not an opioid and does not have any known psychoactive properties. Nonetheless, its misuse could have negative health consequences if too large a dose is taken. This could happen when recreational drug users expect psychoactive properties from their “tramadol” tablets and, when they do not obtain that effect, simply increase the dosage.²²²

220 Ibid.

221 Country report submitted by Benin to the Twenty-eighth Meeting of Heads of National Drug Law Enforcement Agencies, Africa (UNODC/HONLAF/28/CRP.11).

222 UNODC, “At the crossroads of tramadol”, draft.

NEW PSYCHOACTIVE SUBSTANCES

Seizures of both plant-based and synthetic new psychoactive substances declined in 2018

The quantities of both plant-based and synthetic NPS seized have fluctuated markedly in recent years and declined in 2018 compared with the previous year.

Seizures of plant-based new psychoactive substances continue to be dominated by kratom and khat

For the third year in a row, the largest quantities of plant-based NPS seized in 2018 were of kratom (*Mitragyna speciosa*), a substance that has both opioid-like and stimulant-like effects. This was followed by khat, a stimulant, as well as smaller quantities of ayahuasca, a hallucinogenic drink made from the stem and bark of the tropical liana *Banisteriopsis caapi* and other botanical ingredients, and *Salvia divinorum*, another hallucinogen, the leaves of which are consumed by chewing or smoking or in the form of a tea. In previous years, the plant-based NPS seized also frequently included kava, which is used to produce a drink with sedative, anaesthetic and euphoriant properties, and *Datura stramonium*, a hallucinogen. None of those plants are under international control; they are regulated in some

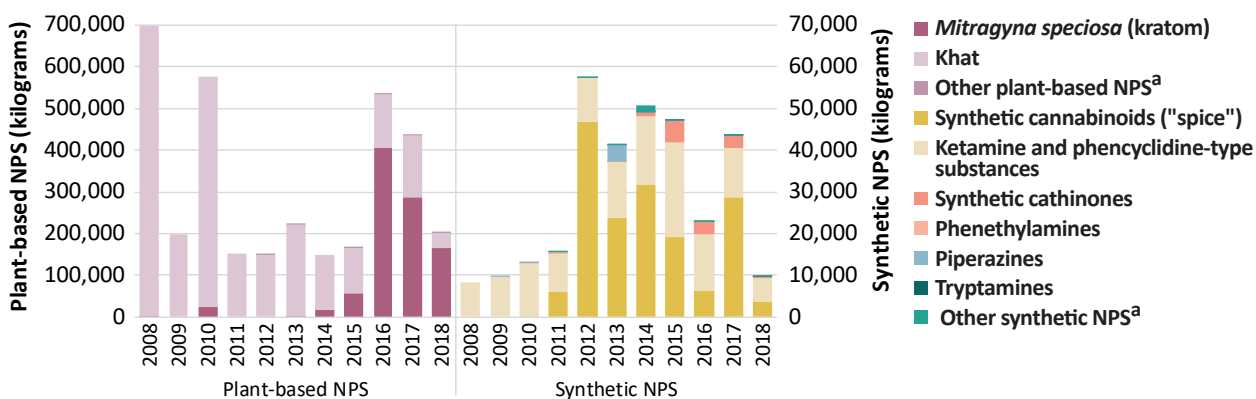
Seizures of new psychoactive substances

Seizures of NPS usually take place in countries where these substances are regulated. Variations of NPS seized may therefore reflect changes in their national regulation, in addition to changes in supply and in law enforcement capacity.

jurisdictions only. Kratom, for example, is available online in a number of countries.

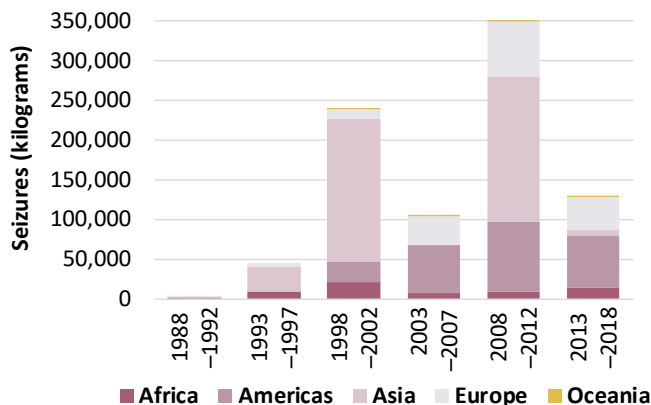
Measured by weight, kratom accounted for 63 per cent of all plant-based NPS seized over the 2014–2018 period and for 82 per cent in 2018, while khat accounted for most of the remainder. The trafficking and use of kratom still appears to be concentrated mostly in South-East Asia, with most kratom being seized in Malaysia, followed by Thailand and Myanmar, over the 2014–2018 period. Although seizures in those three countries have accounted for more than 99 per cent of the global total over the past decade, the figures indicating such a concentration may be misleading, since the drug is not controlled – and therefore not seized – in many countries. Smaller seizures of kratom made in South-East Asia also involved shipments to final destinations in other subregions, in particular in North America (most notably the United States) and Oceania (most

FIG. 56 Quantities of new psychoactive substances seized at the global level, 2008–2018



Source: UNODC, responses to the annual report questionnaire.

^a Reported seizures of other plant-based NPS in 2018 included ayahuasca and *Salvia divinorum*, and in previous years also kava, *Datura stramonium*, harmine and salvinorin A. Substances currently not under international control.

FIG. 57 Average annual seizures of khat, 1998–2018

Source: UNODC, responses to the annual report questionnaire.

notably Australia). In parallel, smaller quantities of kratom were also seized in Western and Central Europe and in Africa (e.g., South Africa, supplied through Indonesia).

While kratom is controlled, for example, in Australia, it is not controlled at the federal level in the United States. Following some 30 reported overdose cases in the United States²²³ in 2015 and 2016, there was an unsuccessful attempt to have kratom listed under schedule I of the Controlled Substances Act in 2016.^{224, 225} Nonetheless, kratom cannot be freely imported into the United States. In May 2018, the Food and Drug Administration issued warnings to three distributors for illegally selling unapproved drug products containing kratom in that country. Moreover, as at May 2019, kratom was controlled in the states of Alabama, Arkansas, Indiana, Rhode Island, Tennessee, Vermont and Wisconsin.²²⁶

Khat used to be the most commonly seized plant-based NPS, but the quantities seized globally have fluctuated around a downward trend line in recent years, from a peak of 697 tons in 2008 to 37 tons in 2018. The reasons for that decline are not known, but it may be linked in part to the fact that khat is

now transported in freeze-dried form instead of fresh. The difference in weight resulting from the two forms of trafficking can be considerable.

Khat seizures in the 2008–2012 period were dominated by quantities seized in Asia, notably in the Near and Middle East. Most of the khat intercepted during the 2013–2018 period, by contrast, was seized in North America (50 per cent) and in Western and Central Europe (28 per cent), followed by East Africa (8 per cent).

In the past decade, khat has been seized in a total of 57 countries across all regions. Compared with the interceptions of kratom reported by 10 countries, with three countries in South-East Asia (Malaysia, Thailand and Myanmar) accounting for the bulk of those seizures, this suggests that the khat market still has a far broader geographical reach than the kratom market.

Although khat appears to be most widely used in Yemen and Somalia, and in their expatriate communities abroad,²²⁷ it is often trafficked from Ethiopia and Kenya, which were mentioned most frequently as the countries of origin or departure in the annual report questionnaire both in the period 2014–2018 and over the past decade.²²⁸

Availability of synthetic new psychoactive substances appears to be declining

After marked increases over the 2009–2012 period, the overall quantities of synthetic NPS seized have shown a downward trend since 2012, most notably when they fell from 44 tons in 2017 to 10 tons in 2018. This may partly reflect the fact that some of the most widely used and most harmful NPS have been put under national and international control in recent years and therefore, according to the current definition, no longer belong to the NPS category.²²⁹ Moreover, a number of countries in North America, Europe and Oceania, where major

223 Oliver Grundmann and others, “The therapeutic potential of kratom”, *Addiction*, vol. 113, No. 10 (June 2018), pp. 1951–1954.

224 Jennifer Kurtz, “Kratom legality in the U.S. by state (2019 updated)”, *Redstorm Scientific* (May 2019).

225 Grundmann and others, “The therapeutic potential of kratom”.

226 Kurtz, “Kratom legality in the U.S. by state (2019 updated)”.

227 Rita Annoni Manghi and others, “Khat use: lifestyle or addiction?”, *Journal of Psychoactive Drugs*, vol. 41, No. 1 (2009), pp. 1–10.

228 UNODC, responses to the annual report questionnaire data.

229 According to the United Nations definition, an NPS is a psychoactive substance that is not under international control but has similar properties to those of substances under international control. The moment such a substance is controlled at the international level, it ceases to be an NPS.

markets for NPS are located, have introduced various controls on NPS traded in recent years. In parallel, China, which is frequently mentioned as the main country of origin or departure for various synthetic NPS (with 27 per cent of all such mentions over the 2014–2018 period, ahead of India with 10 per cent), has introduced controls in various waves on the manufacture of and trade in such substances. This and other developments appear to have had an impact on the proliferation of NPS at the global level, reducing the quantities of those substances on key markets.

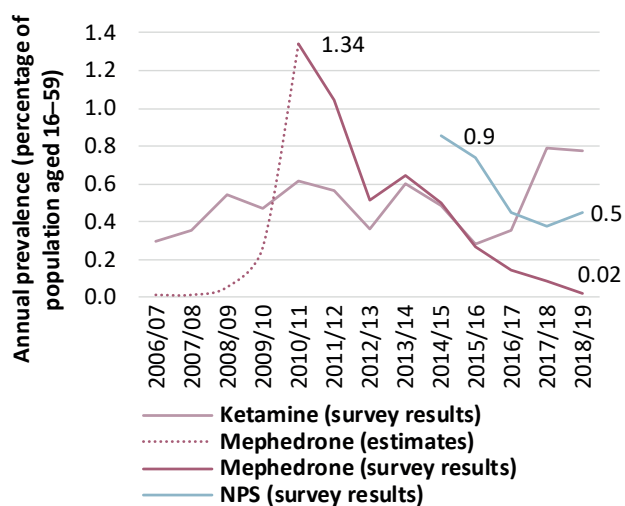
Use of new psychoactive substances is also declining in the United States and Europe

There is no comprehensive information on the use of NPS worldwide. Some data are available in the United States and Europe, where NPS markets first emerged and where the largest markets for such substances have been documented. These data show a downward trend in NPS use, in line with the trend in supply indicators.

Prevalence data for England and Wales, for example, show a clear downward trend in the use of NPS, which fell from 0.9 per cent of the population aged 16 to 59 in the fiscal year 2014/15 to 0.5 per cent in 2018/19, after the introduction of the Psychoactive Substances Act 2016. The Act entered into force in May 2016 and generally prohibits the production and import of and trade in substances that are intended for consumption for their psychoactive effects. While the use of NPS remains more popular among young people aged 16 to 24, who account for about half of NPS users, the use of such substances in that group also declined considerably over the same period, from an annual prevalence of 2.8 per cent in 2014/15 to 1.4 per cent in 2018/19. At the same time, NPS use has remained entrenched among some marginalized groups, such as the homeless and people in prison, which are not properly reflected in household surveys.

The prevalence data mentioned above do not include the use of NPS that were placed under national or international control during the 2000–2014 period. For example, mephedrone, a synthetic cathinone, gained greatly in popularity in 2009 and 2010 before

FIG. 58 Use of new psychoactive substances in England and Wales, United Kingdom, 2006–2019



United Kingdom, Home Office, *Drug Misuse: Findings from the 2018 to 2019 Crime Survey for England and Wales*, Statistical Bulletin 21/19 (London, September 2019).

^a Estimates derived from the British Crime Survey, conducted in 2010/11, and seizure statistics from the Forensic Science Service.

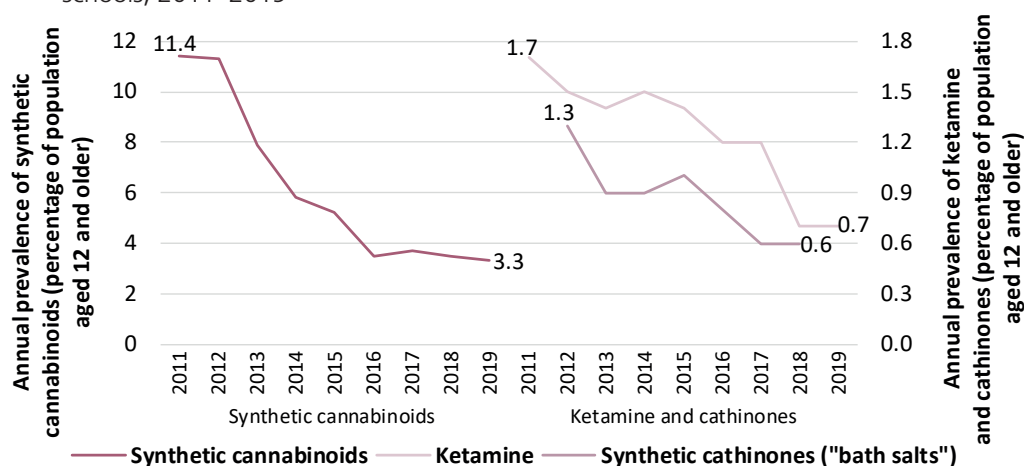
becoming a controlled substance in the United Kingdom (class B drug) in 2010 and before being controlled at the international level as from 2014. After the introduction of those regulations, the annual prevalence rate of mephedrone fell from 1.3 per cent of the general population aged 16 to 59 in England and Wales in the fiscal year 2011/12 to 0.5 per cent in 2014/15 and further to 0.02 per cent in 2018/19.²³⁰

The situation has, however, been different in the case of ketamine, a substance that has not been internationally controlled but was scheduled as a class C drug in the United Kingdom in 2006 and reclassified as a class B drug in 2014. The patterns of ketamine non-medical use have fluctuated significantly in England and Wales over the past decade, with its prevalence rate more than doubling between the fiscal years 2006/07 and 2018/19.²³¹ Ketamine is discussed here, in the context of NPS, although it actually differs significantly from other NPS; in

²³⁰ United Kingdom, Home Office, *Drug Misuse: Findings from the 2018 to 2019 Crime Survey for England and Wales*, Statistical Bulletin 21/19 (London, September 2019).

²³¹ Ibid.

FIG. 59 Use of new psychoactive substances among twelfth-grade students in United States high schools, 2011–2019



Source: National Institute on Drug Abuse, *Monitoring the Future* survey.

contrast to substances that have little or no history of medical use, ketamine is used widely in human and veterinary medicine.

Data on the United States also indicate a marked decline in the use of NPS. In particular, the prevalence of synthetic cannabinoid use among twelfth-grade students fell from 11.4 per cent in 2011 to 3.3 per cent in 2019. Similarly, the use of ketamine fell from 1.7 to 0.7 per cent over the same period, and the use of “bath salts” (synthetic cathinones) dropped from 1.3 per cent in 2012 to 0.6 per cent in 2018, the most recent year for which data are available. This happened in the context of a deterioration in the reputation of many of those substances among young people, in parallel to several waves of controls of synthetic cannabinoids and synthetic cathinones at the national level during the 2010–2012 period²³² and later at the global level, as well as the control of ketamine at the national level in 1999.²³³ Over the 2000–2019 period, the

annual prevalence of ketamine non-medical use among twelfth-grade high-school students fell drastically, from 2.5 per cent to 0.7 per cent.²³⁴

The different levels of NPS use in Austria and Germany offer an example of how similar countries may encounter different prevalence rates as a result of different NPS regulations. These two neighbouring countries in Western Europe have strong cultural ties, share the same language, have similar gross domestic product per capita figures and similar rates of social inequality, as well as similar health, legal and law enforcement systems, along with significant exchanges with each other of goods and services and movement of people. Both countries also had similar prevalence rates of overall drug use (about 7 per cent) among the general population aged 15 to 64 in 2015.²³⁵ However, the prevalence rate of NPS

Administration, “Schedules of Controlled Substances: Placement of Ketamine into Schedule III”, 21 CFR Part 1308, *Federal Register*, vol. 64, No. 133 (13 July 1999), pp. 37673–37675.

²³⁴ Lloyd D. Johnston and others, “Trends in annual prevalence of use of various drugs in grades 8, 10, and 12”, in *Monitoring the Future: National Survey Results on Drug Use 1975–2018 – Overview, Key Findings on Adolescent Drug Use* (Ann Arbor, Institute for Social Research, University of Michigan, 2019).

²³⁵ Ministry of Health of Germany, *SUCHT, Zeitschrift für Wissenschaft und Praxis*, vol. 62 (October 2016); and Julian Strizek and Alfred Uhl, *Bevölkerungserhebung zu Substanzgebrauch 2015*, Band 1: Forschungsbericht (Vienna, Gesundheit Österreich, 2016).

²³² United States, Dangerous Synthetic Drug Control Act of 2011, sect. 605; Jennifer A. Fass, Andrea A. Fass and Angela S. Garcia, “Synthetic cathinones (bath salts): legal status and patterns of abuse”, *Annals of Pharmacotherapy*, vol. 46, No. 3 (February 2012), pp. 436–441; United States, Department of Justice, Drug Enforcement Administration, “Drug fact sheet: bath salts or designer cathinones (synthetic stimulants)”; and United States, Department of Justice, Drug Enforcement Administration, *Drugs of Abuse: A DEA Resource Guide*, 2017 edition.

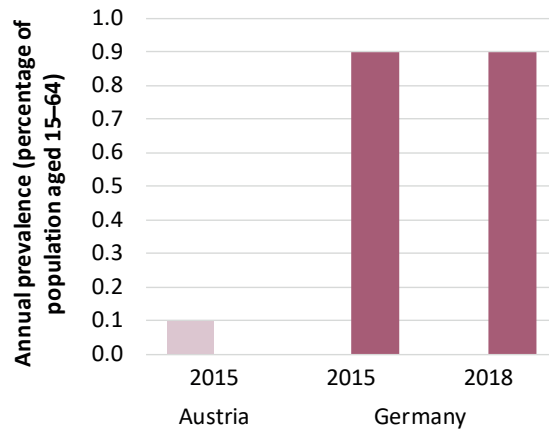
²³³ United States, Department of Justice, Drug Enforcement

use among the general population in Austria (0.1 per cent) was substantially lower than in Germany (0.9 per cent) in 2015.²³⁶

It is worth noting that in Austria, unlike in Germany, control of the import of “spice” products began far earlier, under the country’s law on medicinal products (as from 2008), and more general control of NPS followed the implementation of the country’s New Psychoactive Substances Act of December 2012.²³⁷ Based on the identification of individual psychoactive substances and implementing generic legislation for major drug classes, the Act prohibits the manufacture of, domestic trade in and the import and export of such NPS for non-medical purposes. An analysis of the impact of the Act on the market for NPS in Austria would be a complex undertaking and require a multi-indicator analysis. However, the striking difference in prevalence rates of NPS use between Austria and Germany suggests that differences in their respective NPS regulation could explain, at least partly, the different levels of NPS use. Comprehensive controls of NPS in Germany arrived a few years after the regulations in Austria, probably providing time for the NPS market to gain strength in Germany, where the implementation of legislation on NPS began in November 2016. Data show that the annual prevalence of NPS use then remained unchanged at 0.9 per cent, in contrast to an overall increase in drug use in Germany between 2015 and 2018, from 7.1 per cent to 8.1 per cent of the population aged 18 to 64.²³⁸ NPS use did not change after the German NPS Act, but the marked upward trend previously observed in Germany came to a halt.

Although their prevalence rates have stabilized or even declined in some countries, NPS – as main substances or adulterants – have captured important segments of the drug markets in certain locations and among people with drug use disorders. A study on residues detected in syringes collected from the bins of street-mounted automatic injection kit

FIG. 60 Use of new psychoactive substances in Austria and Germany, 2015–2018



Sources: Julian Strizek and Alfred Uhl, *Bevölkerungserhebung zu Substanzgebrauch 2015* (Vienna, Gesundheit Österreich GmbH, 2016); German Ministry of Health / SUCHT, *Zeitschrift für Wissenschaft und Praxis*, vol. 62, October 2016; t, N.-N. Seitz, K. Lochbühler, J. Atzendorf, C. Rauschert, T. Pfeiffer-Gerschel, L. Kraus, “Trends des Substanzkonsums und substanzbezogener Störungen. Auswertung des Epidemiologischen Suchtsurveys von 1995 bis 2018”, *Deutsches Ärzteblatt International*, vol. 116, Nos. 35–36; and UNODC, responses to the annual report questionnaire.

dispensers at services in six European cities in 2017 found a very high proportion of syringes containing cathinones in Budapest (80 per cent of the 226 syringes analysed) and in Paris (44 per cent of the 259 syringes analysed), while those substances were found in less than 10 per cent of syringes in Helsinki and in far lower proportions in Amsterdam, Glasgow and Lausanne.²³⁹ Synthetic cathinones reportedly appeared on the local drug market in Budapest after a heroin shortage in 2011, and cathinones have since presented a substantial challenge to services. Initially, the main cathinones injected in Budapest were pentedrone and MDPV, but this changed over time, and in 2017 the most commonly found cathinones were *N*-ethylhexedrone (76 per cent) and 4-Cl-*alpha*-PVP (45 per cent). In Paris, two cathinones were detected: 3-MMC or 4-MMC (mephedrone) (34 per cent) and 4-MEC (24 per cent).²⁴⁰ In Helsinki, six different cathinones were

²³⁶ UNODC, responses to the annual report questionnaire.

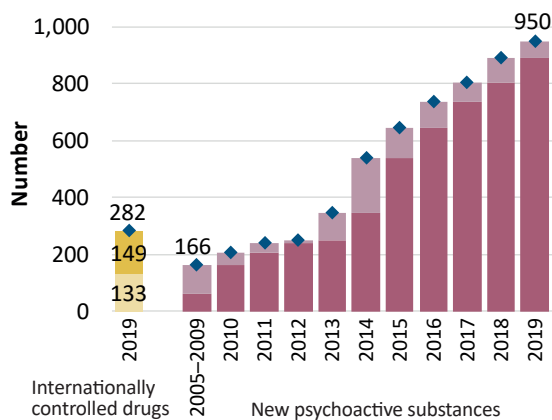
²³⁷ Johanna Schopper, Bundesministerium für Gesundheit, “Das Neue Psychoaktive-Substanzen-Gesetz“ (NPSG): Neue Aspekte und Entwicklungen zum Thema Freizeitdrogenkonsum”, presentation given at the ReDUse international conference in Vienna on 16 November 2012.

²³⁸ UNODC, responses to the annual report questionnaire.

²³⁹ EMCDDA, *Drugs in Syringes from Six European Cities: Results from the ESCAPE Project 2017* (Luxembourg, Publications Office of the European Union, 2019).

²⁴⁰ Ibid.

FIG. 61 Number of internationally controlled drugs in 2019 and new psychoactive substances identified at the global level, 2005–2019 (cumulative figures)



- Psychotropic substances (1971 Convention)
- Narcotic drugs (1961 Convention)
- NPS identified for the first time in current year
- NPS identified in previous years
- ◆ Total number of substances

Sources: UNODC, *World Drug Report 2013* (Vienna, 2013), updated with UNODC, Commission on Narcotic Drugs, Scheduling Decisions. Available at www.unodc.org/unodc/en/commissions/CND/Mandate_Functions_Mandate-and-Functions_Scheduling.html; and UNODC early warning advisory on new psychoactive substances.

detected in syringes; the most common one was *alpha*-PVP (4 per cent).²⁴¹

The majority (80 per cent) of syringes that tested positive for a synthetic cathinone also contained traces of other drugs. In more than two thirds (69 per cent) of cases, another cathinone was detected, but cathinones were also found in combination with other substances. In Helsinki, they were detected with amphetamines and opioids. In Paris, cathinones were found in the presence of cocaine, while other NPS (such as new amphetamine analogues or synthetic cannabinoids) were found together with cathinones in syringes in Budapest.²⁴² Combinations of two or more stimulants (cocaine, amphetamine, methamphetamine or synthetic cathinone) were not uncommon and, taken together, appeared in 10 per cent of syringes (including 4 per cent in Budapest

²⁴¹ Ibid.

²⁴² Ibid.

and 5 per cent in Paris). In this context, it seems that comparatively cheaper stimulants, such as amphetamines and cathinones, are used by dealers to adulterate more expensive drugs.²⁴³

If only NPS are considered, a total of 23 different cathinones were found in syringes across the six European cities, as well as seven different synthetic cannabinoids and five piperidines, out of a total of 116 psychoactive substances detected in such syringes, including opioids (both plant-based opiates and synthetic opioids, including various fentanyl derivatives), amphetamines, “ecstasy” (MDMA), ketamine, benzodiazepines, piperidines and cocaine.²⁴⁴

Where data are available, they show a steady decline in the use of NPS in Europe, but such substances have established themselves in some marginalized groups in society, such as the homeless or people in prison, among whom the smoking of synthetic cannabinoids has been identified as a problem.²⁴⁵ In Europe, the use of NPS in prisons was reported by 22 countries, with synthetic cannabinoids identified as posing the main challenge and health risks (16 countries), whereas the use of synthetic cathinones in prisons was reported by 10 countries, NPS with opioid effects by six, and new benzodiazepines by four countries.²⁴⁶ In Latvia, the use of synthetic opioids in prisons has also been linked to an increase in overdose cases and in injecting drugs and sharing needles among prisoners who use drugs.²⁴⁷

Geographical spread of trafficking in new psychoactive substances is declining

The number of countries reporting seizures of synthetic NPS rose from 2 in 2001 to 20 in 2008, then to 50 in 2017, after which it decreased to 38 in 2018. This trend is broadly consistent with the overall trend in the quantities of synthetic NPS seized

²⁴³ Ibid.

²⁴⁴ Ibid.

²⁴⁵ EMCDDA, *EU Drug Markets Report 2019* (Luxembourg, Publications Office of the European Union, 2019).

²⁴⁶ EMCDDA, *New Psychoactive Substances in Prison: results from an EMCDDA Trendspotter Study – June 2018*, EMCDDA Rapid Communication Series (Luxembourg, Publications Office of the European Union, 2018).

²⁴⁷ Ibid.

and the number of synthetic NPS identified globally, suggesting that after years of growth, the global synthetic NPS market has started to shrink in terms of both size and spread. Overall, a total of 72 countries across all regions reported seizures of synthetic NPS to UNODC during the 2008–2018 period, whereas a total of 57 countries reported seizures of plant-based NPS in the same period.

The largest quantities of synthetic NPS seized during the 2014–2018 period were reported in the Americas (46 per cent, mostly in North America), followed by Asia (41 per cent, mostly in East and South-East Asia) and Europe (12 per cent).

Data also indicate that synthetic cannabinoids have been dominating among the synthetic NPS seized in the past decade. During the 2014–2018 period, those substances were followed by ketamine, synthetic cathinones and, at lower levels, aminoindanes, tryptamines, phenethylamines and piperazines.

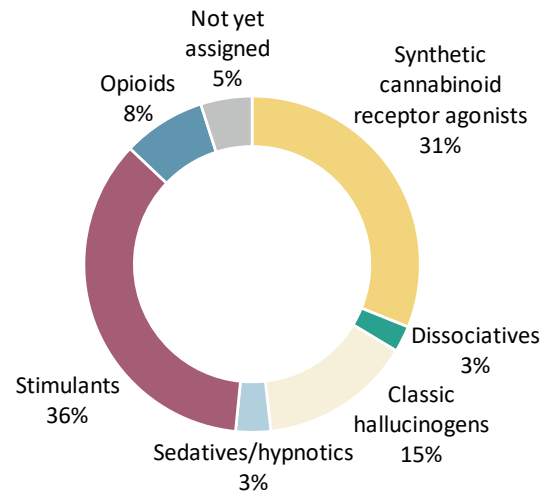
Some 950 new psychoactive substances have been identified at the global level since 2005

In March 2019, the Commission on Narcotic Drugs decided to schedule four substances (all fentanyl analogues) under the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol and a further five substances under the Convention on Psychotropic Substances of 1971, thus raising the total number of psychoactive substances under international control to 282 as at the end of 2019. By comparison, the number of NPS identified by authorities worldwide and reported to UNODC is already more than three times that figure, having reached a total of 950 in December 2019, up from 892 in December 2018 and 166 in 2009.

It should be noted, however, that not all identified NPS may merit being placed under international control, as taking such a step depends on the harm they can cause and their persistence on the market; some only emerge for a short period of time and then disappear.

Data show that most of the synthetic NPS identified in the period 2009–2019 had stimulant effects (mostly cathinones and phenethylamines), followed by synthetic cannabinoids and hallucinogens (mostly tryptamines).

FIG. 62 Distribution of synthetic new psychoactive substances reported to UNODC, by psychoactive effect group, 2009–2019



Source: UNODC early warning advisory on new psychoactive substances.

Note: The analysis of pharmacological effects comprises NPS registered up to December 2019. Plant-based substances were excluded from the analysis, as they usually contain a large number of different substances, some of which may not be fully known, and the effects and interactions of which may not be fully understood.

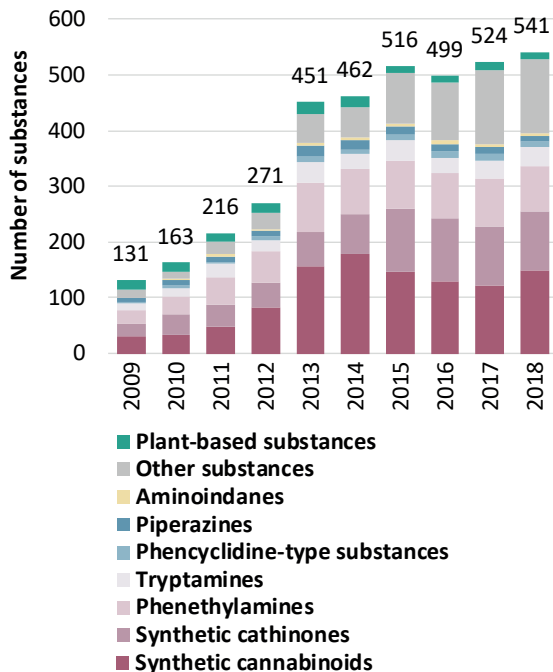
More than 500 different new psychoactive substances are reported each year

An analysis of NPS reported to UNODC suggests increasing diversification in the NPS market until 2015, followed by a trend towards stabilization in the number of new substances arriving on the market in individual countries, at an overall rate of more than 500 NPS per year, with 528 synthetic NPS and 13 plant-based NPS reported in 2018.

While there was a decrease in the number of new synthetic cannabinoids arriving on markets worldwide over the 2014–2018 period, the number of NPS with stimulant effects increased, and the number of newly emerging NPS with opioid effects rose sharply, from 7 substances in 2014 to 48 in 2018. That increase represents a rise from 2 per cent of all NPS in 2014 to 9 per cent in 2018.

The main concern for the authorities in a number of countries has been the emergence of new synthetic opioid receptor agonists (NPS with opioid effects), often fentanyl analogues, in recent years. Although

FIG. 63 New psychoactive substances reported to UNODC each year, by psychoactive effect group, 2009–2018



Source: UNODC early warning advisory on new psychoactive substances.

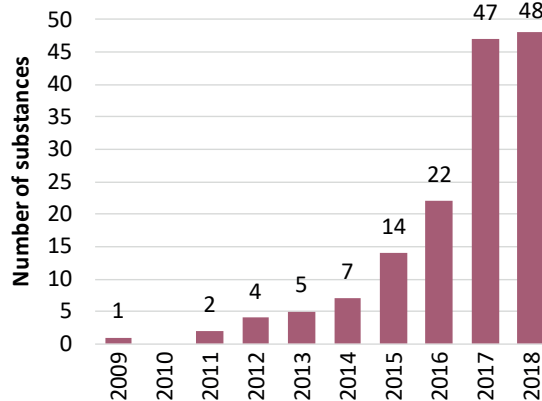
fewer in number than other NPS categories, they have proved to be particularly potent and harmful, leading to increasing numbers of overdose deaths, in particular in North America and, to a lesser extent, in Europe and other regions.

Over the past decade, most NPS have been reported each year in Europe and North America. Since 2013, however, more systematic monitoring of NPS has also been carried out in South America, Central America and the Caribbean, leading to a growing body of evidence on the regional characteristics of the NPS problem.²⁴⁸ Several countries in those sub-regions have established national early warning systems, and a regional early warning system was set up in 2019.²⁴⁹ The regional system has issued a number of alerts on the emergence and presence of

248 UNODC, “Global SMART Newsletter for Latin America and the Caribbean”, No. 3, March 2019.

249 Observatorio Interamericano sobre Drogas, “Boletín Informativo del Observatorio Interamericano sobre Drogas: Reporte del Sistema de Alerta Temprana sobre Drogas de las Américas – SATA”, vol. No.1, (March 2020).

FIG. 64 New psychoactive substances with opioid effects reported annually to UNODC, 2009–2018



Source: UNODC early warning advisory on new psychoactive substances.

a broad range of substances other than those typically associated with the drug market in the region, such as NPS with hallucinogenic properties, sometimes sold as “LSD”, as well as on various medicines used for non-medical purposes.²⁵⁰ While the total number of such alerts may still be comparatively small, they clearly point to an increasing awareness of the emergence of NPS and the associated adverse health effects for the drug-using population in South America, Central America and the Caribbean.

250 Ibid.

DRUG TRAFFICKING OVER THE DARKNET

Vendors and customers perceive advantages in using the darknet for drug transactions

Purchases and sales of drugs and NPS over the Internet involve both the open net (using encrypted communication) and the darknet, which forms part of the deep web. Although not discussed in this chapter, various social media apps are also increasingly being used for purchasing and selling drugs.

The main characteristic and comparative advantage of darknet markets is their perceived anonymity, in particular the physical anonymity of those who do business on such markets. Purchasing drugs on those markets does not necessarily require physical contact, which reduces the inhibitions of some customers who might otherwise be reticent to interact personally with drug dealers. In addition, the customer does not have to go to dangerous places to buy drugs. Darknet trafficking also overcomes the challenge of sellers and buyers having to be in the same location; thus, organizations that traffic drugs over the darknet do not need to have the critical mass of customers necessary to sustain a local market.

Customers intending to buy drugs over the darknet typically access it through the onion router (TOR) in order to conceal their identities. Specialized darknet explorers (such as GRAMS, before it was taken down in December 2017, DuckDuckGo, Ahmia,²⁵¹ Torch, Hidden Wiki,²⁵² etc.) enable them to access their desired market platforms. The goods bought on the various darknet marketplaces are then typically paid for in cryptocurrencies, most notably bitcoins, which are also used for licit transactions on the open web.²⁵³ These cryptocurrencies can

subsequently be used to buy other goods and services, or they may be exchanged for various national currencies.

In general, the drugs are delivered by public or private postal services, presumably without their knowledge, although the drugs may also be hidden in locations that are secretly communicated to the buyer.^{254, 255} Parcels are often sent to anonymous post office boxes, including automated lockers for self-service collection. In jurisdictions with strong secrecy-of-correspondence laws, which typically apply to letters, drugs are often dispatched in letters. In some countries, drugs purchased on the darknet are thus preferably posted in letters to destinations within the poster's own country. This has also prompted some darknet vendors to transport letters containing drugs across the border into neighbouring countries in order to post them within the client's destination country and avoid detection.²⁵⁶

Darknet platforms bring anonymous suppliers and anonymous customers together. Although some darknet drug sales are from dealer to dealer, there are indications that most are still from dealer to user. Purchasers may benefit from other customers' feedback about the quality of the drugs sold, which can help them to evaluate the perceived reliability of the supplier.^{257, 258, 259} The platforms may guarantee the

251 Christian Rentrop, "Darknet per Suchmaschine durchstöbern", *tippstricks*, 28 November 2019. Available at <https://www.heise.de/tippstricks/Darknet-per-Suchmaschine-durchstoebeln-4598008.html>.

252 Tim Aschermann, "Darknet-Suchmaschine - gibt es das?", *CHIP*, 30 July 2019. Available at https://praxistipps.chip.de/darknet-suchmaschine-gibt-es-das_46504.

253 Martin Horton-Eddison and Matteo Di Cristofaro, "Hard interventions and innovation in crypto-drug markets: the escrow example", Policy Brief No. 11 (Swansea, United

Kingdom, Global Drug Policy Observatory, Swansea University, August 2017), p. 4.

254 World Customs Organization, *Illicit Trade Report 2015* (Brussels, December 2016), p. 44.

255 See the background report prepared by UNODC for the meeting on the recent development of the opiate market in Central Asia, the Russian Federation and the Caucasus, held in Vienna on 29 and 30 January 2020.

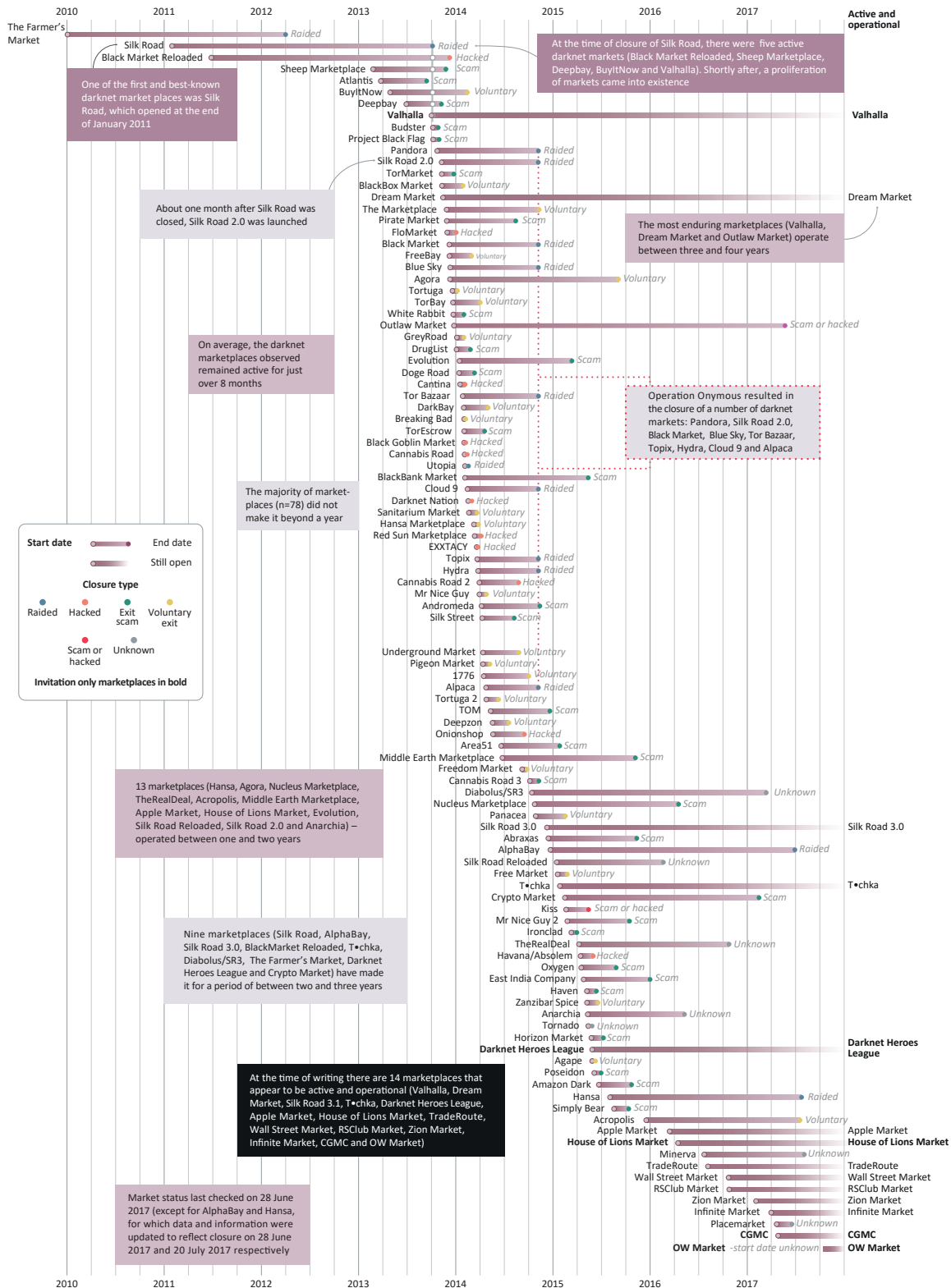
256 Presentation by Robert Taferner, Austrian Criminal Intelligence Service, on online drug trafficking at the workshop of the National Reitox Academy on online drug purchases and implications for health responses, organized by Gesundheit Österreich, 2 December 2019.

257 M.J. Barratt, J.A. Ferris and A.R. Winstock, "Use of Silk Road, the online drug marketplace, in the United Kingdom, Australia and the United States", *Addiction*, vol. 10, No. 4 (May 2014).

258 Meropi Tzanetakis, Gerrit Kamphausen, Bernd Wersé and Roger von Laufenberg, "The transparency paradox. Building trust, resolving disputes and optimising logistics on conventional and online drugs markets", *International Journal of Drug Policy*, vol. 35 (September 2016).

259 Judith Aldridge and David Décary-Héту, "Not an 'eBay for drugs': the cryptomarket 'Silk Road' as a paradigm shifting criminal innovation", *SSRN Electronic Journal* (May 2014).

FIG. 65 Lifespan of darknet markets, 2010–2019



payments of the goods sold, typically by making use of escrow account systems,²⁶⁰ into which the client is required to pay immediately for the required goods but the finalization of the payment to the supplier is postponed until the goods have actually been received by the customer.

The darknet appears to be particularly attractive for selling drugs.^{261, 262} As reported previously,²⁶³ an analysis of the goods and services listed on the darknet revealed that in 2017 (and in previous years),²⁶⁴ 62 per cent of offers on the darknet were drugs and drug-related chemicals, that is, mostly illicit drugs and, to a lesser extent, drug-related chemicals and pharmaceuticals. The remaining 38 per cent were mainly related to fraud and counterfeit products, followed by guides and tutorials, hacking resources and malware, and firearms and explosives.²⁶⁵ Drug sales on the darknet markets in the European Union were found to involve primarily cannabis, ATS and cocaine, that is, drugs that are mostly purchased for recreational purposes.²⁶⁶ Other drugs, such as heroin, are also sold over the darknet but account for a smaller share of overall sales.

Confidence in drug purchases over the darknet has started to suffer

In contrast to licit online trade in goods and services on the open net, the trafficking of drugs over the darknet has been characterized by a high turnover of drug markets. As a result of law enforcement

activities, exit scams and voluntary closures, darknet markets continue to disappear and new ones to emerge.²⁶⁷ Although the darknet market ecosystem is clearly both dynamic and resilient, the fact that darknet markets, including the largest ones, disappear quickly seems to have eroded, at least temporarily, the confidence of some drug buyers in the overall reliability of those markets.

A previous analysis of 103 darknet markets selling drugs over the period 2010–2017 revealed that those markets were, on average, active for just over eight months,²⁶⁸ and their average lifespan does not appear to have increased in recent years. In fact, as at May 2019, most of the previously important darknet markets had disappeared. Out of more than 110 darknet markets for drugs identified during the period 2010–2019, just 10 remained fully operational. Most of the darknet markets selling drugs that were operational in 2019 had been launched only in 2018.²⁶⁹

Sales of drugs over the darknet are likely to continue

It is not clear what the long-term impact of recent law enforcement successes in dismantling darknet sites will be on the survival of the darknet as a marketplace for drug sales. Internationally coordinated law enforcement activities, combined with extensive cyberattacks by competitors operating on the darknet, appear to have generated a general distrust in the onion router environment,^{270, 271} which may at the very least affect the growth rate of the darknet in the near future. However, the onion router's overall user-friendliness, existing market variety and

260 Horton-Eddison and Di Cristofaro, "Hard interventions and innovation in crypto-drug markets", p. 3.

261 EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*, Joint Publication Series (Luxembourg, Publications Office of the European Union, 2017).

262 EMCDDA and Europol, *EU Drug Markets Report 2019* (Luxembourg, Publications Office of the European Union, 2019).

263 *World Drug Report 2018* (United Nations publication, Sales No. E.18.XI.9).

264 Based on active listings data from AlphaBay, Dream Market, Hansa, TradeRoute and Valhalla darknet marketplaces, spanning from the launch of each marketplace through to 21 August 2017, or their closure.

265 Data based on active listings found on AlphaBay, Dream Market, Hansa, TradeRoute and Valhalla from the launch of each market to 21 August 2017 (or previous market closure) (EMCDDA and Europol, *Drugs and the Darknet*).

266 *Global Drug Survey 2020* and previous years.

267 EMCDDA and Europol, *EU Drug Markets Report 2019*.

268 EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

269 EMCDDA and Europol, *EU Drug Markets Report 2019*.

270 Europol, *Internet Organised Crime Threat Assessment (IOCTA) 2018* (The Hague, 2018)

271 The onion router is a free, open-source software that enables anonymous communication. The original software project launched under that name was intended to conceal users' physical locations and thus to protect their personal privacy. The core principle of the onion router was developed in the mid-1990s by the United States Naval Research Laboratory and was developed further by the United States Defense Advanced Research Projects Agency with the purpose of protecting United States intelligence communication online.

existing customer base make full migration to new platforms currently unlikely.²⁷²

This does not mean that the dismantling of large sites will not have an impact on overall drug-related darknet sales and the distribution of darknet marketplaces. In contrast to earlier periods, when one or two markets dominated the overall darknet sector²⁷³ no similar, clearly dominant darknet market has been identified since the disappearance of Dream Market. The darknet drug marketplace is now characterized by fragmentation and ever-greater distrust,²⁷⁴ but that may not last.

There are already some early indications of the emergence of new potential champions among the darknet drug markets. One of them may be Empire Market, which exhibits some of the same features as the now-defunct AlphaBay market did, but with some security improvements. Empire Market is still small compared with AlphaBay and Dream Market at their peaks, but it appears to have been growing rapidly over the past few months and was reportedly the single largest darknet market for drugs as at January 2020, according to some darknet sources.²⁷⁵ As changes in darknet markets take place extremely quickly, it remains to be seen whether the platform, which was founded in early 2018,²⁷⁶ will emerge as the dominant darknet market in the near future (like Silk Road, AlphaBay and Dream Market before it) or disappear into oblivion within a few months, like many other platforms that were hyped for short periods of time.

Empire Market allows payments not only in bitcoins, but also in other cryptocurrencies, such as Litecoins and Monero, which are gaining in popularity owing to concerns among darknet users that the flow of bitcoins might be traced by the

authorities. Empire Market applies a multi-signature system to authorize cryptocurrency transactions and uses sophisticated encryption programmes such as Pretty Good Privacy and two-factor authentication features in order to increase customer security.²⁷⁷

Another recently opened (July 2019) darknet market to be monitored for drug sales is the Samsara market, which appears to have many similarities to the now-defunct Dream Market. Some observers have even expressed the view that the Samsara market may have been opened by the same operators who previously ran Dream Market.²⁷⁸ If true, that would definitely pose a major challenge for law enforcement authorities, as the operators of Dream Market proved to be extremely efficient in marketing their services across the darknet community while maintaining high standards of security.

Exit scams and shutdowns of darknet markets have had an impact

It has been argued that the shutdown of major trading platforms would not have long-lasting effects on drug sales over the darknet, that disruptions might only achieve short-term success and that customers and suppliers would simply shift to the next-largest trading platforms and overall drug sales would quickly recover.²⁷⁹ However, in reporting on the consequences of the shutdown of AlphaBay and Hansa in mid-2017, the Global Drug Survey 2018, a non-representative survey of Internet users, suggested that as at January 2018, some 15 per cent of darknet users used such markets less frequently after the shutdowns and 9 per cent had stopped using the darknet for drug purchases. This suggests that the shutdowns may have had an impact on the purchase of drugs over darknet platforms, at least for a few months.

Similarly, there are indications that following a long-term upward trend, monthly sales of drugs through major darknet markets may have stabilized or even declined over the period July 2017–August 2018

272 Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2019 (The Hague, 2019).

273 Such as Silk Road (2011–2013), Silk Road 2.0 (in 2014, ending in November 2014), Evolution (November 2014–January 2015), Agora (January 2015–October 2015) (Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2019), AlphaBay (November 2015–July 2017) and Dream Market (mid-2017–April 2019) (Europol, *Internet Organized Crime Threat Assessment* (IOCTA) 2019).

274 Europol, *Internet Organized Crime Threat Assessment* (IOCTA) 2019.

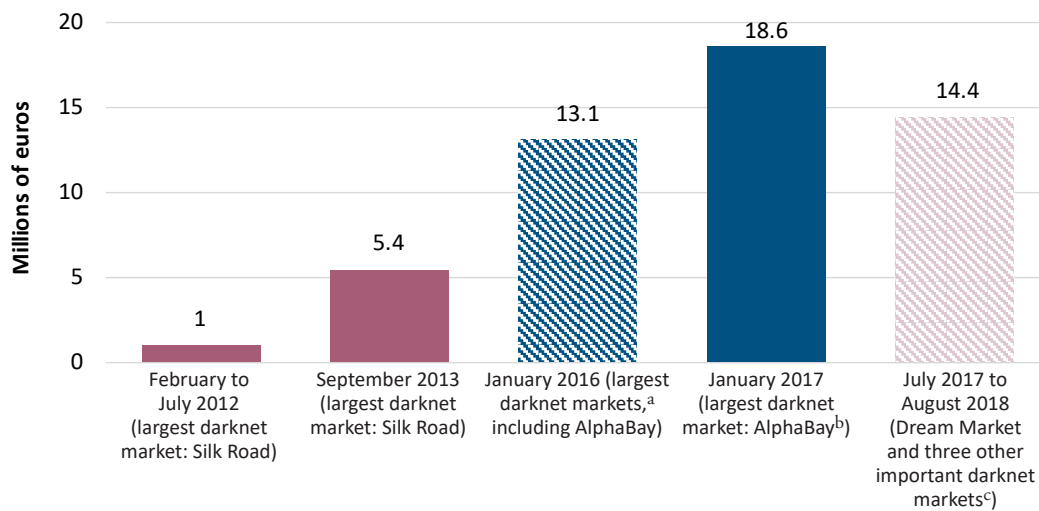
275 See www.darknetstats.com/empire-market/.

276 EMCDDA and Europol, *EU Drug Markets Report 2019*.

277 See www.thedarkweblinks.com/darknet-market-list/.

278 Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2019.

279 EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

FIG. 66 Estimates of monthly sales of drugs through different major darknet markets, 2012–2018

Sources: Nicolas Christin, “Traveling the Silk Road: a measurement analysis of a large anonymous online marketplace”, proceedings of twenty-second International World Wide Web Conference, May 2013; Kristy Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands* (Santa Monica, California, RAND Corporation, and Cambridge, United Kingdom, 2016); EMCDDA and Europol, *EU Drug Markets Report 2019*; Nicolas Christin and Jeremy Thomas, “Analysis of the supply of drugs and new psychoactive substances by Europe-based vendors via darknet markets in 2017-18”, background paper commissioned by EMCDDA for the *EU Drug Markets Report 2019*.

Note: The “major darknet markets” were identified by the respective authors. Even though global sales figures are reported, the identification of those markets may still have been influenced by the research focus of the authors, which was mainly on darknet activities in European Union countries.

^a The eight largest darknet markets for drug listings in January 2016 were AlphaBay (36 per cent of the listings on those eight markets, or 28 per cent of all available drug listings on darknet markets at the time), followed by Nucleus, Dream Market, Crypto Market, Hansa, Python, French Darknet and Darknet Heroes League.

^b UNODC calculations, based on estimated daily sales of some 600,000 over the darknet.

^c The three other darknet markets were TradeRoute, Valhalla and Berlusconi Market. TradeRoute disappeared because of an exit scam in October 2017; Valhalla was raided in February 2019; Dream Market was closed in April 2019; and Berlusconi Market was raided in November 2019.

compared with monthly drug sales over the darknet at the beginning of 2017. Direct comparability is limited as it remains difficult to extrapolate the overall size of darknet markets from data on some key darknet markets, in particular as the selection of those key markets may have been influenced by the research focus of the authors, and because their relative importance may change over time.²⁸⁰

280 The analysis, for example, in January 2016 of the then six key darknet markets (in terms of listings: AlphaBay, Nucleus, Dreammarket, CryptoMarket, Hansa, Python, French Dark Net and Dark Net Heroes League) revealed a combined number of 105,811 listings, compared with 27,250 combined listings for a further 11 darknet markets. This suggests that those six key darknet markets accounted for around 80 per cent of all known listings on darknet markets in January 2016 (Kristy Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands* (RAND Corporation, Santa Monica, California, and Cambridge, United Kingdom, 2016)). Later,

Nevertheless, raids, exit scams – which typically involve the organizers of darknet markets taking hold of funds held in escrow accounts before shutting those markets down – and voluntary closures appear to have at least temporarily halted the long-term upward trend in drug sales over the darknet. The most notable of these include: the dismantling of the then three largest darknet markets AlphaBay, Hansa and the Russian Anonymous Marketplace (RAMP) in mid-2017, which together were estimated by Europol to account for the bulk of all darknet market activity at the time;²⁸¹ the end of a

Europol estimated that the three main darknet markets in the first two quarters of 2017 (AlphaBay, Hansa and the Russian Anonymous Marketplace) accounted for 87 per cent of all darknet activities (Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2018).

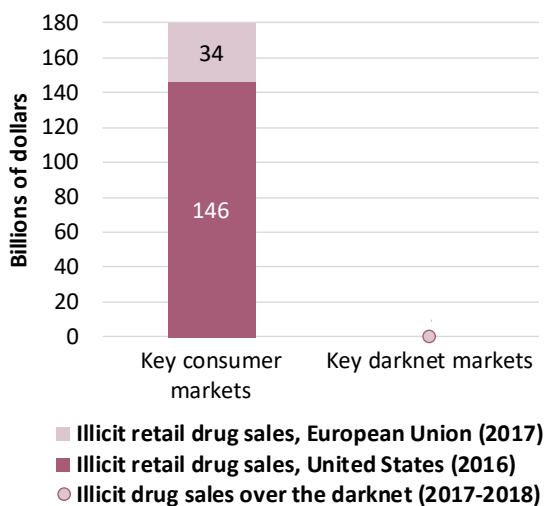
281 Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2018.

number of other darknet markets following exit scams in 2017 (including CryptoMarket, Silk Road 3.1, Trade Route and Outlaw Market); the exit scam involving Olympia Market in 2018 and the closure of Dream Market in April 2019, the largest darknet market at the time; and successful raids by authorities targeting Valhalla in February 2019 and Wallstreet in April 2019.²⁸²

Drug supply over the darknet remains modest compared with overall illicit retail sales of drugs in Europe and the United States

The overall darknet sector has remained comparatively modest compared with overall illicit drug sales in the United States and the European Union. Based on available data, the best estimate suggests that the

FIG. 67 Annual illicit retail drug sales in the United States (2016) and Europe (2017) versus annual illicit drug sales through key darknet markets (2017–2018)



Sources: Gregory Midgette, Steven Davenport, Jonathan P. Caulkins and Beau Kilmer, *What America's Users Spend on Illegal Drugs, 2006–2016* (RAND Corporation, Santa Monica, California, 2019); EMCDDA and Europol, *EU Drug Markets Report 2019*; EMCDDA, "Analysis of the supply of drugs and new psychoactive substances by Europe-based vendors via darknet markets in 2017–18".

Note: Based on data from the four largest drug markets on the darknet (Dream Market, followed by TradeRoute, Valhalla and Berlusconi Market) from July 2017 to August 2018.

²⁸² EMCDDA and Europol, *EU Drug Market Report 2019*.

four largest darknet markets (Dream Market, TradeRoute, Berlusconi Market and Valhalla) accounted for 0.12 per cent of the combined illicit retail drug sales of the United States and the European Union. Even if those four markets accounted for just half of the total darknet market – although the actual proportion was probably far higher – the size of the overall darknet market would still equal only some 0.2 per cent of the combined retail drug markets of the United States and Europe.

Despite the rapidly changing nature of the market landscape, the overall characteristics of darknet trafficking seem to remain relatively unchanged

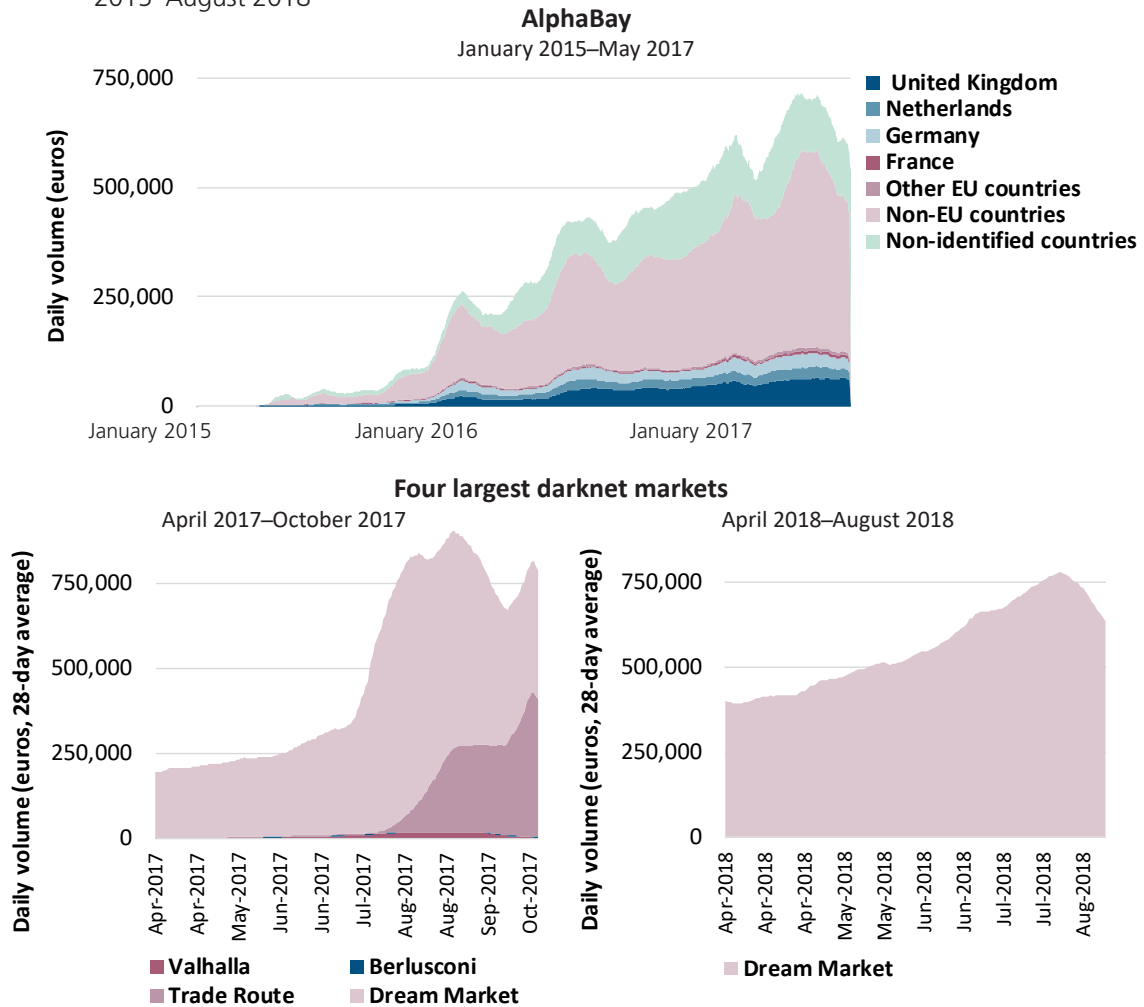
A more in-depth analysis of the involvement of AlphaBay, Dream Market and other important darknet markets in supplying drugs shows that the classic pattern identified in previous years, in which the closure of a major darknet market favours, first of all, the next-largest darknet market(s), remained true for the second half of 2017 and the first half of 2018. Thus, following the successful shutdown of AlphaBay by the authorities in July 2017, both Dream Market and TradeRoute benefited greatly from vendors and customers switching to those platforms. Notably, Dream Market, founded in late 2013, had already been in existence for three and a half years when AlphaBay was raided, and had gained the trust of other darknet users. Once TradeRoute ceased operations in the last quarter of 2017 owing to an exit scam, vendors and customers also moved on to Dream Market, and its popularity continued to grow in the following quarters. Subsequently, by August 2018, the reported daily sales on Dream Market exceeded even those estimated to have taken place on AlphaBay in January 2017.^{283, 284}

An analysis of the vendors identified on AlphaBay (March 2015–May 2017) and on Dream Market

²⁸³ EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

²⁸⁴ Nicolas Christin and Jeremy Thomas, "Analysis of the supply of drugs and new psychoactive substances by Europe-based vendors via darknet markets in 2017–18" (November 2019).

FIG. 68 Trends in drug sales on AlphaBay, Dream Market and other major darknet markets, January 2015–August 2018



Sources: EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy, Joint publications series* (Luxembourg, Publications Office of the European Union, November 2017); Nicolas Christin and Jeremy Thomas, “Analysis of the supply of drugs and new psychoactive substances by Europe-based vendors via darknet markets in 2017–18” (November 2019).

^a Each point on the two graphs represents a moving 28-day average. The plot is stacked, meaning that the top line represents the sum of all markets. The vertical dotted lines represent times at which scrapes of the relevant markets were obtained, with the black dotted lines depicting scrapes of Dream Market. The dip at the end of the second plot is an artefact due to missing data for the computation of the moving average.

and the other three major darknet markets (TradeRoute, Valhalla and Berlusconi Market, for the period July 2017–August 2018) suggests that the importance of vendors on the darknet may have increased, in particular in the European Union (from 29 per cent of darknet sales through AlphaBay from March 2016 to May 2017 to 44 per cent of total darknet sales through Dream Market, TradeRoute, Valhalla

and Berlusconi Market from July 2017 to August 2018).^{285, 286}

²⁸⁵ EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

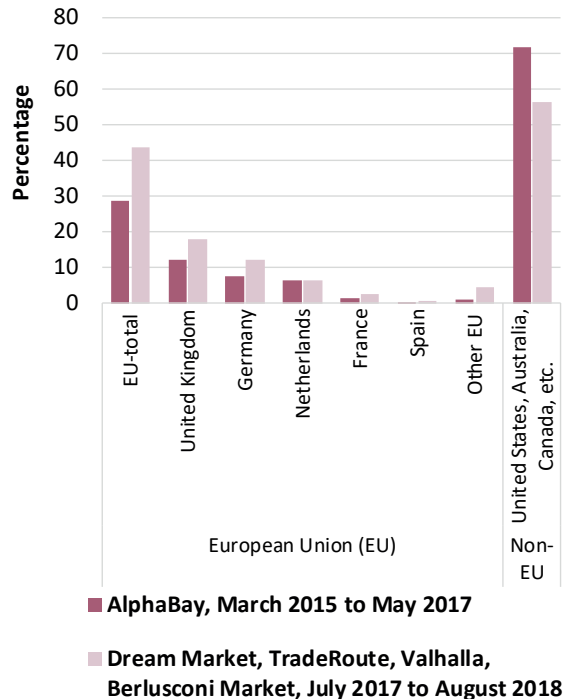
²⁸⁶ Nicolas Christin and Jeremy Thomas, “Analysis of the supply of drugs and new psychoactive substances by Europe-based vendors via darknet markets in 2017–18” (November 2019).

Findings from research conducted in 2016 on the eight largest darknet markets at the time²⁸⁷ suggested that most of the revenues of darknet vendors in Europe were made by vendors from the United Kingdom, followed by vendors located in Germany, the Netherlands, France and Spain, while most of the revenues of darknet vendors from outside the European Union were generated by vendors located in the United States (36 per cent of the total), followed by those in Australia (11 per cent) and Canada (7 per cent).²⁸⁸ The analysis of AlphaBay over the period March 2015–May 2017²⁸⁹ and the analysis of vendors on Dream Market, TradeRoute, Valhalla and Berlusconi Market over the period July 2017–August 2018 confirmed this ranking of vendor countries of origin by sales revenue. The data for most countries show that patterns of sales of various drugs over the darknet were similar in the periods March 2015–May 2017 and July 2017–August 2018. Only for smaller markets that emerged later in Europe were changes noted in the rankings of sales by vendor location.^{290, 291}

However, vendors on the darknet do not necessarily indicate their true locations. There have been frequent reports, for instance, of darknet vendors located in the Netherlands who chose German IP addresses and subsequently also chose German postal services to have their parcels delivered to their clients in order to avoid ever-tighter customs controls of parcels originating in the Netherlands.²⁹²

In terms of the goods and services sold over the darknet, an analysis of Dream Market and the three other major darknet markets (TradeRoute, Valhalla and Berlusconi Market) in the period July

FIG. 69 Geographical spread of darknet vendors on key darknet markets, based on revenues generated



Sources: EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*; EMCDDA and Europol, *EU Drug Markets Report 2019*.

2017–August 2018 revealed that 80 per cent were related to drugs.²⁹³

An analysis of the markets in the United Kingdom, Germany and the Netherlands, which are responsible for the bulk of drug sales on the darknet markets in the European Union (i.e., 92 per cent of sales in the period March 2015–May 2017 and 83 per cent in the period July 2017–August 2018), shows that cannabis, ATS and cocaine are the most common drugs sold over the darknet in the European Union. Other drugs, including dissociatives (such as ketamine), hallucinogens, NPS and opioids, are also sold over the darknet but account for a smaller share of overall sales.^{294, 295}

287 AlphaBay, followed by Nucleus, Dream Market, Crypto Market, Hansa, Python, French Darknet and Darknet Heroes League.

288 Kristy Kruihof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands* (RAND Corporation, Santa Monica, California, and Cambridge, United Kingdom, 2016).

289 EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

290 Ibid.

291 EMCDDA and Europol, *EU Drug Markets Report 2019*.

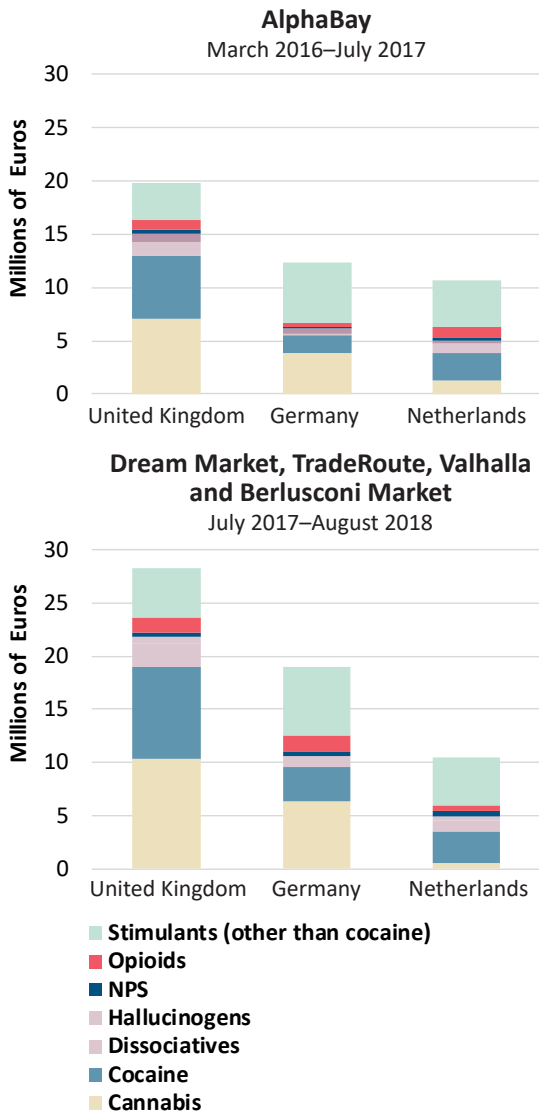
292 Presentation by Robert Taferner, Austrian Criminal Intelligence Service, on online drug trafficking at the workshop of the National Reitox Academy on online drug purchases and implications for health responses, organized by Gesundheit Österreich, 2 December 2019.

293 Christin and Thomas, “Analysis of the supply of drugs and new psychoactive substances by Europe-based vendors”.

294 EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

295 EMCDDA and Europol, *EU Drug Markets Report 2019*.

FIG. 70 Drugs sold on the darknet in different European countries



Sources: EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*; EMCDDA and Europol, *EU Drug Markets Report 2019*.

Notes: Dissociatives: ketamine, gamma-hydroxybutyrate (GHB), gamma-butyrolactone (GBL); hallucinogens: LSD, PCP (excluding psychedelics); non-cocaine stimulants: amphetamine, methamphetamine, MDMA, MDA; opioids: heroin, opium, analgesics.

Expressed as a proportion of sales made on street markets in Europe, the data suggest that the darknet is more important for sales of “ecstasy”, but of relatively low importance for sales of heroin.²⁹⁶ This

²⁹⁶ Ibid.

may reflect the fact that sales over the darknet are still more from dealers to final customers (and/or their close friends), as opposed to being from dealers to other dealers, and that darknet technology is difficult to master for some hard-core heroin users (as opposed to recreational drug users). Moreover, qualitative research among darknet drug users in Austria suggests that purchases of heroin over the darknet are often limited to the acquisition of quality heroin for certain special occasion, such as Easter, Christmas, birthdays and parties, while daily purchases of smaller quantities (in which lower and often varying degrees of purity are accepted) still take place on the street. Heroin users need their daily ration and often do not have the financial means to purchase heroin in larger quantities and/or are afraid that such large amounts might be stolen by other heroin-dependent persons.²⁹⁷

Similar to the situation in the European Union, an analysis carried out in St. Petersburg, Russian Federation, showed that the drugs most commonly offered on Hydra, the main Russian darknet market in 2019, were cannabis (marijuana and hashish), followed by ATS (notably amphetamine, “ecstasy” and to a lesser extent methamphetamine) and cocaine. As in the European Union, sales of opiates, notably heroin, over the darknet also seem to play less of a role. In contrast to the darknet markets for drugs in the European Union, however, sales of cathinones (i.e., mephedrone and *alpha*-PVP) appear to be more important in the Russian Federation.^{298, 299}

At the same time, the darknet has also expanded to various locations outside Europe, the Americas and Oceania. Although such markets still seem to be comparatively small in developing countries, their share appears to have increased. Notably, Asian countries have been identified as both sources and destinations for crypto-drug transactions.³⁰⁰

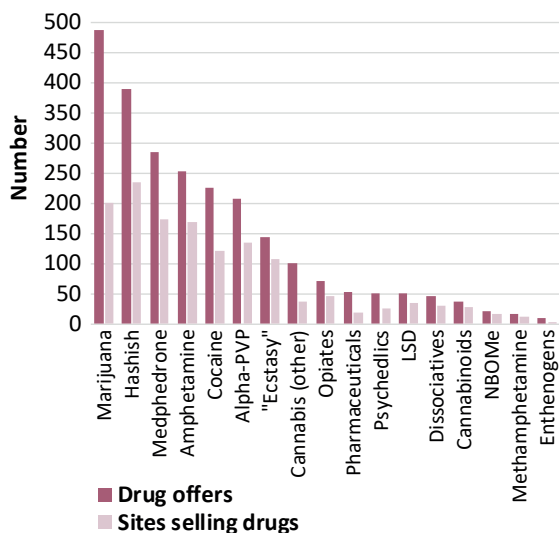
²⁹⁷ Irene Schmutterer, “Purchasing in web drug supermarkets: motives, concern, harms; results from the VIDRO project”, presentation given at the National Reitox Academy, Vienna, 2 December 2019.

²⁹⁸ UNODC, background document of the meeting on the recent developments of the opiate market in Central Asia, the Russian Federation and the Caucasus, held in Vienna on 29 and 30 January 2020.

²⁹⁹ Source: DrugStat, “Na chëm sidit Piter?”, 3 April 2019. Available at <https://telegra.ph/Na-chyom-sidit-Piter-04-03>.

³⁰⁰ Julian Broséus and others, “A geographical analysis of traf-

FIG. 71 Number of offers and sites on the Hydra darknet platform in St. Petersburg, Russian Federation, by drug type, 2019



Source: DrugStat, "Na chëm sidit Piter?", 3 April 2019. Available at <https://telegra.ph/Na-chyom-sidit-Piter-04-03> (translated from Russian).

In an analysis of the Evolution darknet market, which was active from January 2014 to March 2015, 93 countries across the globe were identified as source countries and 164 as destination countries for darknet transactions, with China and Hong Kong, China, accounting for 3.6 per cent of all listings in that period.³⁰¹ The analysis also revealed that the listing proportions of China (including Hong Kong, China) were three times higher than their respective vendor proportions. This may be explained by the strict control of China's Internet traffic, which leaves only a few vendors on the market who consequently deal in larger quantities. The majority of the drug listings related to China and Hong Kong, China, concerned NPS (93 per cent). This was in stark contrast to the majority of other countries, where more traditional drugs dominated the darknet.³⁰²

It is noteworthy that the opioid crisis in the United States has been linked in part to vendors and

ficking on a popular darknet market", *Forensic Science International*, vol. 277 (August 2017), pp. 88–102.

301 Ibid.

302 Ibid.

manufacturers in China who use the Internet, including the darknet, for transactions and regular postal services, such as the United States Postal Service, to transport drugs, including fentanyl and its analogues, which are often classified as NPS.^{303, 304, 305} (including the United States Postal Service) to transport the drugs, including fentanyl and its analogues.^{306, 307, 308} An analysis of email addresses linked to drug listings found on eight major darknet markets in 2016 revealed that while most could be linked to the United States (34 per cent) and Europe (32 per cent, notably the Netherlands and the United Kingdom with 12 per cent each), China accounted for 9 per cent and India for 3 per cent of the total.³⁰⁹ It is also of note that, prior to his arrest and suicide in 2017, the founder and key administrator of the AlphaBay darknet market, a Canadian citizen, actually organized the operations of the largest darknet platform while living in Thailand, although its key computer servers were located in Lithuania,^{310, 311} which clearly underlines the international nature of this business.

Alternatives to drug supply over the darknet are emerging

Europol has reported that the closure of key darknet markets has given rise to a growing number of single-vendor shops,³¹² as well-established vendors with high levels of trust and good reputation have set up their own hidden service platforms and continued to do business with the clientele previously established on those key markets. There is also a general

303 United States Department of Justice, DEA, *Drug Threat Assessment 2019*, and previous years.

304 UNODC, responses to the annual report questionnaire.

305 International Drug Policy Consortium, *10 Years of Drug Policy in Asia: How Far Have We Come? A Civil Society Shadow Report* (London, 2019).

306 International Drug Policy Consortium, *10 Years of Drug Policy in Asia: How Far Have We Come?*

307 UNODC, responses to the annual report questionnaire.

308 United States Department of Justice, DEA, *2019 Drug Threat Assessment* (December 2019) and previous years.

309 Kristy Kruihof and others, *Internet-facilitated Drugs Trade*.

310 United States Federal Bureau of Investigation, "Darknet takedown: authorities shutter online criminal market AlphaBay", 20 July 2017.

311 United States Department of Justice, "AlphaBay, the largest online 'dark market', shut down", 20 July 2017.

312 Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2019.

trend towards more fragmented darknet markets operating through the onion router.³¹³

In addition, growth has been observed in secondary, non-English-speaking darknet markets, which generally cater to a particular nationality or language group.³¹⁴ In particular, the platform Hydra, which targets Russian-speaking communities worldwide, seems to be of growing importance.³¹⁵

Moreover, the development of encrypted communications applications that bypass the traditional darknet markets may have contributed to enhancing single-vendor trade on the darknet, helping to direct users to services and enabling closed communication.³¹⁶

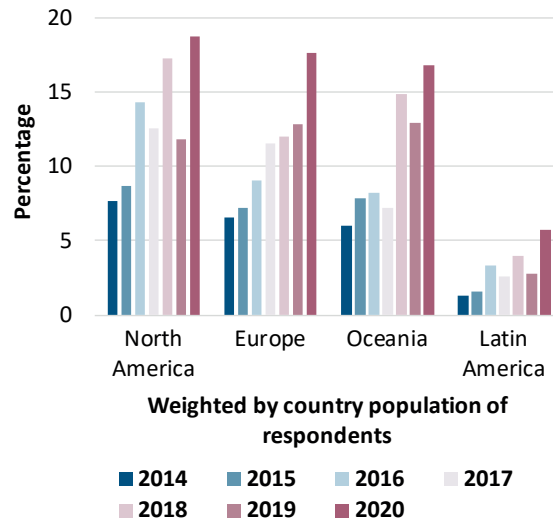
In parallel, some sophisticated open web marketplaces have emerged, which are characterized by high levels of anonymity among a large number of players and by the rapid replacement of arrested participants; they operate with encrypted messages and existing postal services, not only for drug delivery but also for the transfer of money.

An increasing percentage of a selected group of drug users purchase drugs on the darknet

The Global Drug Survey, which is based on a non-representative convenience sample of roughly 100,000 to 500,000 self-selected people from more than 50 countries – mostly developed countries – each year, shows that the proportion of Internet users using drugs who purchased drugs over the darknet more than tripled from 4.7 per cent in January 2014 to 15 per cent in January 2020,³¹⁷ with increases found in all regions covered by the survey.³¹⁸

However, disaggregated data suggest that the proportion of Internet users purchasing drugs over the darknet declined between January 2018 and January

FIG. 72 Proportion of surveyed Internet users using drugs in the past year who purchased drugs over the darknet, selected regions and subregions, January 2014–January 2020



Source: UNODC calculations based on *Global Drug Survey 2020* data and previous years: detailed findings on drug cryptomarkets. Available from Dr. Monica Barratt, Drug Policy Modelling Program, National Drug and Alcohol Research Centre, Australia.

Notes: The *Global Drug Survey* is based on a convenience sample of 100,000 to 500,000 people every year, of whom 50,000 to 90,000 replied to questions on drug purchases over the darknet. Values shown have been weighted by the population of reporting countries; North America: averages based on information from respondents in Canada and the United States; Europe: averages based on information from respondents in 25 European countries (not included are data from the Russian Federation, which are only available for 2018 and 2020); Oceania: averages based on information from respondents in Australia and New Zealand; Latin America: averages based on information from respondents in Brazil, Colombia and Mexico (not included are data from Argentina and Chile, which are only available for 2020 and 2019, respectively).

2019 in all regions except Europe, before increasing markedly in all regions between January 2019 and January 2020. The temporary decline in 2018 may have been a consequence of the shutdown of major darknet drug markets in July 2017. Responses from survey participants on the impact of darknet market closures, in particular of AlphaBay and Hansa in mid-2017 and Dream Market in April 2019, on their behaviour as drug purchasers over the darknet suggest that the overall impact of the closure of darknet markets in 2017 may have been far more pronounced than of the closure of darknet markets in 2019.

313 Ibid.

314 Ibid.

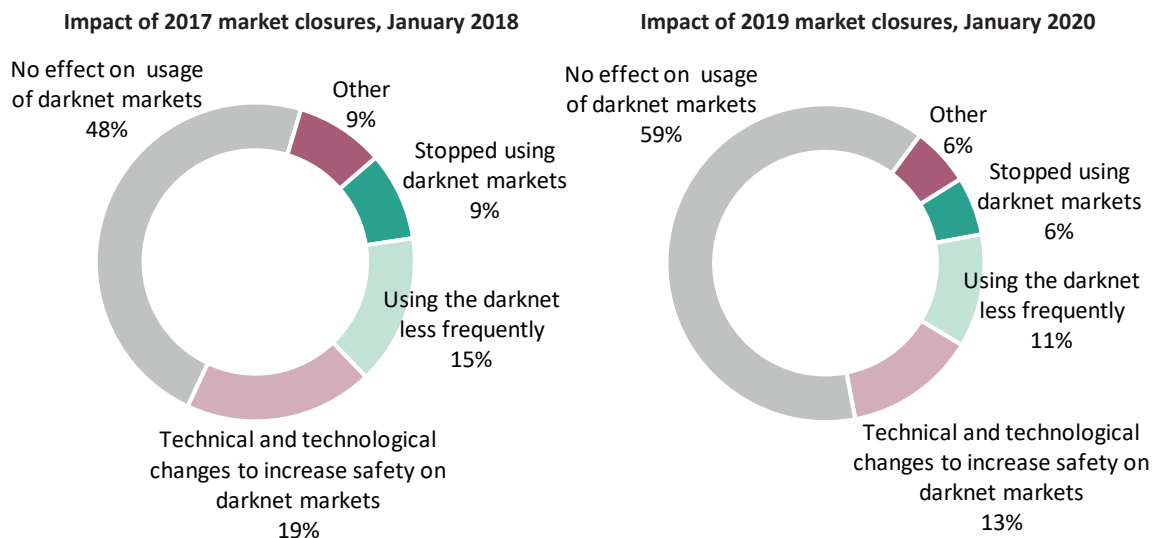
315 *World Drug Report 2019* (United Nations publication, Sales No. E.19.XI.8).

316 Europol, *Internet Organised Crime Threat Assessment* (IOCTA) 2019.

317 Data from the *Global Drug Survey* refer to January of the reporting year.

318 *Global Drug Survey 2020* and previous years.

FIG. 73 Reported impact of market closures among persons purchasing drugs on the darknet in 2017 and in 2019



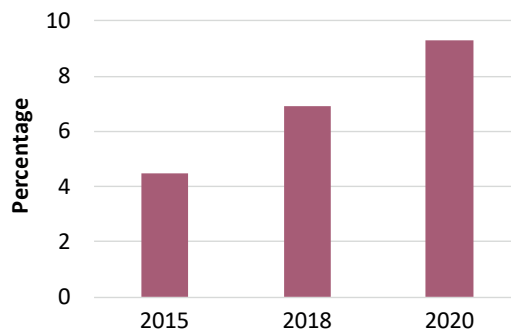
Source: *Global Drug Survey 2020* and previous years: detailed findings on drug cryptomarkets.

While half of Internet users purchasing drugs on the darknet continue to use the same type of drugs that they used prior to obtaining drugs through the darknet, some have changed their drug use habits. More than a quarter of those who started using drugs before they began buying drugs on the darknet now report (in 2020) that they consume a wider range of drugs, and 9.7 per cent report that they consume a different class of drugs. In addition, the darknet may be increasingly developing into an alternative to other sources of drugs, such as friends, acquaintances or street drug dealers, for people who did not previously use drugs: the proportion of people purchasing drugs on the darknet who did not use drugs prior to their first drug purchase on the darknet has doubled, from 4.5 per cent in 2015 to 9.3 per cent in 2020.³¹⁹

Analysis shows also that most people who purchased drugs over the darknet in 2020 only started doing so recently, i.e., a third in the last year, about half in the last two years and two thirds in the last three years. By contrast, following shutdowns of close to 100 darknet markets over the past decade, very few people who reported having started using the darknet as a source of drugs at the time of Silk Road

³¹⁹ *Global Drug Survey 2020* and previous years.

FIG. 74 Share of people who had not consumed drugs prior to their first purchase of drugs on the darknet, among Internet users purchasing drugs over the darknet, 2015–2020



Source: *Global Drug Survey 2020* and previous years: detailed findings on drug cryptomarkets.

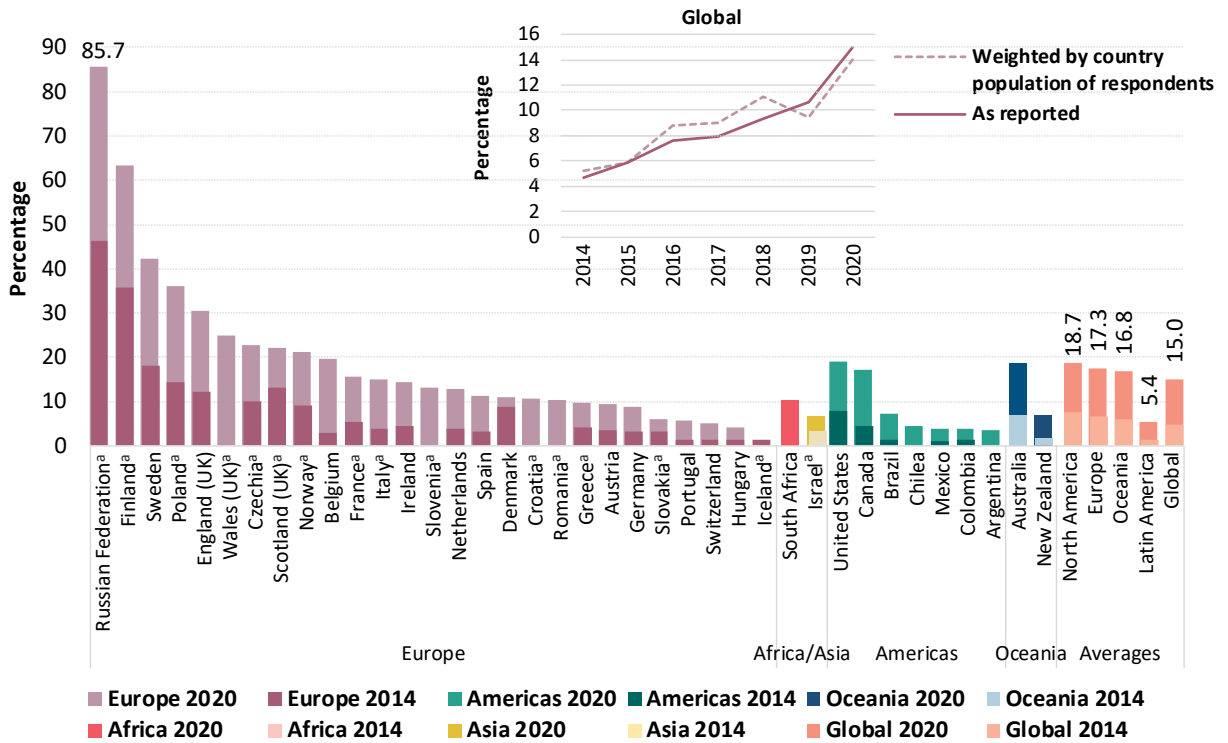
appear to be still involved in purchasing drugs on the darknet.^{320, 321}

It has been argued that the Covid-19 pandemic in 2020 and the subsequent lockdown in many

³²⁰ EMCDDA and Europol, *Drugs and the Darknet: Perspectives for Enforcement, Research and Policy*.

³²¹ *Global Drug Survey 2020*.

FIG. 75 Proportion of surveyed Internet users using drugs (in the past year) who purchased drugs over the darknet, global average and selected countries, January 2014 and January 2020



Source: UNODC calculations based on the *Global Drug Survey 2020* data and previous years: detailed findings on drug cryptomarkets. Note: The *Global Drug Survey* is based on a convenience sample of 100,000 to 500,000 people every year, of whom 50,000 to 90,000 replied to questions on drug purchases over the darknet. All regional averages are weighted by the population of each country. North America: averages based on information from respondents in Canada and the United States; Europe: averages based on information from respondents in 25 European countries (not included are data from the Russian Federation, which are only available for 2018 and 2020; Oceania: averages based on information from respondents in Australia and New Zealand; Latin America: averages based on information from respondents in Brazil, Colombia and Mexico (not included are data from Argentina and Chile, which are only available for 2020 and 2019, respectively).^a Data for either January 2014 or January 2020 were not available; data from the most recent year available were taken as a proxy.

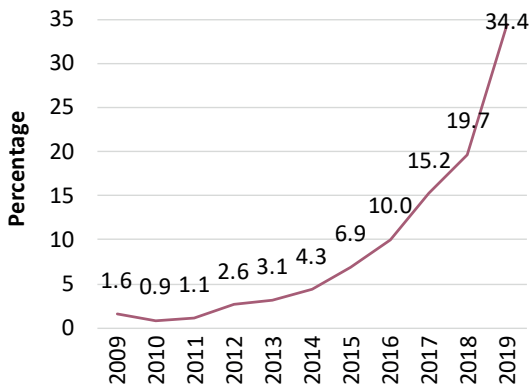
countries have led to a reduction in overall drug trafficking, which has gone hand in hand with increases in drug prices.^{322, 323} At the same time, there are indications that cybercrime, including sales of drugs through the darknet at the retail level, has increased.^{324, 325, 326} A recent analysis of three major

European markets, Cannazon, Agarth and Versus (in order of importance), points to an increase in market activity mainly in relation to cannabis. An increase of more than 25 per cent from January to March 2020, mostly driven by Cannazon, a market specialized in the sale of cannabis.³²⁷ Detailed analysis of that market shows a marked increase in retail sales of cannabis (sales of 1 g, 10 g, 28 g and up to 1 ounce) while sales of large quantities of the drug (sales of 100 g, 500 g and 1 kg) declined from January to March 2020.

322 UNODC, *Research Brief: COVID-19 and the Drug Supply Chain: from Production and Trafficking to Use* (Vienna, May 2020).
 323 Ibid.
 324 Europol, “Catching the virus: cybercrime, disinformation and the COVID-19 pandemic” (April 2020).
 325 UNODC, *Research Brief: COVID-19 and the Drug Supply Chain: from Production and Trafficking to Use*.
 326 EMCDDA, *Special Report: COVID-19 and Drugs – Drug Supply Via Darknet Markets* (Lisbon, May 2020).

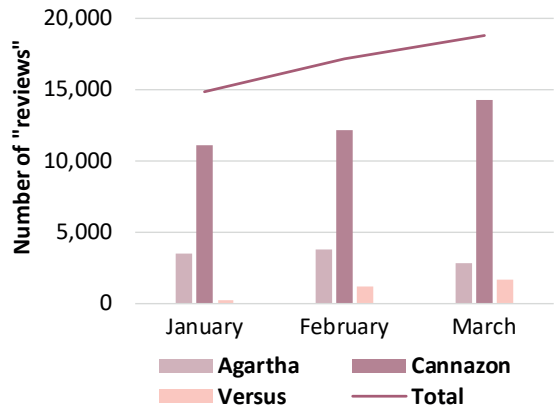
327 Ibid.

FIG. 76 Year in which Internet users who purchase drugs via the darknet obtained their first drug through the darknet, reported in January 2020



Source: *Global Drug Survey 2020*: detailed findings on drug cryptomarkets.

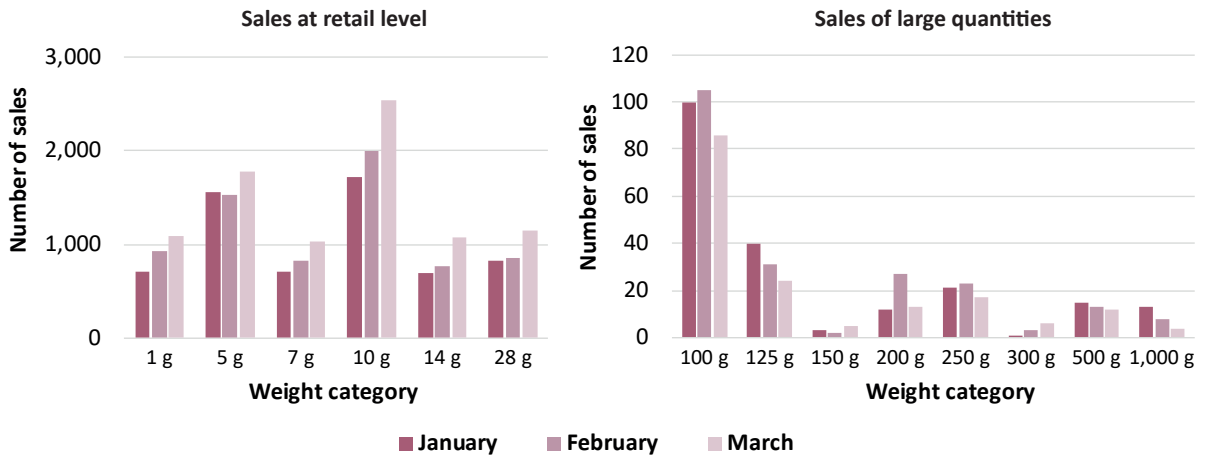
FIG. 77 Number of “reviews” of three European darknet markets, Agartha, Cannazon and Versus, January–March 2020



Source: EMCDDA, *Special Report: COVID-19 and Drugs – Drug Supply Via Darknet Markets*.

Note: The number of “reviews” refer to the number of feedback reports posted by people buying drugs on the three darknet markets (Agartha, Cannazon and Versus).

FIG. 78 Sales of cannabis by weight category on Cannazon market, January–March 2020



Source: EMCDDA, *Special Report: COVID-19 and Drugs – Drug Supply Via Darknet Markets*.

DEVELOPMENTS IN JURISDICTIONS WITH MEASURES REGULATING THE NON-MEDICAL USE OF CANNABIS

As at December 2019, legal provisions had been approved in Canada, Uruguay and in 11 jurisdictions in the United States, including the District of Columbia and the Northern Mariana Islands, to allow the production and sale of cannabis products for non-medical use. The common feature of the legislation in Canada and in the jurisdictions in the United States is that most of them allow for-profit industry to produce and sell cannabis products for non-medical use. There are some differences in the level of regulation, its implementation and the control of the non-medical use of cannabis (see tables 3, 4 and 5 for details on cannabis regulations in each jurisdiction in Canada, the United States and Uruguay). Moreover, those regulations are implemented in different local contexts and influenced by different dynamics, which is likely to have a different impact on the development of cannabis markets within each jurisdiction, on the extent of the non-medical use of cannabis and on other indicators relating to public health and safety and criminal justice. It may take years of regular monitoring of different indicators to fully assess the outcome and impact of the legislation. The sections below therefore do not represent an attempt to assess the impact of cannabis legalization, but rather to describe the outcome of one year of implementation of different features of the legislation, the status of legislation and the regulation of the non-medical use of cannabis in Canada, as well as the developments in Uruguay and selected jurisdictions in the United States.

Legalization of the non-medical use of cannabis in Canada

In 2018, the Government of Canada passed the Cannabis Act, which permits the commercial production and sale of cannabis products for non-medical use by people aged 18 and older. The new legislation and its supporting regulations came into effect on 17 October 2018, although the use

of cannabis products for medical purposes had already been allowed in Canada as early as 1999. The objectives of the current cannabis legislation in Canada are to keep cannabis away from young people (under 18 years of age), to prevent criminals from profiting from the distribution and sale of cannabis and to safeguard public health and safety by allowing adults (aged 18 and older) legal access to cannabis.³²⁸ Under the constitutional division of powers in Canada, the federal Government and provincial governments have different responsibilities.³²⁹ As the provinces historically developed their own systems to regulate the sale of alcohol, a similar approach has been applied to regulate the non-medical use of cannabis products.

To monitor the outcome of the new cannabis regulations, the Government of Canada has invested in a formal system that may eventually help to evaluate their impact and support the further development of policies and programmes. One of the main measures taken to that end is a cannabis survey that established a baseline in 2018 and is repeated every quarter in order to provide objective information on trends in the use of cannabis products, both medical and non-medical, as well as on how the legal cannabis market has evolved over time.

Following an initial increase in 2018, cannabis use appears to have stabilized

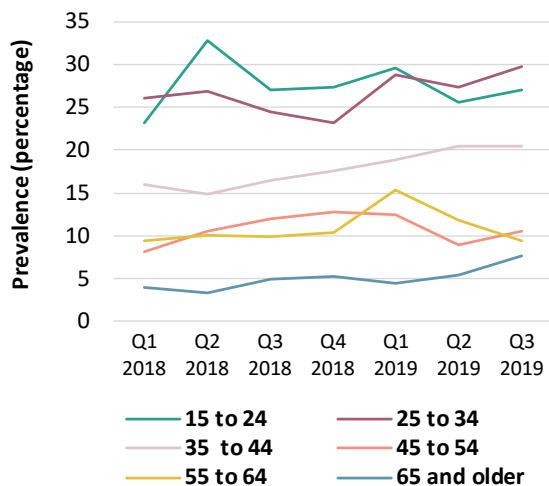
At the baseline, in the first quarter of 2018, nearly 14 per cent of Canadians (12.2 per cent of women and 15.8 per cent of men) reported that they had used cannabis, including cannabis products for medical purposes, in the past three months.³³⁰ The highest prevalence rates were reported among those aged 25–34 (26 per cent) and 15–24 (23 per cent). By the beginning of 2019, the prevalence of use in the past three months had increased to 17.5 per cent, and it remained close to that level until the third quarter of 2019 (17.1 per cent). While the

328 Canada, Ministry of Justice, “Cannabis legalization and regulation”. Available at www.justice.gc.ca/eng/cj-jp/cannabis.

329 See table at the end of the present chapter.

330 It should be noted that prevalence of use in the past three months is not a measure generally used in the *World Drug Report*. The information on past-three-month prevalence is presented here only because it is the period of monitoring and reporting established by Statistics Canada.

FIG. 79 Use of cannabis in the past three months in Canada, 2018–2019



Source: Statistics Canada, “National cannabis survey 2018 and 2019”.

Note: The quarters on the horizontal axis refer to the times at which the survey was conducted. Data refer to cannabis use for medical and non-medical purposes in the past three months.

prevalence of cannabis use in the past three months rose in most age groups in 2019, the most marked increase was observed in the oldest age group (65 and older), for which the prevalence nearly doubled in comparison with 2018. There also seems to be a larger proportion of new users among older adults than in other age groups: while 10 per cent of new cannabis users were aged 25–44 in the second and third quarters of 2019, more than one quarter were aged 65 and older.³³¹

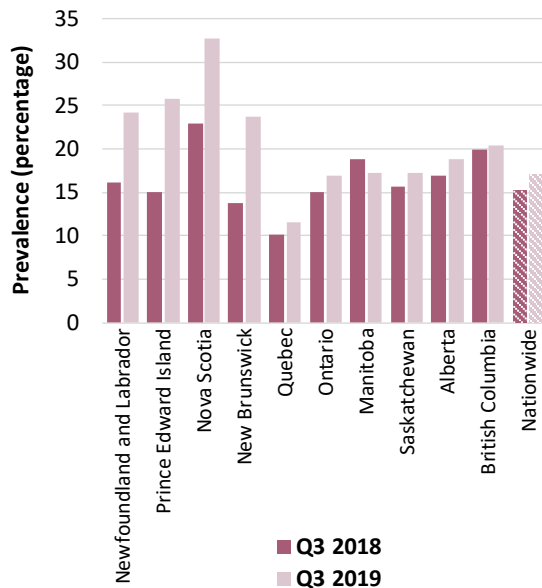
Cannabis use has increased in all provinces but Manitoba. In most provinces, the increase between 2018 and 2019 was rather modest. In four provinces, however, cannabis use increased considerably (Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick).

Most young people are using cannabis for non-medical purposes

There is a considerable level of overlap between the medical and non-medical use of cannabis products in Canada, although the proportion varies by age group. In the second and third quarters of 2019, 52

331 Statistics Canada, “National cannabis survey: third quarter 2019”, 30 October 2019.

FIG. 80 Use of cannabis in the past three months across provinces in Canada, third quarter of 2018 and third quarter of 2019



Source: Statistics Canada, “National cannabis survey: third quarter 2018 and 2019”.

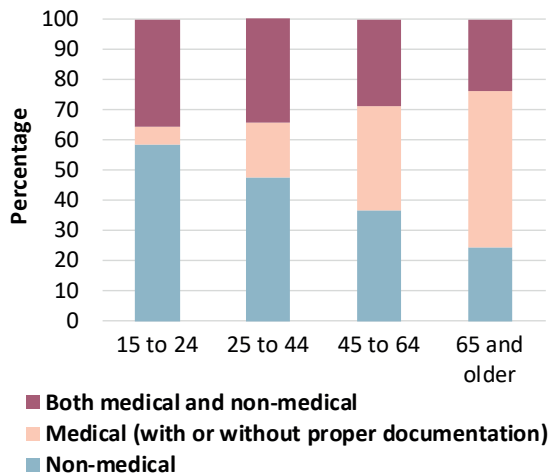
Note: Data refer to cannabis use for medical and non-medical purposes in the past three months.

per cent of cannabis users aged 65 and older reported using cannabis for medical purposes (with or without proper documentation for such use). On the other hand, nearly 60 per cent of cannabis users aged 15–24 reported the use of cannabis products for non-medical purposes, and one third of respondents in that age group reported using those products for both medical and non-medical reasons.

Along with the increase in prevalence, the frequency of cannabis use also increased marginally. At the beginning of 2018, some 5 per cent of the population aged 15 and older were daily users of cannabis products; by the third quarter of 2019, this proportion had increased to 6 per cent. Increases in the proportion of daily users of cannabis were observed mainly among males, young people aged 18–24 and those aged 65 and older.

Daily or near-daily use of cannabis is more frequent in younger users than in older ones. Nearly 8 per cent of people aged 15–24 and 9 per cent of those aged 25–44 were daily or near-daily users of

FIG. 81 Distribution of reported reasons for cannabis use among people who used cannabis in the past three months, by age group, Canada, second and third quarter of 2019



Source: Statistics Canada, "Cannabis survey 2019".

Note: The proportion of people between 15 and 24 using cannabis medically was considered unreliable.

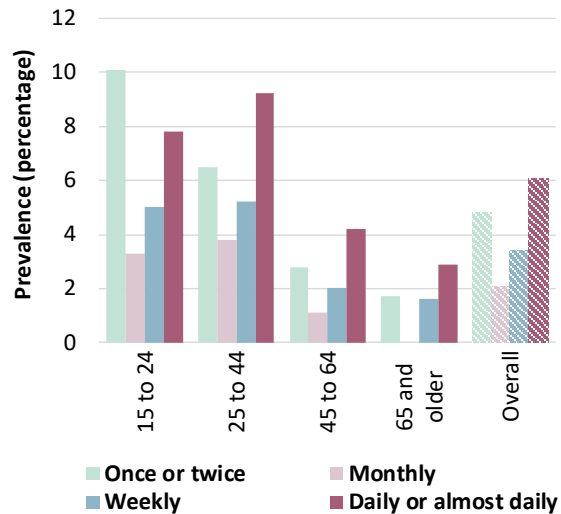
cannabis, compared with 4 per cent of people aged 45–64 and nearly 3 per cent of those aged 65 and older. Men were twice as likely as women to be daily or near-daily cannabis users. A commonly observed pattern of use is that regular and frequent users of cannabis, such as daily or near-daily users, represent a small proportion of all cannabis users, but they account for the bulk of cannabis products consumed. It is estimated that in 2018, for example, around half a million people in Canada consumed some 810 tons of cannabis, of which half (426 tons) were consumed by daily or near-daily users and another 355 tons by those who reportedly used cannabis at least once a week.³³²

Many cannabis users continue to purchase cannabis from illegal sources

The transition from the illegal market to legal sources of cannabis has been a gradual one. The proportion of cannabis users sourcing their products from the legal market increased from around 25 per cent in the second and third quarters of 2018 to

332 Statistics Canada, "Prevalence of cannabis consumption in Canada", table 36-10-0597-01.

FIG. 82 Use of cannabis in the past three months, by frequency of use and age group, Canada, second and third quarter of 2019



Source: Statistics Canada, "Cannabis survey 2019".

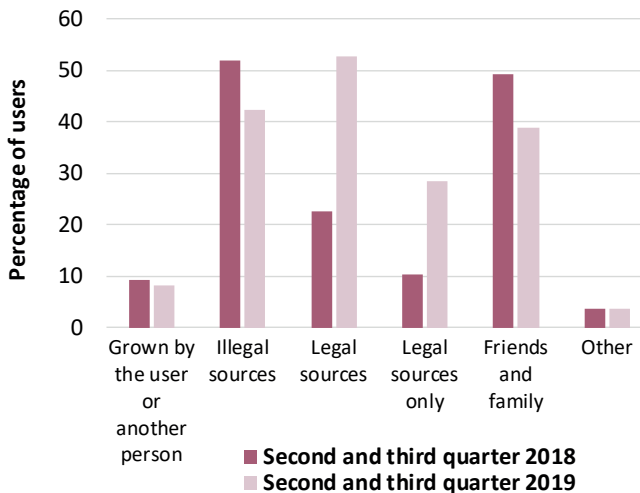
Note: Data refer to cannabis use for medical and non-medical purposes in the past three months.

about 50 per cent one year later, and in 2019 nearly 30 per cent relied solely on the legal market for their cannabis (compared with 10 per cent in 2018). Many users relied on multiple sources to obtain their cannabis, with about 40 per cent of cannabis users still getting their product from illegal sources.

In 2019, young people aged 15–24 were more likely than those in older age groups to obtain cannabis from illegal sources, whereas a larger share of older cannabis users relied solely on legal sources; 41 per cent of cannabis users aged 65 or older reported using only legal sources to obtain cannabis, compared with roughly one quarter of the other age groups.

While most cannabis users had used more than one product, over three quarters of users purchased and consumed dried cannabis flower or leaf for smoking. Although the sale of edibles and extracts started only at the end of 2019, a substantial share of cannabis users reported using edible cannabis products (26 per cent), cannabis oil or vape pens (19 per cent), hashish (16 per cent) and solid cannabis concentrates (14 per cent) during the same year.

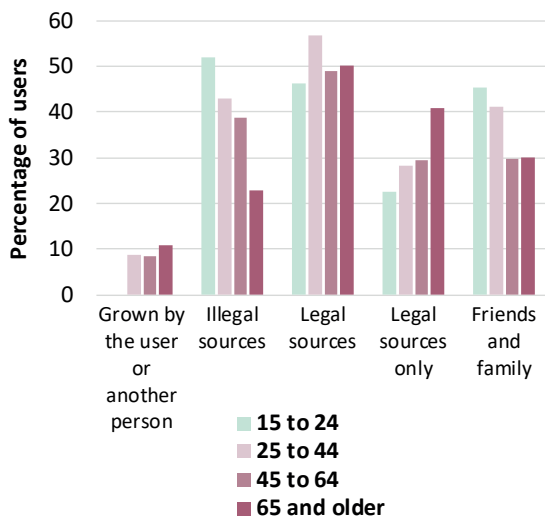
FIG. 83 Sources of cannabis among those who reported cannabis use in the past three months, Canada, 2018 and 2019



Source: Statistics Canada, "Cannabis survey 2018 and 2019".

Note: Multiple responses could be provided by each respondent. Data refer to people who used cannabis for medical and non-medical purposes in the past three months.

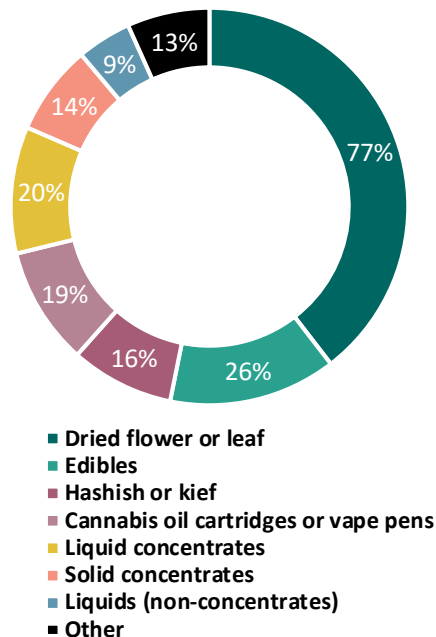
FIG. 84 Sources of cannabis among those who reported cannabis use in the past three months, by age group, Canada, 2019



Source: Statistics Canada, "Cannabis survey 2019".

Note: Combined data for the second and third quarters of 2019. Multiple responses could be provided by each respondent. Data refers to people who used cannabis for medical and non-medical purposes in the past three months.

FIG. 85 Proportion of cannabis users consuming different products, 2019



Source: Statistics Canada, "Cannabis survey 2019".

Implementation of cannabis regulations differs across provinces

According to the new cannabis regulations, the federal Government of Canada is responsible for setting the requirements for those who grow and produce cannabis, including the types of cannabis products available for sale. For example, the regulations were amended in October 2019 to allow the production and sale of edible cannabis, cannabis extracts and topicals, and the sale of those products began gradually from December 2019.³³³ The provincial and territorial governments, for their part, are responsible for developing, implementing, maintaining and enforcing systems to oversee the distribution and sale of cannabis.

In most provinces, the retail licensing regime is similar to that regulating the sale of liquor, and cannabis is sold through licensed retailers (private sector),

³³³ On 14 June 2019, the Government of Canada announced new regulations for edible cannabis, cannabis extracts and cannabis topicals. Those regulations were published in the *Canada Gazette*, Part II, vol. 153, No. 13, on 26 June 2019 and came into force on 17 October 2019.

provincial retail stores (public sector) and online. Many provinces have adopted a hybrid model that allows either public or private physical retail outlets together with online retail controlled by regulatory authorities, or a combination of all three. With the exception of the Nunavut territory, all the provinces and territories allow retail sales of cannabis products online. British Columbia and Yukon are the only

TABLE 2 Models of cannabis sales in Canada, by province and territory

	Physical retail		Online retail
	Public	Private	
Newfoundland and Labrador		√	√
Prince Edward Island	√		√
Nova Scotia	√		√
New Brunswick	√		√
Quebec	√		√
Ontario		√	√
Manitoba		√	√
Saskatchewan		√	√
Alberta		√	√
British Columbia	√	√	√
Yukon	√	√	√
Northwest Territories	√		√
Nunavut	Not allowed	Not allowed	Not allowed

Source: Statistics Canada, "The retail cannabis market in Canada: a portrait of the first year", 12 December 2019.

province and territory that allow all three modes, while Alberta, Manitoba, Newfoundland and Labrador, Ontario and Saskatchewan have allowed private bricks-and-mortar retail stores.

By the end of July 2019, about 400 retail outlets had been opened across Canada. The opening of retail outlets has been slower in some places than in others. Ontario, the most populous province in Canada, with a population of 14 million, began with a retail system in which licences were issued to operators by way of a lottery. At the end of July 2019, the province thus had only 24 outlets, fewer than 2 outlets per 1 million population, whereas Newfoundland and Labrador had the same number of outlets per 500,000 population. The province of Alberta permitted the opening of the largest number of retail outlets, with 176 private retail outlets for a population of 4 million.

After the cannabis regulations were adopted and sales began in October 2018, retail sales of non-medical cannabis online and in cannabis stores up to September 2019 totalled some 908 million Canadian dollars,³³⁴ or an average of Can\$24 (approximately \$18) per capita. Although Ontario had the smallest number of retail outlets, it had the highest retail sales (Can\$216 million), followed by Alberta (Can\$196 million) and Quebec (Can\$195 million), by the end of September 2019. Out of the

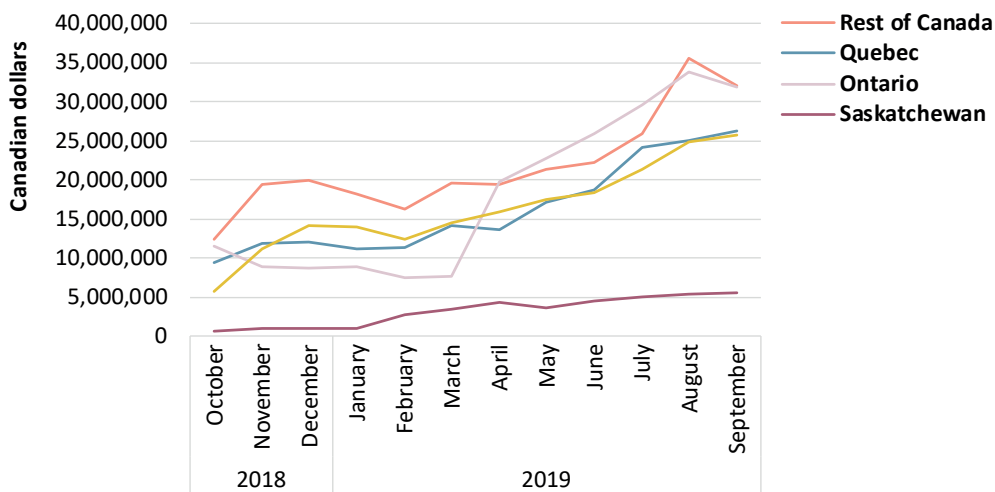
TABLE 3 Number of retail cannabis outlets in Canada, by province and territory, July 2019

	Population	March	May	July
		Number of outlets		
Canada	36,540,268	217	285	407
Newfoundland and Labrador	528,567	26	26	26
Prince Edward Island	150,566	4	4	4
Nova Scotia	950,680	13	13	13
New Brunswick	766,852	21	21	21
Quebec	8,297,717	14	16	18
Ontario	14,071,445	NA	20	24
Manitoba	1,335,396	21	23	23
Saskatchewan	1,150,782	19	26	35
Alberta	4,243,995	75	101	176
British Columbia	4,922,152	16	27	57
Yukon	39,628	2	2	4
Northwest Territories	44,936	6	6	6
Nunavut	37,552	-	-	-

Source: Statistics Canada, "The retail cannabis market in Canada".

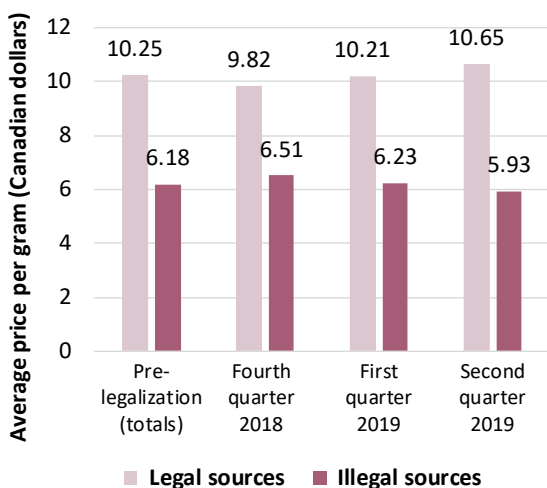
334 At an exchange rate of 1 Canadian dollar to \$0.75, this figure would equal \$681 million.

FIG. 86 Retail sales of non-medical cannabis, by provinces, in Canada, October 2018–September 2019



Source: Statistics Canada, “Retail trade sales by province and territory”, table 20-10-0008-01.

FIG. 87 Price of cannabis on the legal and illegal markets, Canada, 2018–2019



Source: Statistics Canada, “Quarterly cannabis prices, 2019”.

total of Can\$908 million, most sales were made through bricks-and-mortar stores (Can\$788 million), while online retail sales (Can\$120 million) accounted for 13 per cent. Direct-to-consumer trade by wholesalers, which includes retail sales by public sector stores classified as wholesalers, accounted for 1.9 per cent over the same period.

The sale of non-medical cannabis through legal sources represents only a portion of the cannabis market, as it appears that a substantial proportion of users still rely on illegal sources to obtain cannabis (42 per cent in 2019). Moreover, cannabis prices on the illegal market have remained considerably lower (and have been declining) compared with the prices on the legal market. In the second quarter of 2019, based on 236 submissions, the average price per gram of cannabis on the legal market was Can\$10.65, compared with Can\$5.93 per gram on the illegal market.

Large corporations are investing in the cannabis market in Canada

Although the Cannabis Act introduced a variety of classes of cannabis licences, including for smaller producers, the federal Government requires that a potential supplier have a production facility in place, meaning that the supplier will have already made a substantial investment prior to applying for a licence.^{335, 336} Some have speculated that this has contributed to deterring small entrepreneurs from applying for licences and may have favoured the

335 Canada, “Cannabis duty: apply for a cannabis licence from the CRA” (24 February 2020).

336 Transform Drug Policy Foundation, “Cannabis legalisation in Canada: one year on” (n.p., n.d.).

emergence of a market dominated or even monopolized by a relatively small number of large, multi-billion-dollar businesses.³³⁷ There have also been reports of the alcohol, tobacco and finance industries investing in companies involved in non-medical cannabis production. For instance, according to media sources, in October 2017 Constellation Brands, a major international producer of wine, beer and spirits, invested \$4 billion to acquire a 9.9 per cent stake in Canopy Growth, the leading Canadian producer, to develop cannabis-based beverages. By the end of December 2019, Constellation owned a 35 per cent stake in Canopy.³³⁸ In December 2018, the tobacco company Altria made a \$1.8 million investment in Cronos Group, a cannabis production company, giving Altria a 45 per cent interest in Cronos.³³⁹ Earlier in the year, Molson Coors Brewing, another multinational alcohol company, signed a joint venture with Quebec-based HEXO to develop and market cannabis-infused beverages. Market analysts have predicted that the alcohol industry will also invest in companies that plan to produce beverages that combine cannabis and beer and, in particular, they predicted that by the end of 2019 two of the largest cannabis companies in the world would be owned by two of the largest alcohol and tobacco companies.^{340, 341, 342}

The retail cannabis market in Canada is likely to continue to evolve as jurisdictions adapt their regulatory approaches, as supply chains develop and as cannabis product offerings are diversified. Overall, the implementation of laws permitting the non-medical use of cannabis in Canada is still in its nascent stages, and it may take several years of monitoring to clarify how the cannabis market has evolved and

to identify its dynamics and the impact of legalization on public health and safety, among other outcome measures. Differences in the implementation of federal legislation in the provinces may also vary in impact and thus require contextual analysis at the provincial and territorial levels.

Latest trends in the cannabis market in jurisdictions in the United States allowing the non-medical use of cannabis

In the United States, a total of 33 states, as well as the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands, had approved or had in place a comprehensive programme for medical cannabis by the end of 2019.³⁴³ As at December 2019, 11 state-level jurisdictions in the United States,³⁴⁴ plus the District of Columbia, allowed the non-medical use of cannabis, and most also allowed commercial production by for-profit industry.³⁴⁵ It is worth noting that all the states that have legalized the non-medical use of cannabis previously had measures in place permitting the medical use of cannabis.

In addition to Vermont, Illinois is another state in which measures allowing the non-medical use of cannabis were passed through the state legislature rather than through voters' initiatives, as was the case in the other states that have legalized the non-medical use of cannabis. In May 2019, the Illinois General Assembly passed the Cannabis Regulation and Tax Act, which was signed by the state Governor

337 Ibid.

338 Ezequiel Minaya, "Pot company Canopy Growth picks new CEO", *Forbes*, 9 December 2019.

339 Sean Williams, "Cronos Group's \$1.8 billion investment from Altria has closed. Now what?", *The Motley Fool*, 17 March 2019.

340 Craig Giammona, "The next big thing is weed beer", *Bloomberg Businessweek*, 10 October 2018.

341 Sean Williams, "Altria grossly overpaid for its equity stake in pot stock Cronos Group", *The Motley Fool*, 11 December 2018.

342 As presented in Wayne Hall and others, "Public health implications of legalising the production and sale of cannabis for medicinal and recreational use", *Lancet*, vol. 394, No. 10208 (October 2019).

343 According to the National Conference of State Legislatures, a medical cannabis programme is considered to be comprehensive if it has the following measures in place: (1) protection from criminal penalties for using cannabis for a medical purpose; (2) access to cannabis through home cultivation, dispensaries or some other system that is likely to be implemented; (3) it allows a variety of strains or products, including those with more than "low THC"; (4) it allows either smoking or vaporization of some kind of cannabis products, plant material or extract; (5) it is not a limited trial programme. For instance, South Dakota and Nebraska have limited trial programmes that are not open to the public.

344 In the United States, cannabis is federally prohibited as a substance listed in schedule I of the Controlled Substances Act.

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

346 National Conference of State Legislatures, "Marijuana overview", 17 October 2019.

in June. The sale of cannabis for non-medical use began on 1 January 2020. Under the law, adults aged 21 and older are allowed to purchase and possess up to 30 g of cannabis flower, edibles with a maximum of 500 mg of THC, or 5 g of cannabis concentrates. Non-residents of Illinois will be allowed to purchase half of those amounts. As in some other states, individual cities, villages and municipalities have the option to decide whether to allow the non-medical use of cannabis in their jurisdictions by passing ordinances. Nonetheless, local governments may neither prohibit home cultivation of cannabis nor “unreasonably prohibit” its non-medical use.

Developments in Colorado and Washington

Colorado and Washington were the first two states in the United States to legalize the production of cannabis for non-medical use, in 2012. However, prior to legalization, those states and others, such as California, had various regimes in place that permitted or tolerated the production and sale of cannabis for medical use, which allowed people with a range of conditions that were not well-defined to gain access to cannabis. The states of Colorado and Washington, for which more long-term trend data are available, are interesting case studies for examining the public health and public safety outcomes that have emerged in the years since the production of cannabis for non-medical use was legalized.

Extent of adult non-medical use of cannabis in Colorado and Washington

Colorado and Washington are among the states that have had a higher prevalence of cannabis use than the national average, even prior to the legalization of the non-medical use of cannabis. An increase in cannabis use in Colorado can be observed from 2008–2009 onwards, when some of the main increases in cannabis use in Colorado came with the proliferation of bricks-and-mortar “dispensaries” that openly sold medical cannabis before the legalization of non-medical cannabis.^{347, 348} Nonetheless,

347 Jonathan P Caulkins and Beau Kilmer, “Considering marijuana legalization carefully: insights for other jurisdictions from analysis for Vermont”, *Addiction*, vol. 111, No. 12 (December 2016).

348 Rosalie L Pacula and others, “Assessing the effects of medical marijuana laws on marijuana use: the devil is in the details”, *Journal of the Association for Public Policy Analysis and Man-*

since 2009, past-month cannabis use (as an indicator of recent cannabis use) among adults aged 18 and older in both states has increased far more drastically than the national average – by some 86 per cent in Colorado and more than doubled in Washington, as compared to a 50 per cent increase across the entire country. This also holds true for other states that have legalized the non-medical use of cannabis.³⁴⁹

A similar pattern is seen in the daily or near-daily use of cannabis. In Colorado, for instance, 7.6 per cent of adults used cannabis for non-medical purposes on a daily or near-daily basis in 2017,³⁵⁰ compared with the national figure of 4.7 per cent in the population aged 18 and older. In the 2012–2013 period, 5.6 per cent of the population aged 12 and older reported daily or near-daily use in Colorado, compared with about 3 per cent nationwide. While past-month prevalence continues to be higher among those aged 18–25, the prevalence among people aged 26 and older has more than doubled since 2008/09 in both states.

In Colorado, while the majority of cannabis users (84 per cent) reported smoking in the past 30 days, half of those users also reported using multiple consumption methods and cannabis products, including taking edibles and vaporizing and “dabbing” cannabis concentrates in 2017.

Extent of non-medical use of cannabis among adolescents

One concern about legalizing the non-medical use of cannabis for adults (21 years and older) is that its use could also increase access to cannabis and its use among adolescents.^{351, 352} Based on national data, cannabis use among high-school students

agement, vol. 34 (2015), pp. 7-31.

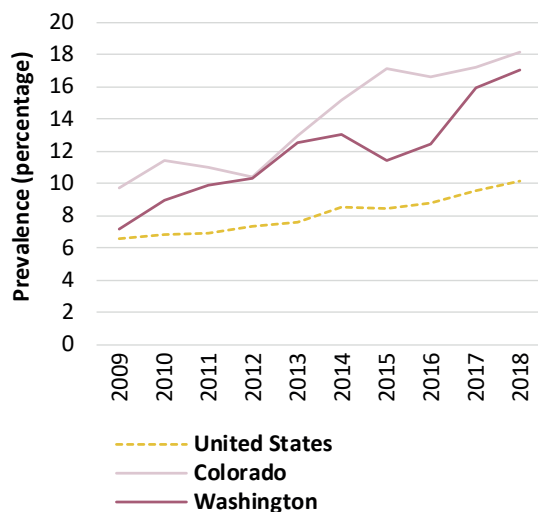
349 United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*; and state-level estimates.

350 United States, Colorado Department of Public Health and Environment, “Monitoring health concerns related to marijuana in Colorado: 2018” (2018).

351 Brendan Saloner, Emma E. McGinty and Colleen L. Barry, “Policy strategies to reduce youth recreational marijuana use”, *Pediatrics*, vol. 135, No. 6 (June 2015), pp. 955–957.

352 Christian Hopfer, “Implications of marijuana legalization for adolescent substance use”, *Substance Abuse*, vol. 35, No. 4 (August 2014), pp. 331–335.

FIG. 88 Use of cannabis in the past month in Colorado, Washington and the United States, 2009–2018



Source: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*; and state-level estimates.

Note: The prevalence refers to the population aged 18 and older; the prevalence estimates for Colorado and Washington per year are based on a two-year average (e.g., 2015/16, 2016/17, 2017/18).

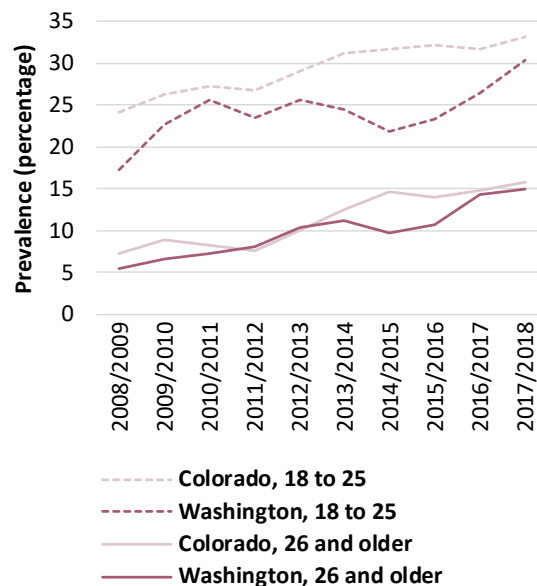
remained stable overall, whereas the risk perception of the occasional use of cannabis declined in the United States over the period 2012–2018.^{353, 354} In Colorado, although there has been a decline in daily or near-daily use of cannabis among high-school students, they are now consuming and exposed to cannabis products with far higher THC content than was available or used earlier. In 2017, about 20 per cent of high-school students in Colorado reported non-medical use of cannabis in the past month; that rate is comparable to the national average among high-school students.³⁵⁵ The non-medical use of cannabis increases in higher grades. It is

353 United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*.

354 Lloyd D Johnston and others, *Monitoring the Future, National Survey Results on Drug Use 1975–2018: Overview, Key findings on Adolescent Drug Use* (Ann Arbor, Institute for Social Research, University of Michigan, 2019).

355 The data on high-school students in Colorado is taken from the “Healthy Kids Colorado Survey” and the national data from the “Youth Risk Behaviour Survey”.

FIG. 89 Use of cannabis in the past month, by age group, Colorado and Washington, United States, 2009–2018

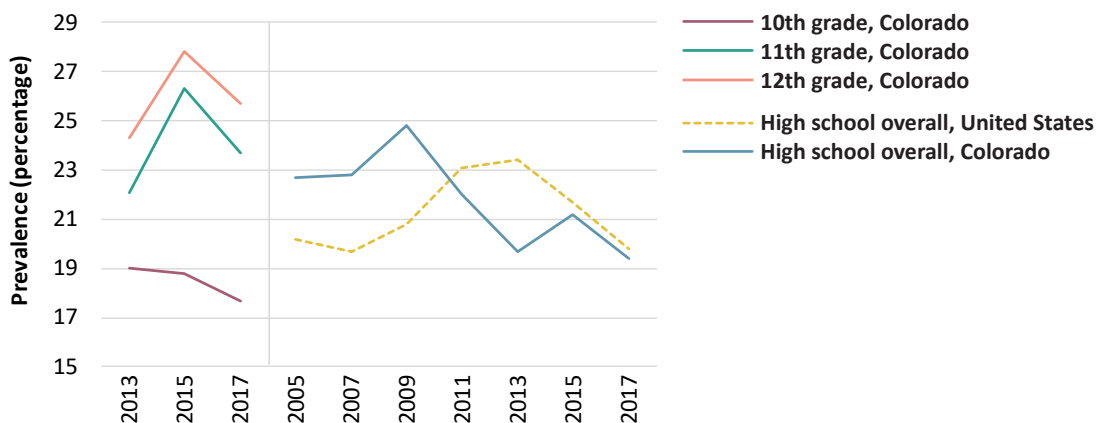


Sources: United States, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, *Results from the National Survey on Drug Use and Health*; and state-level estimates.

estimated to be the highest among twelfth grade students, with one in four students in that grade reporting non-medical cannabis use in the past month. The past-month use of cannabis among eleventh and twelfth grade students in Colorado increased from the first round of the survey in 2013 but then declined from 2015; however, it remained higher in 2017 than in 2013. The risk perception of the use of cannabis also remained stable over the same period among high school students in Colorado.

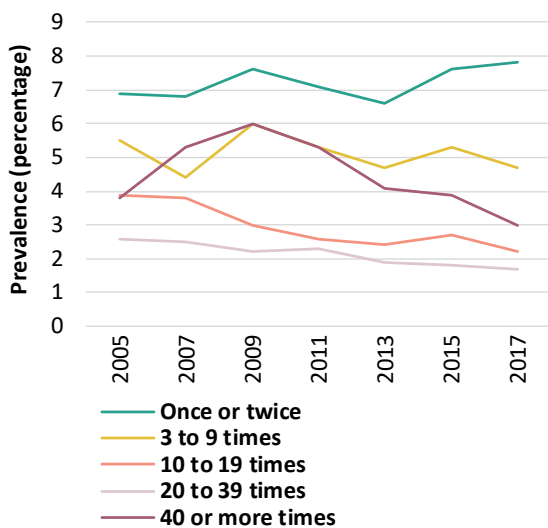
While the daily or near-daily use of cannabis among high-school students in Colorado has declined, the prevalence of occasional users, that is, those who report having used cannabis one or two times in the past month, has increased since legalization. Nevertheless, 4.7 per cent of high-school students reported using cannabis daily or nearly daily (20 or more times in the past 30 days) in 2017. Moreover, although the share of high-school students smoking cannabis declined from 92 per cent in 2015 to 84 per cent in 2017, there was an increase in the share

FIG. 90 Colorado: trends in past-month use of cannabis among high-school students, United States, 2005–2017



Sources: Colorado Department of Public Health and Environment, “Healthy Kids Colorado Survey, 2005–2017”; and Centers for Disease Control and Prevention, “Youth Risk Behaviour Survey”.

FIG. 91 Colorado: trends in past-month use of cannabis, by frequency of use among high-school students, United States, 2005–2017



Source: Colorado Department of Public Health and Environment, “Healthy Kids Colorado Survey, 2005–2017”.

In Washington state, the past-month use of cannabis among high-school students of different grades has generally remained stable, although it increases by grade, with the highest past-month prevalence found among twelfth grade students, as in Colorado. The perception of risk relating to cannabis use among high-school students has also declined since the non-medical use of cannabis was legalized, with nearly three quarters of twelfth grade students seeing no or low risk in trying cannabis a few times and less than half perceiving no or low risk in the regular use of cannabis in 2018.³⁵⁶ Similarly, some 38 per cent of twelfth grade students considered that it was fairly easy to get cannabis. Over half of high-school students reported getting cannabis from a friend, and about 15 per cent reported giving money to someone to buy it for them.³⁵⁷ One alarming finding is that more than half of the twelfth grade students who had used cannabis in the past month in 2018 reported that they had driven a motor vehicle within three hours of using cannabis on at least one occasion in the past month.

The onset of cannabis use at an early age and regular cannabis use among adolescents has been associated with deficits in learning, memory, reading skills and

of those who reported using edibles with high THC content (from 28 per cent in 2015 to 36 per cent in 2017) or “dabbing” cannabis extracts and concentrates (from 28 per cent in 2015 to 34 per cent in 2017) in the past month.

356 United States, Washington State Department of Health, “Healthy Youth Survey 2018”.

357 Ibid.

FIG. 92 Washington: trends in cannabis use in the past month among high-school students, United States, 2006–2018



Source: United States, Washington State Department of Health, “Healthy Youth Survey 2018”.

mathematics.³⁵⁸ Similarly, scientific literature shows that the cannabis users who are most at risk of developing cannabis dependence have a history of poor academic achievement, deviant behaviour in childhood and adolescence, rebelliousness, poor parental relationships and a parental history of drug and alcohol problems.^{359, 360} In Washington state, for example, 40 per cent of twelfth grade students who reported cannabis use in the past month had lower marks³⁶¹ than those who had not used cannabis, although the role of other factors in mediating cannabis use and poor marks cannot be ruled out.³⁶²

Public health outcomes: emergency department visits and hospitalization in Colorado

One public health measure used to assess the outcome of legalizing the non-medical use of cannabis

358 Mary Becker and others, “Longitudinal changes in cognition in young adult cannabis users”, *Journal of Clinical and Experimental Neuropsychology*, vol. 40, No. 6 (August 2018), pp. 529–543.

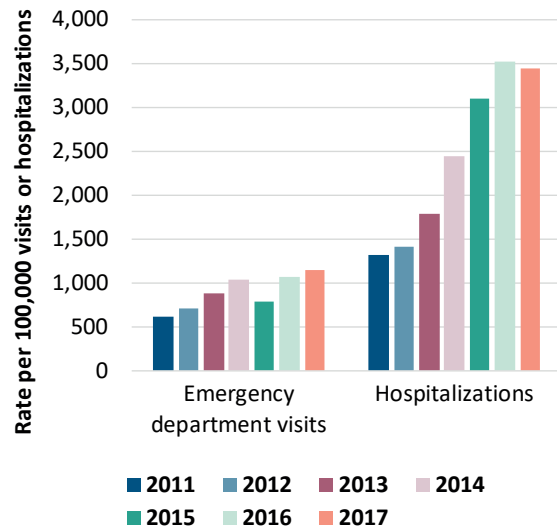
359 As presented in Hall and others, “Public health implications of legalising the production and sale of cannabis”.

360 Michael Lynskey and Wayne Hall, “The effects of adolescent cannabis use on educational attainment: a review”, *Addiction*, vol. 95, No. 11 (November 2000), pp. 1621–1630.

361 Lower grades were considered to be as follows: C – average grade; D – between 59 and 69 per cent, or below average; and F – failing grade.

362 Washington State Department of Health, “Healthy Youth Survey 2018”.

FIG. 93 Colorado: cannabis-related emergency department visits and hospitalizations, United States, 2011–2017



Source: Colorado Department of Public Health and Environment, “Colorado Hospital Association data”.

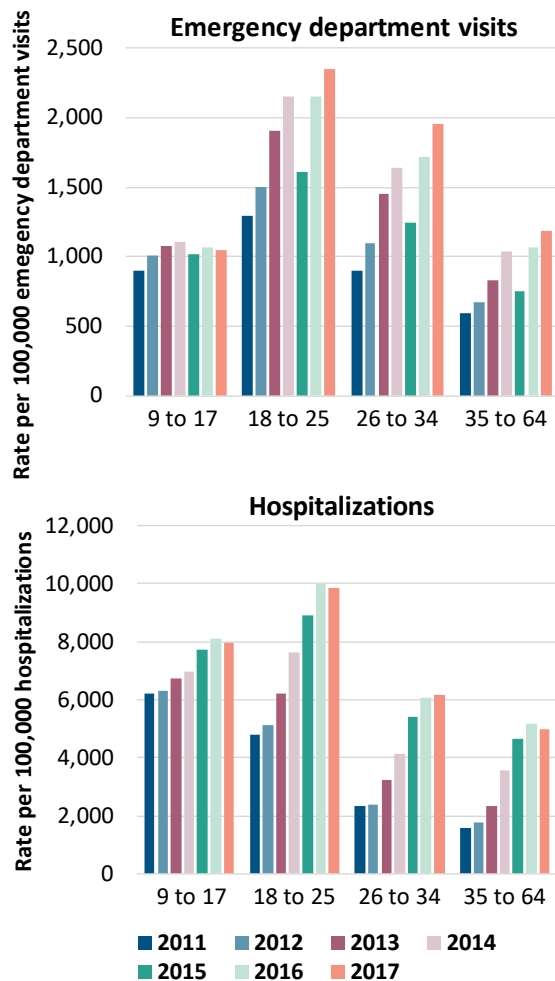
is the monitoring of the adverse health consequences of increased exposure to cannabis resulting in emergency room visits and hospitalization and the development of cannabis use disorders. Emergency room visits may be due to acute intoxication, which is seen more among novice users. Patients may present with anxiety, panic attacks, public intoxication, vomiting and other non-specific symptoms that could be precipitated by the use of cannabis products with varying THC content. This is especially the case with high-THC edible cannabis products, which delay the onset of severe psychoactive effects that a person is unable to regulate.^{363, 364} Cannabis-related hospitalizations can arise from acute intoxication but are mainly a result of cannabis use disorders.³⁶⁵ In 2017, there were 1,139 cannabis-

363 Andrew A. Monte and others, “Acute illness associated with cannabis use, by route of exposure: an observational study”, *Annals of Internal Medicine*, vol. 170, No. 8 (April 2019), pp. 531–537.

364 George Sam Wang and others, “Marijuana and acute health care contacts in Colorado”, *Preventive Medicine*, vol. 104 (November 2017), pp. 24–30.

365 The Colorado Department of Public Health and Environment has three definitions of cannabis-related hospitalization and emergency department visits that include at least one cannabis-related billing code in up to 30 billing codes

FIG. 94 Colorado: cannabis-related emergency department visits and hospitalizations, by age group, United States, 2011–2017



Source: Colorado Department of Public Health and Environment, "Colorado Hospital Association data".

related emergency department visits per 100,000 such visits in Colorado, an increase by 60 per cent since 2012. Similarly, 3,439 cannabis-related hospitalizations per 100,000 hospitalizations were reported in the same year, a rate that has more than doubled since 2012. It is important to note,

listed for each visit. These codes include accidental poisoning by psychodysleptics, poisoning by psychodysleptics, poisoning, adverse effects and underdosing by cannabis, cannabis abuse, cannabis dependence and cannabis use.

however, that figures for emergency room visits and hospitalizations also include those for the treatment of cannabis use disorders. Nevertheless, emergency department visits and hospitalizations are based on billing records in which cannabis use is mentioned. The increase in hospitalizations therefore not only reflects the increased exposure of the population to cannabis products with high THC content but also increased patient comfort with reporting cannabis use. This is likely to increase the chance that a cannabis billing code is included in the diagnosis of patients.^{366, 367, 368}

The highest rates of emergency department visits and hospitalizations are reported among young adults aged 18–25, and the past-month prevalence of cannabis use is also highest in that age group. The rates of cannabis-related hospitalizations doubled and emergency room visits increased by more than 50 per cent for young adults aged 18–25 between 2012 and 2017. Moreover, the rates of cannabis-related emergency department visits and hospitalizations among older adults (aged 26–34 and 35–64) have also increased substantially since the legalization of the non-medical use of cannabis in 2012.

Public health outcomes: cannabis-related poisoning incidents in Colorado and Washington state

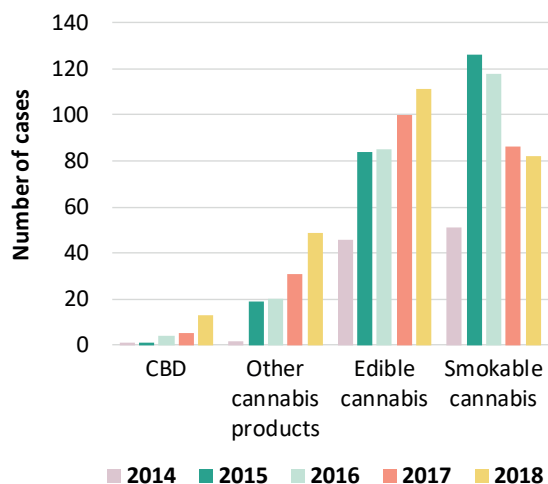
In Colorado, the number of cases reported to poison centres owing to intoxication or adverse effects relating to cannabis exposure is low in absolute terms, but has been increasing since 2014. In 2018, there were a total of 255 such exposure cases. As with the changes in consumption patterns for different cannabis products in Colorado, between 2014 and 2018 there was a 2.4-fold increase in the number of cannabis exposure cases related to edibles, mostly among children aged 8 and younger and among children and adolescents aged 9–17. The increase in reported cannabis exposure cases involving children is likely

366 Sam Wang and others, "Marijuana and acute health care contacts in Colorado".

367 Colorado Department of Health and Environment, "Monitoring health concerns related to marijuana in Colorado: 2018".

368 Brad A. Roberts, "Legalized cannabis in Colorado Emergency Departments: a cautionary review of negative health and safety effects", *Western Journal of Emergency Medicine*, vol. 20, No. 4 (July 2019), pp. 557–572.

FIG. 95 Colorado: cannabis exposure cases reported to poison centres, United States, 2014–2018



Source: Colorado Department of Public Health and Environment, “Rocky Mountain Poison and Drug Safety data”.

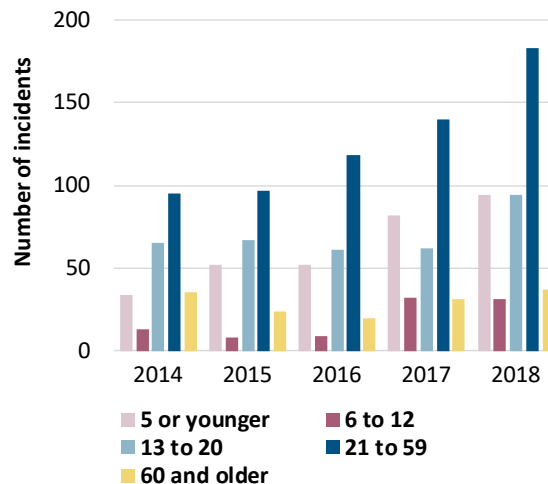
to be related to the increasing presence of cannabis inside the house (5.5 per cent in 2017) and in or around the house (11.2 per cent in 2017) among families with children since 2014.³⁶⁹ Furthermore, it is estimated that in the period 2016–2017 approximately 32,800 families with children aged 1–14 exposed them to second-hand cannabis smoke or cannabis vapor.³⁷⁰ Cannabis exposure cases related to smoking cannabis, although declining since 2016, were reported mainly among young adults (aged 18–24) or adults aged 25 and older.

Since 2014, the number of calls to the Washington Poison Center regarding cannabis-related incidents has also increased considerably. In 2018, 497 cannabis exposure cases were reported, as compared to 245 cases in 2014. While calls to the poison centre have increased for nearly all age groups, the largest increase in cannabis-related cases was related to children aged 12 and younger (a 2.6-fold increase), as well as adults aged 21–59 (a twofold increase) from 2014 to 2018. Since the reporting of exposure cases is voluntary, it is likely that those reported exposures

³⁶⁹ Colorado Department of Health and Environment, “Monitoring health concerns related to marijuana in Colorado: 2018”.

³⁷⁰ Ibid.

FIG. 96 Washington: cannabis-related incidents reported to the Washington Poison Center, United States, 2014–2018



Source: Washington Poison Center, “2018 annual data report: cannabis” (Seattle, 2019).

underrepresent the actual extent of occurrence of such cases in Washington.³⁷¹

In Washington, three fifths of the cases of exposure to cannabis reported in 2018 were related to exposure to cannabis alone, while the remainder involved exposure to cannabis together with other substances, including alcohol. In addition, among the total cases of cannabis exposure, nearly one third were due to the ingestion of cannabis edibles, for which the number of cases doubled from 216 in 2015 to 420 in 2018. The remaining cases involved exposure to cannabis due to smoking or the use of concentrates.³⁷²

Public health outcomes: cannabis use before and during pregnancy and in the post-partum stage

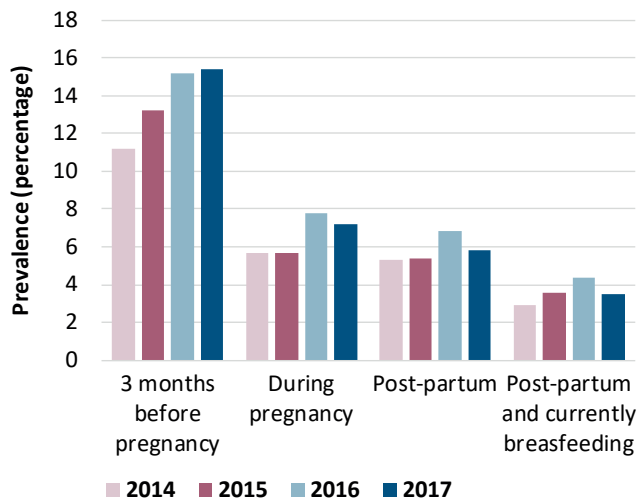
Cannabis use among young women may affect their menstrual cycle and their ability to become pregnant.³⁷³ Cannabis use during pregnancy is also associated with low birth weight, low alertness and

³⁷¹ Washington Poison Center, “2018 annual data report: cannabis” (Seattle, 2019).

³⁷² Ibid.

³⁷³ Public Health Agency of Canada, *Thinking about Using Cannabis Before or During Pregnancy?* (October 2018).

FIG. 97 Colorado: cannabis use among pregnant, post-partum and breastfeeding women, United States, 2014–2017



Source: Colorado Department of Public Health and Environment, “Pregnancy Risk Assessment Monitoring System (PRAMS)”, data 2014–2017.

other neurodevelopmental effects on newborns. In addition, cannabis use by the mother in the post-partum and breastfeeding stages may impact the infant’s growth and health.^{374, 375, 376, 377}

National data in the United States suggest an increase during the 2002–2017 period in past-month cannabis use, daily or near-daily use of cannabis and the number of days of cannabis use among women aged 12–44, including those who were pregnant. The past-month use of cannabis

doubled, while daily or near-daily cannabis use nearly quadrupled among pregnant women from 2002 to 2017.³⁷⁸

While data on cannabis use among pregnant women are not available for Washington, cannabis use among women in Colorado before and during pregnancy and in the post-partum and breastfeeding stages increased in the 2014–2017 period, and the increase in cannabis use in the three months before pregnancy was statistically significant. Cannabis use during pregnancy was also reported by 7.2 per cent of expectant women in 2017. The combined data from the 2014–2017 period showed that cannabis use during pregnancy was significantly higher among women aged 15–19 (15.9 per cent) than among women aged 20 and older, as well as among mothers with less than 12 years of education (13.6 per cent) than among those who had had 12 years of education (9.3 per cent) or more (4.8 per cent).³⁷⁹

Public safety outcomes: cannabis-related driving under the influence and traffic fatalities

Research has shown that people driving under the influence of cannabis are likely to experience impairment of key driving skills, including reaction time, tracking ability and target detection.^{380, 381} There may also be impairment of cognitive skills, such as judgment, anticipation and divided attention, as well as of executive functions, such as route-planning and risk-taking.³⁸² Other research has also shown that, compared with a sober person, a driver who is under the influence of cannabis is likely to overestimate his or her impairment and tends to compensate by typically driving more slowly and following other cars at greater distances, although

374 Mohammad R. Hayatbakhsh and others, “Birth outcomes associated with cannabis use before and during pregnancy”, *Pediatric Research*, vol. 71 (February 2012), pp. 215–219.

375 Sheryl A. Ryan and others, “Marijuana use during pregnancy and breastfeeding: implications for neonatal and childhood outcomes”, *American Academy of Pediatrics*, vol. 142, No. 3 (September 2018).

376 Kimberly S. Grant and others, “Cannabis use during pregnancy: pharmacokinetic and effects on child development”, *Pharmacology and Therapeutics*, vol. 182 (February 2018), pp. 133–151.

377 See, for example, the advisory issued in August 2019 by the United States Surgeon General on the use of cannabis, its effect on the developing brain and cannabis use during pregnancy. Available at www.hhs.gov/surgeongeneral/reports-and-publications/addiction-and-substance-misuse/advisory-on-marijuana-use-and-developing-brain/index.html#use-pregnancy.

378 Nora D. Volkow and others, “Self-reported medical and non-medical cannabis use among pregnant women in the United States”, *JAMA*, vol. 322, No. 2 (July 2019), pp. 167–169.

379 Colorado Department of Public Health and Environment, “Pregnancy Risk Assessment Monitoring System (PRAMS)”, data 2014–2017.

380 Rebecca L. Hartman and others, “Cannabis effects on driving lateral control with and without alcohol”, *Drug and Alcohol Dependence*, vol. 154 (September 2015), pp. 25–37.

381 Richard P. Compton, “Marijuana-impaired driving: a report to Congress” (Washington D.C., National Highway Traffic Safety Administration, 2017).

382 Ibid.

they may still be a hazard on the road.³⁸³ A driver under the influence of alcohol, by contrast, is more likely to underestimate the impairment and take more risks while driving. Moreover, cannabis can have an additive effect with alcohol to increase the driver's impairment and thus cause even more lane weaving and increase the likelihood of accidents.³⁸⁴

A contentious issue between people who are for and against the legalization of cannabis remains whether it has had an impact on driving under the influence of cannabis and caused fatal car crashes. The evidence remains inconclusive, as within the United States there have been no differences in cannabis- or alcohol-related traffic fatalities between states that have and have not legalized the non-medical use of cannabis.³⁸⁵ As different research contributions have also shown, it is difficult to quantify the effects of cannabis on road accidents, as cannabis is often used in combination with alcohol, which increases the challenge of determining the influence of cannabis itself on road traffic accidents.³⁸⁶ Moreover, studies on THC levels and degrees of impairment have found that the level of THC in the blood and the degree of impairment do not appear to be closely related; peak impairment does not occur when THC concentration in the blood is at or near peak levels. In addition, when a blood sample is collected from a driver suspected of cannabis-impaired driving, the collection may not occur until hours after the ingestion of cannabis, whereas THC levels in the blood decline exponentially.³⁸⁷ As there are currently no evidence-based methods to detect cannabis-impaired driving,³⁸⁸ those factors and other issues related to the roadside testing of people under the influence of cannabis, as compared with testing for alcohol, make it challenging to determine the extent and trends of driving under the influence of cannabis and its involvement in fatal traffic crashes.

383 Ibid.

384 Hartman and others, "Cannabis effects on driving lateral control with and without alcohol".

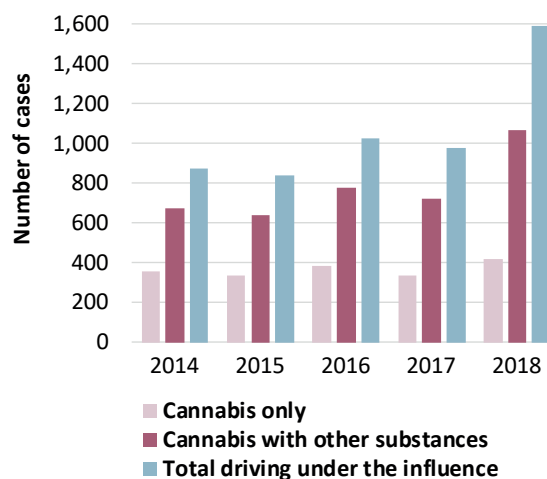
385 Hall and others, "Public health implications of legalising the production and sale of cannabis".

386 Ibid.

387 Compton, "Marijuana-impaired driving".

388 Ibid.

FIG. 98 Colorado: driving under the influence of drugs, United States, 2014–2018

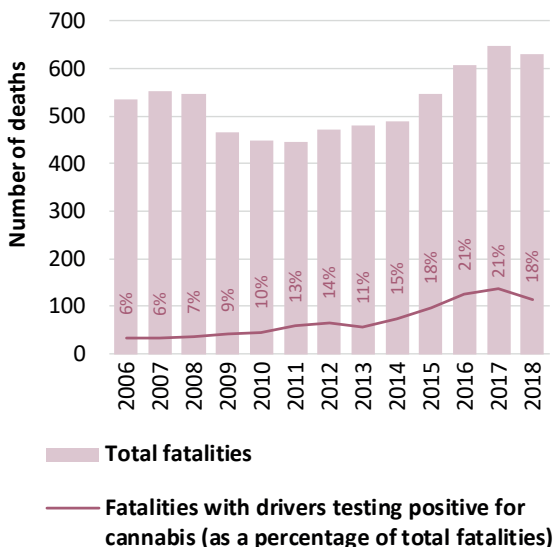


Source: Data from the Colorado State Patrol, as reported in Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado: The Impact*, vol. 6 (September 2019).

Driving under the influence of cannabis was not tracked in Colorado prior to 2014. Notwithstanding all the caveats discussed above, the total number of cases of driving under the influence of drugs nearly doubled in Colorado between 2014 and 2018. During that period, the number of cases in which drivers were under the influence of cannabis alone or in combination with other drugs and/or alcohol also increased by 50 per cent. Nearly one quarter of the cases of driving under the influence reported in 2018 involved cannabis alone, and three fifths of cases involved cannabis in combination with other substances (especially alcohol).

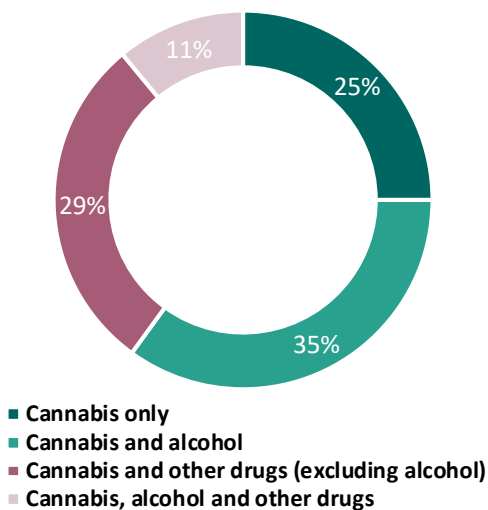
Starting in 2014, data on traffic fatalities in Colorado showed a marked increase in the number of traffic deaths in which the driver tested positive for cannabis use. Over the period 2009–2013, there were 53 traffic deaths on average per year in which the driver tested positive for cannabis, a figure that increased to an average of 110 such deaths in the period 2014–2018, and the proportion of fatalities with drivers testing positive for cannabis doubled over the period 2009–2018. However, toxicology analysis has shown that car crashes in which the driver was found to be under the influence of cannabis frequently involved other drugs, in particular alcohol.

FIG. 99 Colorado: traffic deaths related to cannabis, United States, 2006–2018



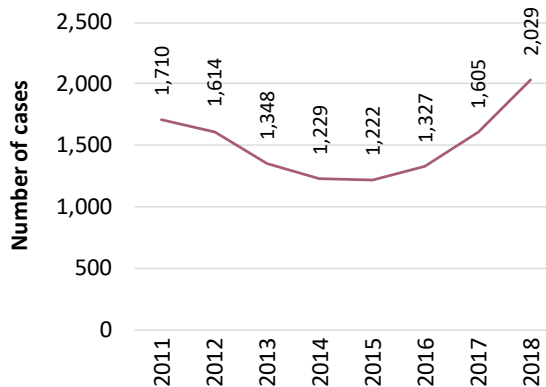
Sources: Data from the National Highway Traffic Safety Administration, Fatality Analysis Reporting System, 2006–2018; and Colorado Department of Transportation, 2012–2018, as reported in Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado*.

FIG. 100 Colorado: toxicological results for other drugs found in drivers involved in fatal crashes who tested positive for cannabis, 2018



Source: Rocky Mountain High Intensity Drug Trafficking Area, *The Legalization of Marijuana in Colorado*.

FIG. 101 Washington: number of cases of driving under the influence of drugs and alcohol, United States, 2011–2018



Source: Washington State Patrol, as cited in “Monitoring impacts of recreational marijuana legalization: 2019 update report”.

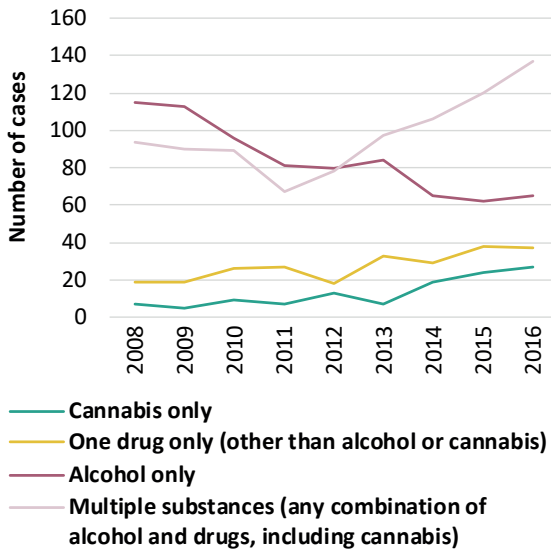
In Washington, driving under the influence of drugs and alcohol is considered the number one contributing factor in fatal crashes and is involved in nearly half of all traffic fatalities. However, in that state, reporting on such cases does not differentiate between cannabis and other drugs.³⁸⁹ The number of reported cases of driving under the influence of drugs has increased by more than 60 per cent in Washington since 2014.

Although not so recent, data on drivers involved in fatal crashes who tested positive for alcohol or drugs in Washington during the period 2008–2016 show that 44 per cent tested positive for two or more substances.³⁹⁰ Of those substances, the most common one was alcohol, followed by THC, while alcohol and THC formed the most common poly-drug combination involved in fatal crashes during that period.

389 Washington State, Statistical Analysis Center, “Monitoring impacts of recreational marijuana legalization: 2019 update report” (July 2019).

390 Washington Traffic Safety Commission, “Marijuana use, alcohol use, and driving in Washington State: emerging issues with poly-drug use on Washington roadways” (April 2018).

FIG. 102 Washington: fatal crashes involving alcohol, cannabis and other drugs, United States, 2008–2016



Source: “Marijuana use, alcohol use, and driving in Washington state: emerging issues with poly-drug use on Washington roadways”, Washington Traffic Safety Commission (April 2018).

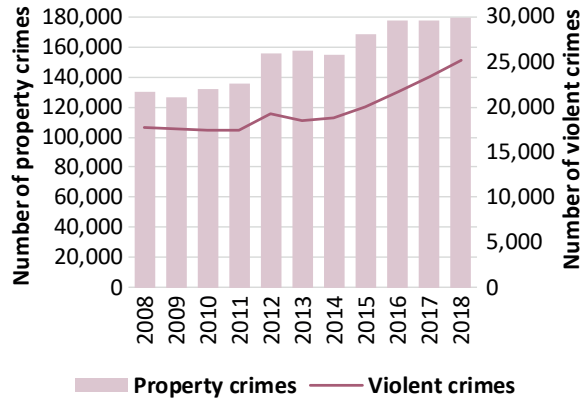
Crime and the non-medical use of cannabis in Washington and Colorado

Two diverging paradigms have emerged with regard to the impact of cannabis legalization on crime. One suggests that cannabis users are more likely to commit violent and property crimes than those who do not use cannabis, and that legalizing the non-medical use of cannabis would result in an increase in the number of regular cannabis users, thereby increasing the risk of young people engaging in violence and delinquency.³⁹¹ In the other paradigm, it is believed that legalizing the non-medical use of cannabis will lead to a decrease in violent crime rates, as individuals’ violent tendencies may be suppressed by the consumption of cannabis.³⁹² Nevertheless in addition, the vulnerability of the cannabis trade, as a cash-based business, could also create incentives for crimes such as burglary, shoplifting and robbery.

³⁹¹ Ruibin Lu and others, “The cannabis effect on crime: time-series analysis of crime in Colorado and Washington State”, *Justice Quarterly* (October 2019).

³⁹² *Ibid.*

FIG. 103 Colorado: reported property and violent crimes, United States, 2008–2018



Source: Colorado Bureau of Investigation.

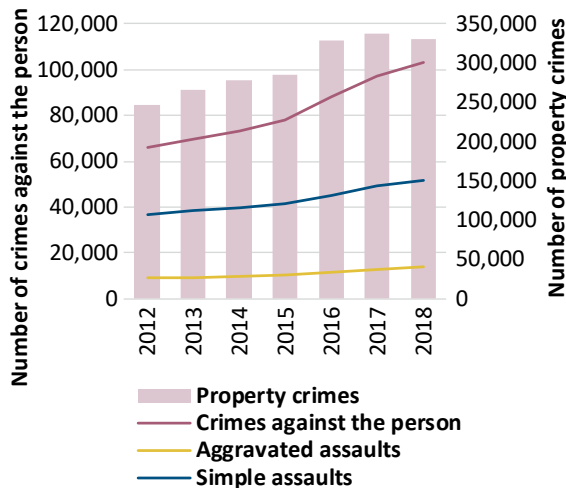
In empirical terms, there have been increases in some types of crime in both Colorado and Washington in the past few years. In particular, Colorado has seen an increase in property crimes since 2015, and crimes against the person and aggravated assaults have increased in Washington since 2016, but it is difficult to attribute those increases to the legalization of the non-medical use of cannabis.

In Colorado, the number of reported property crimes rose by 16 per cent in the 2014–2018 period, while the number of reported violent crimes increased by one third.

In 2018, more than half of the violent crimes reported in Colorado involved assault, followed by non-consensual sex offences (28 per cent) and robbery (15 per cent), whereas 60 per cent of the property crimes involved larceny.³⁹³ Similarly, in Washington there was a 19 per cent increase in property crimes, of which half involved larceny or theft in the 2014–2018 period, while the number of simple assaults and aggravated assaults increased more sharply (by 20 per cent and 47 per cent, respectively).

³⁹³ Colorado Bureau of Investigation data 2018.

FIG. 104 Washington: reported property crimes and crimes against the person (including assault), United States, 2012–2018



Source: Washington Association of Sheriffs and Police Chiefs, annual reports 2012–2018.

Has legalization led to substitution between cannabis and alcohol?

One of the claims made with regard to the outcome of legalizing the non-medical use of cannabis at the state level has been that it would substitute for, and therefore reduce, alcohol consumption and would thus have a positive impact on the substantial harms caused by alcohol. Most of the research on whether cannabis and alcohol are substitutes for, or complements to, one another has comprised econometric analyses of the effects that small changes in alcohol and cannabis prices have had on the consumption of either substance.³⁹⁴ All of the studies conducted on the topic have generated mixed results.

A small proportion of studies have shown that alcohol and cannabis are complementary to each other – that is, the increased use of cannabis also leads to increased use of alcohol and vice versa – while other studies have found no relationship between the two substances. Studies of trends in alcohol sales data in states that have and have not legalized the non-medical use of cannabis have found no evidence of a greater increase in alcohol use in states that have

³⁹⁴ Hall and others, “Public health implications of legalising the production and sale of cannabis”.

legalized the non-medical use of cannabis.³⁹⁵ More than half of the studies, however, have shown that cannabis and alcohol are substitutes, meaning that the increased use of one substance reduces the use of the other.^{396, 397} Other researchers have also suggested that cannabis, especially cannabis for medical use, may serve as a substitute for alcohol, tobacco and other drugs, including prescription drugs.^{398, 399}

A study on the impact of cannabis legalization on alcohol sales in Colorado, Oregon and Washington, the three states with the longest history of legal non-medical use of cannabis, showed that there was no evidence that legalization had had any impact on the sale of spirits or on total alcohol sales, which are generally considered a good proxy for alcohol consumption in the United States. The study showed that the per capita sale of spirits had increased by 3.6 per cent in Oregon, 5.4 per cent in Washington and 7.6 per cent in Colorado in 2018, after the measures allowing the non-medical use of cannabis were implemented in those states. Consistent with national trends, per capita sales of beer had declined by 3.6 per cent in Colorado, 2.3 per cent in Washington and 3.6 per cent in Oregon. The sale of wine increased by 0.7 per cent in Oregon, declined by 3.1 per cent in Washington and increased by 3.2 per cent in Colorado. Overall, per capita sales of alcoholic beverages were fairly stable, as they increased by 1.7 per cent in Colorado, declined by 0.2 per cent in Washington and declined by 0.5 per cent in Oregon.⁴⁰⁰

³⁹⁵ Ibid.

³⁹⁶ Ibid.

³⁹⁷ Meenakshi Sabina Subbraman, “Substitution and complementarity of alcohol and cannabis: a review of the literature”, *Substance Use and Misuse*, vol. 51, No.11 (September 2016), pp. 1399–1414.

³⁹⁸ Philippe Lucas and others, “Cannabis as a substitute for alcohol and other drugs: a dispensary-based survey of substitution effect in Canadian medical cannabis patients”, *Addiction Research and Theory*, vol. 21, No. 5 (November 2012), pp. 435–442.

³⁹⁹ Amanda Reiman, “Cannabis as a substitute for alcohol and other drugs”, *Harm Reduction Journal*, vol. 6, No. 35 (December 2009).

⁴⁰⁰ David Ozgo, “Impact of retail marijuana legalization on alcohol sales in Colorado, Washington state and Oregon” (January 2019).

Can medical cannabis help to address the opioid epidemic in the United States?

In the face of the opioid epidemic in the United States, it has been suggested that medical cannabis products can help to address the high rates of opioid use for pain management and thus to reduce the prevalence of opioid use disorders and opioid overdose deaths.^{401, 402}

A substantial number of randomized control trials have shown that medical cannabis products could be an effective alternative to opioids for pain management. However, one major shortcoming of those clinical trials is that they were conducted with cannabis products that differed from the medical cannabis products currently available in different jurisdictions in the United States, thus limiting the applicability of the findings to the general population.⁴⁰³ In addition, only limited information is available on the efficacy, doses, routes of administration or side effects of commonly used and commercially available cannabis products in the United States.⁴⁰⁴

With regard to cannabis products substituting for opioids as pain relief medication, it is considered that the analgesic effects of cannabis are not sufficiently powerful to palliate acute pain or to manage chronic pain. For example, only in very specific cases have preparations containing THC, such as dronabinol and nabiximols, been shown to be effective in the management of neuropathic pain in patients suffering from multiple sclerosis. A long-term longitudinal study among people who were prescribed opioids showed greater pain severity and pain interference (pain effects on sleep, working ability, daily

living, social interactions, lower pain self-efficacy and higher levels of generalized anxiety disorder) among the 24 per cent who also used cannabis daily or less frequently than among those who did not use cannabis. Moreover, individuals who used cannabis on a near-daily basis were less likely to discontinue opioid use than participants who abstained from cannabis use.⁴⁰⁵

In many studies and reports, individual testimonies have been taken as evidence of the effectiveness of cannabis for pain relief. In the debate surrounding the medical use of cannabis, different cannabis products (smokable, edible or concentrates) for which the dosages and contents are not standardized are often confused with medical cannabis products, such as synthetic THC (dronabinol) or nabiximols containing synthetic THC and CBD, which have gone through the manufacturing and processing safety protocols that pharmaceutical companies must follow when mass-producing pharmaceutical products.⁴⁰⁶

Nevertheless, using an Internet-based survey conducted in 2017, one study examined opioid substitution among respondents with a history of ever using cannabis who self-reported the use of opioids in the past 12 months. Out of the nearly 9,000 respondents, 5 per cent reported ever using cannabis and had used opioids in the past year, among whom 43 per cent had used opioids daily and 23 per cent had used cannabis in the past 30 days. Although the results are based on a small number of respondents, of the 450 who reported ever using cannabis and past-year opioid use, 41 per cent reported a decrease or cessation of opioid use as a result of cannabis use, 46 per cent reported no change in opioid use and 8 per cent reported an increase in opioid use.⁴⁰⁷

Similarly, ecological studies have shown that states with legislation in place regarding medical cannabis had lower rates of opioid overdose deaths than states that did not have such laws. One such study looked at mortality rates in California, Colorado and Washington from 1999 to 2010, and the results suggested

401 Hall and others, "Public health implications of legalising the production and sale of cannabis".

402 Paul J. Larkin Jr., and Bertha K. Madras, "Opioids, overdoses, and cannabis: is marijuana an effective therapeutic response to the opioid abuse epidemic?", *Georgetown Journal of Law and Public Policy*, vol. 17, No. 2 (August 2019).

403 Bia Carlini, "Role of medicinal cannabis as substitute for opioids in control of chronic pain: separating popular myth from science and medicine" (Seattle, United States, Alcohol and Drug Abuse Institute, University of Washington, February 2018).

404 National Academies of Sciences, Engineering, and Medicine, *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research* (Washington, D.C., National Academies Press, 2017).

405 Larkin Jr., and Madras, "Opioids, overdoses, and cannabis".

406 Ibid.

407 Julie H. Ishida and others, "Substitution of marijuana for opioids in a national survey of US adults", *PLoS ONE*, vol. 14, No. 10 (October 2019).

that there was an association between medical cannabis laws and low rates of opioid overdose mortality in those states.⁴⁰⁸ However, another study in which the same data and methods were used as the earlier study and the analysis was extended through 2017 found that the original analysis and conclusions were not valid for the period beyond 2010. In fact, the association between state medical cannabis laws and opioid overdose mortality reversed direction, from minus 21 per cent to plus 23 per cent, and remained positive even after accounting for recreational cannabis laws in those states. The authors concluded that the analysis of the data did not support the interpretation that broader access to cannabis, either for medical or non-medical purposes, was associated with lower opioid overdose mortality.^{409, 410}

As summarized in a recent paper,⁴¹¹ the ecological studies that have shown an association between cannabis use and reduced opioid use (substitution) or low rates of opioid overdose mortality have major limitations: the opioid overdose deaths in a state may not reflect the behaviour of individuals who use medical cannabis; it is difficult to control for confounding factors when state-level data on opioid overdoses is used; and the studies do not control for differences in state policies and programmes that are likely to increase or decrease opioid overdose deaths. Moreover, many of the studies have overlooked the proliferation of fentanyl as a driver of opioid overdose mortality in the United States, which may negate any potential effect of medical cannabis on overdose deaths.⁴¹² It can only be concluded that additional research might help to identify a range of alternative non-opioid medications and non-pharmacological treatments that

could be effective in pain management.⁴¹³ The issue of whether increased accessibility of cannabis could reduce the medical and non-medical use of pharmaceutical opioids and their negative impact remains inconclusive.⁴¹⁴

Developments in the regulation of the non-medical use of cannabis in Uruguay

In 2013, the Government of Uruguay approved legislation (Law No. 19.172) regulating the cultivation, production, dispensing and use of cannabis for different purposes, including non-medical use. In accordance with the legislation, Uruguayan citizens or foreigners with permanent residence aged 18 and older can obtain cannabis for non-medical purposes by registering with the national Institute for the Regulation and Control of Cannabis and by choosing one of three options: (a) purchase in authorized pharmacies; (b) membership of a club; or (c) domestic cultivation.⁴¹⁵ The quantity of cannabis permitted per person, obtained through any of the three mechanisms, cannot exceed 480 g per year. Initially, the Government of Uruguay set THC content at 2 per cent and CBD content at 6–7 per cent. In 2017, the Government introduced two new varieties, with a maximum THC content of 9 per cent and CBD content of no less than 3 per cent.⁴¹⁶

Overall, the implementation of the law has been gradual; as at January 2020, five companies had been granted licences to cultivate, produce and distribute cannabis products for non-medical use in the country. However, those products only include dried flower, since psychoactive edibles and extracts are not allowed in Uruguay. Seventeen pharmacies had been licensed to dispense cannabis for non-medical use, and 39,423 people had registered to acquire cannabis from those pharmacies. In the period July 2017–October 2019, out of over

408 For instance, see Marcus A. Bachhuber and others, “Medical cannabis laws and opioid analgesic overdose mortality in the United States 1999–2010”, *JAMA Internal Medicine*, vol. 174, No. 10 (October 2014), pp. 1668–1673.

409 Chelsea L. Shover and others, “Association between medical cannabis laws and opioid overdose mortality has reversed over time”, *Proceedings of the National Academy of Science of the United States of America*, vol. 116, No. 26 (June 2019), pp. 12624–12626.

410 Another study that arrived at similar results is Gregory Schuster, “Medical marijuana laws and opioid overdose deaths in the United States” (2019).

411 Hall and others, “Public health implications of legalising the production and sale of cannabis”.

412 Schuster, “Medical marijuana laws and opioid overdose deaths in the United States”.

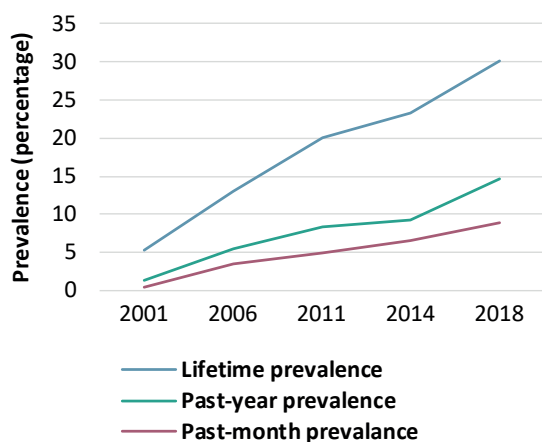
413 Larkin Jr., and Madras, “Opioids, overdoses, and cannabis”.

414 Hall and others, “Public health implications of legalising the production and sale of cannabis”.

415 See also *World Drug Report 2018: Analysis of Drug Markets—Opiates, Cocaine, Cannabis, Synthetic Drugs* (United Nations publication, Sales No. E.18.XI.9 (Booklet 3)).

416 John Hudak, Geoff Ramsey and John Walsh, “Uruguay’s cannabis law: pioneering a new paradigm” (Washington D.C., Centre for Effective Public Management, Brookings Institution, March 2018).

FIG. 105 Non-medical use of cannabis, Uruguay, 2001–2018



Source: Uruguay, Junta Nacional de Drogas, Observatorio Uruguayo de Drogas, Encuesta Nacional en Hogares sobre Consumo de Drogas, 2016 and 2018.

670,000 cannabis transactions, around 3,350 took place in pharmacies, with 60 per cent of those sales in urban centres.⁴¹⁷ It is estimated that out of the total number of cannabis users registered with the pharmacies, some 89 per cent had purchased cannabis at least once, with monthly purchases ranging between 15 and 17 g by October 2019.⁴¹⁸ However, it would seem that the pharmacies currently do not cover the demand of registered users, especially in parts of the country where there is a greater concentration of registered cannabis users.⁴¹⁹

By January 2020, a total of 7,834 people had registered for domestic cultivation of cannabis, and 145 cannabis clubs with a total membership of 4,298 people had been registered. Thus, a total of approximately 51,555 people had access to the regulated cannabis market in Uruguay at that time,⁴²⁰ which is still a relatively small share of the overall population of cannabis users in the country.

In the 2018 survey on drug use in Uruguay, it was estimated that around 12 per cent of men and 5.8 per cent of women had used cannabis in the past month, with a total past-month prevalence of 8.9 per cent among the population aged 15–65, or about 158,000 users.⁴²¹ This reflects an increase in the past-month use of cannabis by more than one third since 2014, while use of cannabis in the past year increased by more than 50 per cent over the same period.

In 2019, the highest past-month prevalence of cannabis use was reported among young people aged 19–25 (20.8 per cent), followed by those aged 26–35 (16.4 per cent). According to the survey, about 25,500 people were estimated to be daily or near-daily users of cannabis – 9.9 per cent of those who reported cannabis use in the past year (13.1 per cent of males, 5.2 per cent of females) – whereas more than one third of regular cannabis users were considered dependent.⁴²²

However, the impact of the provisions regulating the non-medical use of cannabis in Uruguay will become evident only in the coming years, once more information on the outcome measures related to public health and public safety are made available.

417 Uruguay, Instituto de Regulación y Control del Cannabis, “Mercado regulado del cannabis: informe VIII”, 31 October 2019.

418 Ibid.

419 Ibid.

420 Uruguay, Institute for the Regulation and Control of Cannabis website, January 2020.

421 Uruguay, Seventh national household survey on drug use (National Drug Observatory and National Drug Council, 2018).

422 Ibid.

TABLE 4 Regulations for the legalization of the non-medical use of cannabis in Canada

	Federal law	Alberta	British Columbia	Manitoba
Legal process	Government legislation			
Title	Cannabis Act	Gaming, Liquor and Cannabis Act and Gaming, Liquor and Cannabis regulation	Cannabis control and licensing Act (CCLA) Cannabis distribution Act (CDA)	Safe and Responsible Retailing of Cannabis Act
Date implemented	October 17, 2018			
Regulatory authority		Alberta Gaming Liquor and Cannabis (AGLC)	Liquor and cannabis regulation branch	Liquor, Gaming and Cannabis Authority of Manitoba (LGCA) Manitoba Liquor and Lotteries (MBLL)
Minimum age	18	19	19	19
Personal possession quantity	30 g dried or equivalent i.e., 150 g of fresh cannabis 450 g of edible product 2100 g of liquid product 7.5 g of concentrates (solid or liquid) 30 cannabis plant seeds	30 g or equivalent	30 g or equivalent	30 g or equivalent
Home cultivation	Grow from licensed seeds four cannabis plants per residence for personal use Cannabis products such as food and drink at home if organic solvents are not used	Yes	Adults can grow up to four cannabis plants per household, but the plants must not be visible from public spaces	Home growing is not permitted
Interpersonal sharing	30 g or equivalent of legal cannabis product			
Retail transaction limit		30 g or equivalent		
Average retail price per gram (2019 average, Cannabis Stats Hub (13-61-X))		Can\$10.96	Can\$9.32	Can\$10.56

	Federal law	Alberta	British Columbia	Manitoba
Maximum THC content	Dried cannabis to be consumed by inhalations must not exceed 1 g in each discrete unit of cannabis product Products intended to be "administered orally, rectally, vaginally or topically" must not exceed a maximum yield quantity of 10 mg of THC Cannabis oil must not exceed a maximum yield of 30 mg of THC per ml of the oil			
Commercial production	Licensed producers. Each province has an Excise stamp that needs to be fixed on the cannabis products			
Commercial distribution		Licensed retailers Private retail stores, provincial online sales	Private and provincial retail stores, online sales Retail licensing regime similar as for liquor	Private retail stores and online sales
Restrictions on edibles	Cannabis edible products and concentrates legal for sale October 2019	Edibles as yet not allowed	Edibles to be allowed within a year	
Advertising	No promotion, packaging or labelling that could be considered appealing to young people, and ensuring that important product information is presented clearly	No promotion, packaging or labelling that could be considered appealing to young people, and ensuring that important product information is presented clearly Advertising allowed inside cannabis stores	Same as Federal Law	
Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)	Flower \$0.25/g Trim \$0.75/g Seed \$0.25/seed Seedling \$0.25/seedling Federal Ad Valorem Rate 2.5% of dutiable amount of cannabis product when delivered to purchaser	Flower: \$ 0.75/g plus 16.8% of base amount Trim: \$0.225/g plus 17.8% of base amount Seed: \$0.75/seed plus 16.8% of base amount Ad Valorem Additional Rate 7.5% plus 16.8% of deductible amount when delivered (total applicable rate 24.3%)	Flower \$0.75/g Trim \$0.22/g Seed and seedling : \$0.75/seed or seedling 7.5% provincial sale tax in addition to Federal taxes	Wholesale mark-up on non-medical cannabis, a \$0.75 per gram mark-up plus 9% per cent mark-up applied on top of the \$0.75 per gram
Restrictions on use		In cars, areas frequented by children, or tobacco-restricted areas	In cars, areas frequented by children, or tobacco restricted areas	Smoking and vaping cannabis is illegal in public places (including enclosed public places)

	New Brunswick	Newfoundland and Labrador	Northwest Territories
Legal process			
Title	Cannabis Control Act Cannabis Management Corporation Act	Newfoundland and Labrador Cannabis Regulations Control and Sale of Cannabis Act	Cannabis Legalization and Regulation Implementation Act
Date implemented			
Regulatory authority	Cannabis Management Corporation	Newfoundland and Labrador Liquor Corporation (NLC)	North West Territories Liquor & Cannabis Commission (NTLCC)
Minimum age	19	19	19
Personal possession quantity	30 g or equivalent	30 g or equivalent	30 g or equivalent
Home cultivation	Can grow up to four plants at primary residence. Plants must be kept in a separate locked space Outdoor plants must be located behind a locked enclosure at least 1.52 metres high	A private dwelling can contain up to four cannabis plants	Grow up to four cannabis plants per household
Interpersonal sharing			
Retail transaction limit			
Average retail price per gram after tax	Can\$11.36	Can\$10.61	Can\$14.45
Maximum THC content			
Commercial production			
Commercial distribution	Cannabis NB retail stores and online sales	Private retail stores, provincial online sales	NWT Liquor Stores, provincial online sales
Restrictions on edibles			
Advertising			

	New Brunswick	Newfoundland and Labrador	Northwest Territories
Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)	Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser	Flower: \$0.75 /gm Trim: \$0.225 /gm Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser	Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser
Restrictions on use	Illegal to smoke everywhere except private property or residence	Illegal to smoke everywhere except private property or residence	Illegal to smoke everywhere except private property or residence
	Nova Scotia	Nunavut	Ontario
Legal process			
Title	Cannabis Control Act	Cannabis Act Cannabis Statutes Amendments Act	Cannabis, Smoke-Free Ontario, and Road Safety Statute Law Amendment Act, 2017 Cannabis Statute Law Amendment Act, 2018
Date implemented			
Regulatory authority	Nova Scotia Liquor Corporation	Nunavut Liquor and Cannabis Commission	Provincial cannabis committee Cannabis management corporation
Minimum age	19	19	19
Personal possession quantity	30 g or equivalent No limit on home storage for personal use	30 g or equivalent	30 g or equivalent
Home cultivation	Adults can grow up to four cannabis plants per household	Territorial government can regulate whether plants can be grown at home	Adults can grow up to four plants per residence A household is permitted to have four cannabis plants
Interpersonal sharing			
Retail transaction limit			

	Nova Scotia	Nunavut	Ontario	Prince Edward Island
Average retail price per gram after tax	Can\$10.93	Can\$13.71 * not for 2019	Can\$10.53	Can\$11.19
Maximum THC content				
Commercial production				
Commercial distribution	Designated NSLC stores or online	Currently through government-operated online store or by phone	Government retail stores and online sales	Four dedicated government-owned retail stores and online sales
Restrictions on edibles	Sale of edibles illegal under Federal law Edibles can be produced at home for personal use			
Advertising				
Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)	Flower: \$0.75/ g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser	Flower: \$0.75/g plus 19.3% of base amount Trim: \$0.225/g plus 19.3% of base amount Seed/seedling: \$0.75 seed plus 19.3% of base amount 7.5% plus plus 19.3% of the dutiable amount of a cannabis product when delivered to a purchaser (total applicable rate of 26.8%)	Flower: \$0.75/g plus 3.9% of base amount Trim: \$0.225/g plus 19.3% of base amount Seed/seedling: \$0.75 seed plus 19.3% of base amount 7.5% plus plus 19.3 % of the dutiable amount of a cannabis product when delivered to a purchaser (total applicable rate of 26.8 %)	Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser
Restrictions on use	Illegal everywhere except for areas where tobacco may be smoked	Illegal everywhere except for areas where tobacco may be smoked	Illegal to smoke everywhere except private property	Illegal to smoke everywhere except private property, some exceptions for certain public spaces

	Prince Edward Island	Quebec	Saskatchewan	Yukon
Legal process				
Title	Cannabis Control Act Cannabis Management Corporation Act	Cannabis Regulation Act Act to constitute the Société québécoise du cannabis	The cannabis control (Saskatchewan) Act The cannabis control (Saskatchewan) regulations	Cannabis control and regulation act
Date implemented				
Regulatory authority	Provincial cannabis committee Cannabis management corporation	Société québécoise du cannabis	Cannabis Authority under the Saskatchewan Liquor and Gaming Authority	Yukon Liquor Corporation Cannabis Licensing Board (2019)
Minimum age	19	18	19	19
Personal possession quantity	30 g or equivalent	30 g in a public place 150 g in a private residence	30 g of dried cannabis or equivalent	30 g of dried cannabis or equivalent
Home cultivation	A household is permitted to have four cannabis plants.	Prohibited to cultivate cannabis for personal use	Limit of four cannabis plants grown per household	Four plants per household
Interpersonal sharing				
Retail transaction limit		30 g per visit at Société québécoise du cannabis		30 g per purchase
Average retail price per gram after tax	Can\$11.19	Can\$7.88	Can\$10.68	Can\$10.36
Maximum THC content				
Commercial production		Licensed producers		
Commercial distribution	Four dedicated government-owned retail stores and online sales	Government retail stores and online sales	Private retail stores, provincial online sales	Government retail stores and online sales Cannabis Yukon retail store
Restrictions on edibles				
Advertising				

	Prince Edward Island	Quebec	Saskatchewan	Yukon
<p>Taxation Cannabis excise duty rates in provinces and territories (Department of Finance, Canada)</p>	<p>Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser</p>	<p>Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5 % of the dutiable amount when delivered to purchaser</p>	<p>Flower: \$0.75/g plus 6.45% of base amount Trim: \$0.225/g plus 6.45% of base amount Seed/seedling: \$0.75 seed plus 6.45% of base amount 7.5% plus 6.45 per cent of the dutiable amount of a cannabis product when delivered to a purchaser (total applicable rate of 13.95%)</p>	<p>Flower: \$0.75/g Trim: \$0.225/g Seed/seedlings \$0.75 7.5% of the dutiable amount when delivered to purchaser</p>
<p>Restrictions on use</p>	<p>Illegal to smoke everywhere except private property, some exceptions for certain public spaces</p>	<p>Illegal to smoke everywhere except for areas where tobacco may be smoked, excluding university and CEGEP campuses</p>	<p>Illegal to smoke everywhere except private property or residence</p>	<p>Illegal to smoke everywhere except private property or residence</p>

TABLE 5 Regulations for the legalization of the non-medical use of cannabis in jurisdictions in the United States

	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	Nov-14	Nov-16	Nov-12	Nov-14	Nov-16
Date implemented/required date of rule adoption	February 2015: Personal possession, consumption, cultivation October 2016: Retail sales	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	Alcohol and Marijuana Control Office	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	2 oz (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 gm or less	Yes for home grow. Not permitted for retail marijuana
Retail transaction limit	28.5 g	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 of medium quality Source: budzu.com	\$20.00	\$12.03	\$14.14	Not applicable	\$14.00
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	Logo or advertisement for licensed marijuana may not promote excessive consumption, depiction appealing to a person under 21 years. Restrictions on advertisements in school areas, public transport, and contrain prescribed warning	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% 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% excise on retail, \$9.25 per dry weight ounce on flower after harvest. \$2.75 per drug weight ounces on leaves	15% excise tax on cultivation; 10% retail marijuana sales tax to be decreased to 8% in July 2017. Up to 2.9% state sales tax to 3.5% local sales taxes	Not applicable, no commercial market	10% excise on retail
Cannabis clubs	Not explicitly allowed or prohibited Earlier ban on in-store consumption repealed in November 2015.	Not specified although they may exist in the form of microbusiness that allow on-site consumption	Not allowed	Not allowed; currently under investigation by city task force.	State-licensed clubs
Restrictions on use	Cannabis use in public is unlawful 1998: Patient registry, no dispensaries registration; out-of-state patients recognized for approved conditions but not for dispensary purchases; possession, home cultivation	Prohibit cannabis use in a public place unlicensed for such use, including near schools and other areas where children are present. 1996 and 2003; Patient registry - voluntary registration; cooperatives and collectives; State-wide licensing of dispensaries will begin 2018	Not permitted in public places	Not permitted in public places (use on private property)	Not permitted in public places (allowed use in private property or smoking in a state-licensed marijuana social club)
Medical cannabis			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

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Legal process	Voter initiative	Voter initiative	Voter initiative	Voter initiative, state statute	Legislative process	Voter initiative, state statute	Legislative process
Title	Proposal 18-1	Question 4	Question 2	Measure 91	No. 86	Initiative 502	HB 1438
Date passed	6 December 2018	Nov-16	Nov-16	Nov-14	Jan-18	Nov-12	Jun-19
Date implemented/ required date of rule adoption	Commercial licences application begin by 6 December 2019	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	01 July 2018	December 2012: Personal possession, consumption July 2014: Retail sales	1-Jan-20
Regulatory authority	Department of Licensing and Regulatory Affairs	1) Cannabis Control Commission, and 2) Cannabis Advisory Board	Department of Taxation	Oregon Liquor Control Commission	Cannabis Control Board (proposed under S.54)	Liquor and Cannabis Board (formerly the Liquor Control Board)	Department of Financial and Professional Regulation
Minimum age	21	21	21	21	21	21	21
Residency requirement		Not specified	Not specified	None		None	Non residents can acquire half the amount allowed for residents
Personal possession quantity	2.5 oz (70.8 g) on person and 10 oz (283 g) at home	1 oz flower (28.5 g) 5g concentrate	1 oz flower 3.5g concentrate	In public: 28.5 g At home: 228 g	1 oz or 5 g of cannabis	28.5 g	30 g of raw cannabis, 500 mg of THC in cannabis-infused product or 5 g of cannabis concentrate
Home cultivation	Up to 12 plants per household	6 plants, 12 in a single residence away from view; 10 oz. of dried marijuana permitted at home	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	Four plants in flower	2 mature plants or 4 immature plants	Not allowed	Medical cannabis patients can grow up to 5 plants per household. Plants need to be secured and out of view by public.

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Interpersonal sharing	Yes (2.5 oz with a max of 15 mg of concentrate)	Yes	Yes	28.5 g	Same as personal possession limits	Not allowed	
Retail transaction limit		Not specified, presumably same limits as for personal possession	Not specified, presumably same limits as for personal possession	1 oz dried flower 16 oz edible form 72 oz cannabis in liquid form 10 cannabis seeds 4 immature cannabis plants		28.5 g	Not set but would be same as personal possession limit
Retail pricing structure	Market/commercial	Market/commercial	Market/commercial	Market	No provision for setting up a taxed-and-regulated retail marketplace	Market	Market
Average retail price per gram of medium quality Source: budzu.com	\$16.92	\$14.64	\$16.55	\$10.59	NA	\$10.55	\$11.95
Maximum THC content		Not set initially	Not set initially	Not set initially	Cannabis flower: not to exceed 30% THC. Solid concentrates: not exceed 60%. Oils — apart from cartridges for vape pens — not allowed.	Not set initially	Initially 100 mg of THC per package; Department of Agriculture may change maximum level of THC contained in each serving of cannabis-infused product
Registration requirements		Personal data collection not required	Personal data collection not required	None		None	None
Commercial production	Licensed establishments	Licensed establishments	Licensed establishment	Licensed cannabis producers	Not clarified in law	Licensed cannabis producers	Licensed marijuana producers
Commercial distribution	A municipality may completely prohibit or limit the number of establishments operating	Licensed establishments; localities can regulate, limit or prohibit the operation of businesses	Limits on market concentration by population	Licensed retail cannabis stores	Not clarified in law	Marijuana can only be sold and purchased at state-licensed retail stores	Dispensary provides products to adult consumers. Medical cannabis dispensary could also apply for adult sale.

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
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 labelling; marijuana-infused products, packages and labels to be approved by the State Liquor Control Board before sale	Allowed but with information and warning on consumption
Advertising	Restrictions on public signs related to cannabis establishments	Restrictions on marketing to children to be developed in regulations	A licensed marijuana establishment cannot engage in advertising that contains any false or misleading statements, promotes overconsumption, depicts actual consumption, or appeals to minors. Also applies 70/30 rule from Colorado	Entry sign required on exterior of dispensaries; Oregon Liquor Control Commission has authority to further regulate or prohibit advertising	Advertising could not be deceptive, promote overconsumption, offer free samples, or be appealing to minors. Advertising would only be allowed where the licensee can reasonably expect no more than 15% of viewers will be under 21	Cannabis business licensees are limited to two permanent signs on their licensed premises, and all other forms of outdoor ads on the premises are banned. New rules mandated that billboards and signs can no longer contain images of the cannabis plant or cannabis products. Cannot contain depictions of cartoon characters or any depictions that may be appealing to children	Businesses cannot place advertisements that have false or misleading claims; or advertisements that promote overconsumption; depict actual consumption; depict a person under 21 consuming; make health, medicinal or therapeutic claims; contain images that can be appealing to minors or children; advertisements are not allowed within 1,000 feet of school or playground, public park or library, public transport or public property; no sales promotions are allowed; similar restrictions apply on packaging and labelling. Health warnings to be legibly displayed

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Taxation	10% excise tax	3.75% excise on retail	15% excise on wholesale sale 10% excise tax on retail sale	No tax on retail sales from October 2015 to December 2015 25% sales tax after 5 January 2016 17% sales tax in 2017 with options for local communities to establish local tax up to 3%		July 2014 to June 2015: 25% at each stage (production, processing, retail) July 2015: 37% sales tax	10% tax will apply to cannabis flower or products with less than a 35% THC concentration. 20% tax will apply to products infused with cannabis, such as edible products. 25% tax will apply to any product with a THC concentration higher than 35%. In addition, 6.25% sales tax, along with local taxes of up to 3.5%. Consumers may pay between 19.55% and 34.75% depending on a product's potency
Cannabis clubs		Not allowed, although they may exist in establishments that allow on-site consumption	Not specified	Not allowed		Not allowed	
Restrictions on use	Not permitted in public places or place where prohibited by person who owns, occupies or manages the property, allowed in designated public places that are not accessible to persons under 21 years of age	Cannot use cannabis in a place where smoking tobacco is prohibited	Cannabis consumption is for private use only. It is illegal to smoke in public, on federal land or in a vehicle without risking a fine	Smoking marijuana in public is illegal	Use is limited to individual dwellings. Prohibited in street, alley, park or sidewalk in addition to usual smoke free places	It is illegal to consume marijuana in view of the public	Smoking cannabis is not allowed in any place where smoking is prohibited under the Smoke Free Illinois Act

	Michigan	Massachusetts	Nevada	Oregon	Vermont	Washington	Illinois
Medical cannabis	<p>2008: patient registry, dispensaries can be established with local ordinances; dispensation for specific conditions, recognize out of state patients only for legal protection of possession but not for dispensary purchases</p>	<p>2012/2013: patient registry or identification cards; dispensaries, out-of-state patients not recognized</p>	<p>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</p>	<p>1998: Patient registry, dispensaries already existed but not clearly authorized by law or regulated; possession, home cultivation</p>		<p>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</p>	<p>Compassionate use of medical cannabis pilot programme act, August 2013. Eligible patients with a doctor's recommendation, with a recognized debilitating condition, after registering with the state, may legally consume medical marijuana. Purchase limit is 2.5 ounces of cannabis flower every 14 days. New law also allows school nurses or administrators to give cannabis products to students who are registered medical patients and permits students to medicate under the supervision of those officials</p>

TABLE 6 Regulations for the legalization of the non-medical use of cannabis in Uruguay

Uruguay	
Legal process	Government initiative, national law
Title	Law No. 19.172
Date passed	Dec-13
Date implemented/ required date of rule adoption	August 2014: Personal cultivation October 2014: Grower clubs Mid-2017: pharmacy sales
Regulatory authority	Institute for the Regulation and Control of Cannabis (IRCCA)
Minimum age	18
Residency requirement	Uruguayan citizenship or permanent Uruguayan residency required
Personal possession quantity	40 g per month
Home cultivation	Six plants in flower
Interpersonal sharing	Allowed within the home
Retail transaction limit	40 g per month, 10 g per week (sale through pharmacies to registered users)
Retail pricing structure	Government price control
Average retail price per gram after tax	265 Uruguayan pesos per 5 g (approx \$1.2 per gram)
Maximum THC content	All products are required to indicate that CBD is equal to or more than 3% and THC is equal to or less than 9%
Registration requirements	Yes, with IRCCA for any of the three modes of access
Commercial production	Licensed marijuana producers
Commercial distribution	Licensed pharmacies
Advertising	Prohibited
Taxation	No tax, although IRCCA can impose tax in the future.
Cannabis clubs	Clubs with 15-45 members allowed to cultivate up to 99 plants, maximum 480 g of dried product per member per year
Medical cannabis	In 2013: Passed (Law 19.172). Decree N° 46/015. Oils under prescription (CBD) and cosmetics with CBD currently for sale in pharmacies.

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-methylenedioxy-methamphetamine (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.

fentanyls - fentanyl and its analogues.

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 that refers both to opiates and 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 WHO.

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

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 that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state.

substance or drug use disorders — referred to in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition) as patterns of symptoms resulting from the repeated use of a substance despite experiencing problems or impairment in daily life as a result of using substances. Depending on the number of symptoms identified, substance use disorder may be mild, moderate or 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, South Sudan, Uganda, United Republic of Tanzania and Mayotte
- North Africa: Algeria, Egypt, Libya, Morocco, Sudan and Tunisia
- Southern Africa: Angola, Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe and Reunion
- 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, Togo and Saint Helena
- Caribbean: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Anguilla, Aruba, Bonaire, Netherlands, British Virgin Islands, Cayman Islands, Curaçao, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saba, Netherlands, Sint Eustatius, Netherlands, Sint Maarten, Turks and Caicos Islands and United States Virgin Islands
- Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama
- North America: Canada, Mexico and United States of America, Bermuda, Greenland and Saint-Pierre and Miquelon
- South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of) and Falkland Islands (Malvinas)
- 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, Viet Nam, Hong Kong, China, Macao, China, and Taiwan Province of China

- 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, North Macedonia, Romania, Serbia, Turkey and Kosovo⁴²³
- 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, United Kingdom of Great Britain and Northern Ireland, Faroe Islands, Gibraltar and Holy See

Oceania (comprised of four sub-regions):

- Australia and New Zealand: Australia and New Zealand
- Polynesia: Cook Islands, Niue, Samoa, Tonga, Tuvalu, French Polynesia, Tokelau and Wallis and Futuna Islands
- Melanesia: Fiji, Papua New Guinea, Solomon Islands, Vanuatu and New Caledonia
- Micronesia: Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, Palau, Guam and Northern Mariana Islands

⁴²³ All references to Kosovo in the *World Drug Report* should be understood to be in compliance with Security Council resolution 1244 (1999).



UNODC

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Presented in six separate booklets, the *World Drug Report 2020* provides a wealth of information and analysis to support the international community in implementing operational recommendations on a number of commitments made by Member States, including the recommendations contained in the outcome document of the special session of the General Assembly on the world drug problem, held in 2016.

Booklet 1 provides a summary of the five subsequent booklets by reviewing their key findings and highlighting their policy implications. Booklet 2 focuses on drug demand and contains a global overview of the extent of and trends in drug use, including drug use disorders, and its health consequences. Booklet 3 deals with drug supply and presents the latest estimates and trends regarding the production of and trafficking in opiates, cocaine, amphetamine-type stimulants and cannabis. Booklet 4 addresses a number of cross-cutting issues, including the macrodynamics that are driving the expansion and increasing complexity of the drug markets, and describes some of the rapidly evolving drug-related concerns: the latest, multifaceted global opioid crisis; rapid market changes; the market for new psychoactive substances; the use of the darknet for supplying drugs; and developments in jurisdictions that have measures allowing the non-medical use of cannabis. Booklet 5 looks at the association between socioeconomic characteristics and drug use disorders, including at the macro-, community and individual levels, with a special focus on population subgroups that may be impacted differently by drug use and drug use disorders. Finally, booklet 6 addresses a number of other drug policy issues that all form part of the international debate on the drug problem but on which in-depth evidence is scarce, including access to controlled medicines, international cooperation on drug matters, alternative development in drug cultivation areas, and the nexus between drugs and crime.

As in previous years, the *World Drug Report 2020* is aimed at improving the understanding of the world drug problem and contributing to fostering greater international cooperation in order to counter its impact on health, governance and security.

The accompanying statistical annex is published on the UNODC website:
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