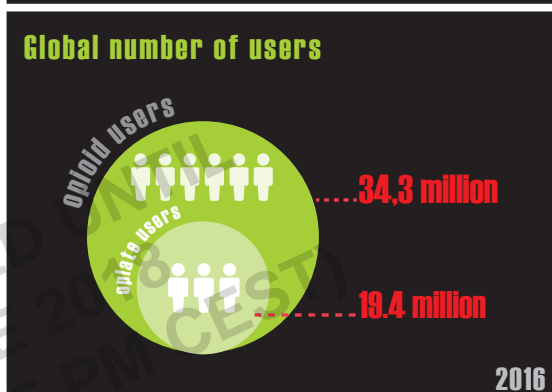
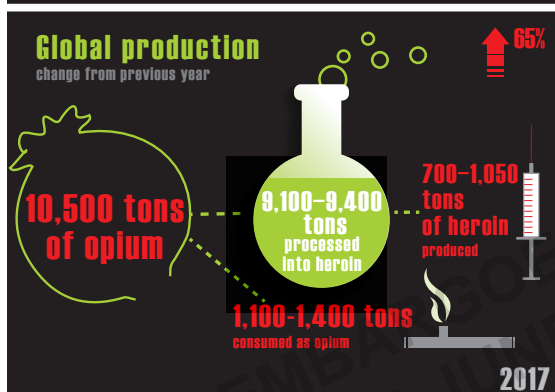
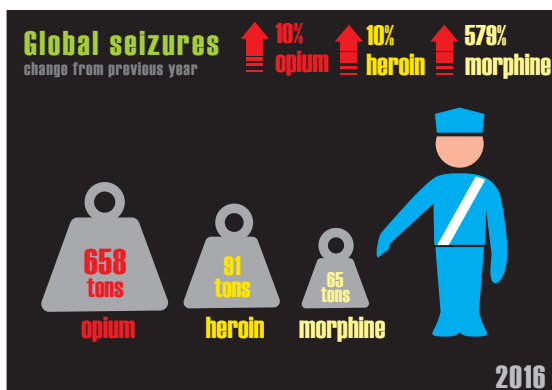
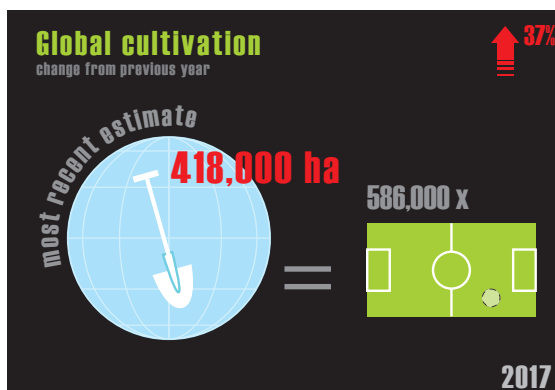


A. OPIOIDS



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

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

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

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

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

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

Record increase in opium poppy cultivation in Afghanistan: future challenges

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

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

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

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

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

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

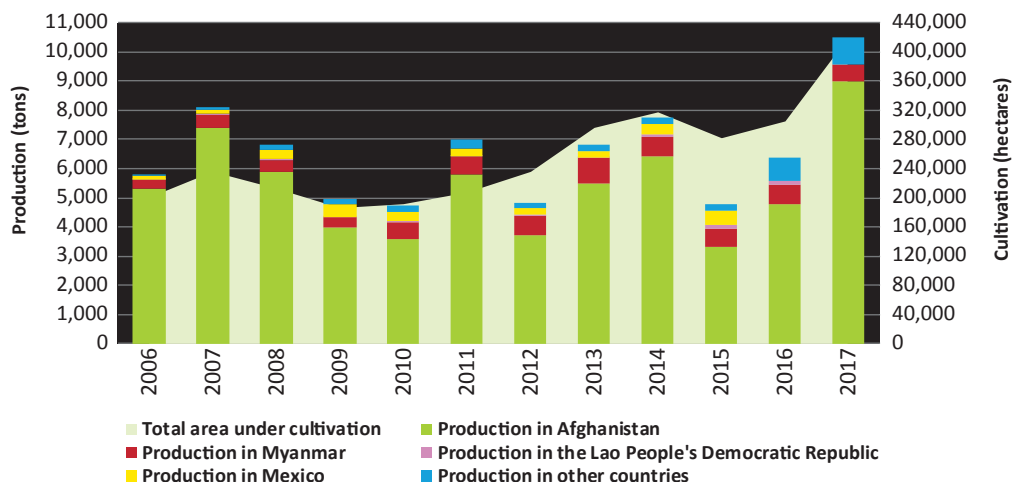
Of the 10,500 tons of opium produced worldwide in 2017, it is estimated that some 1,100–1,400 tons remained unprocessed for consumption as opium, while the rest was processed into heroin, resulting in an estimate of between 700 and 1,050 tons of heroin manufactured worldwide (expressed at export purity),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

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

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

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

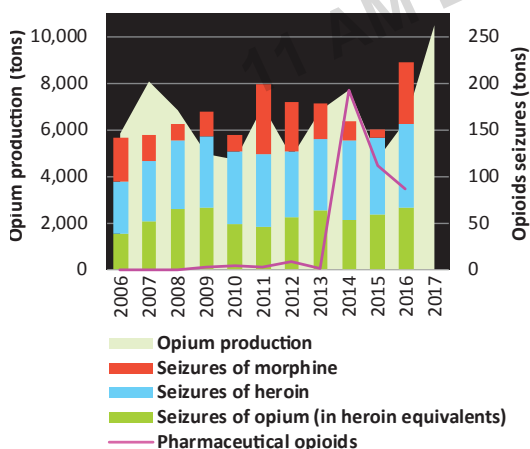
4 Also, only limited data on opium prices could be collected by the opium survey field team in Myanmar in 2017, which may potentially impact on the findings (Myanmar, Central Committee for Drug Abuse Control and UNODC, *Myanmar Opium Survey 2017*, p. 16.).

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

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

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

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

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

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

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

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

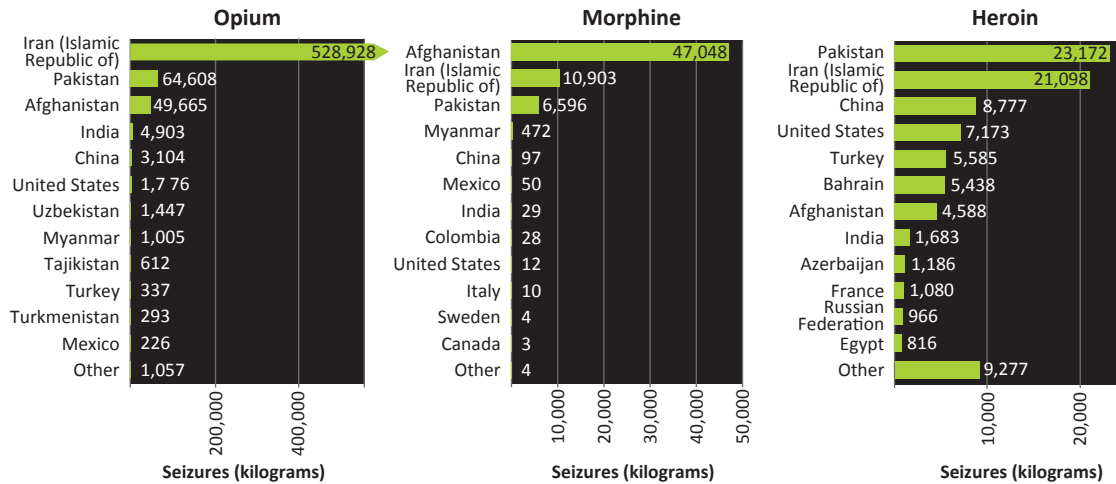
While Canada is mainly supplied with heroin from South-West Asia,⁶ countries in Latin America (mostly Mexico and, to a far lesser extent, Colombia and Guatemala) account for most of the heroin supply to the United States while also supplying the still small heroin markets of South America. However, there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

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

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

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

6 UNODC, responses to the annual report questionnaire.

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

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

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

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

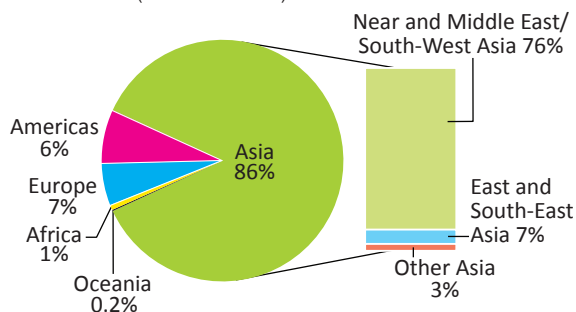
cent), while 6 per cent was seized in East and South-East Asia.

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

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

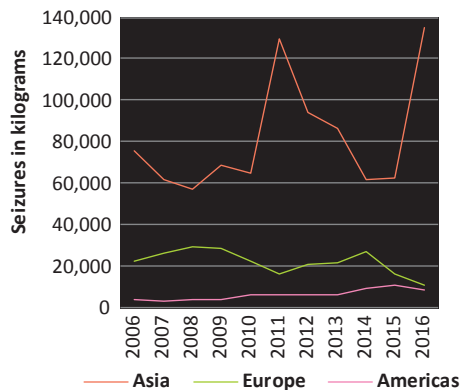
In Europe, the quantity of heroin and morphine seized fell by 32 per cent, to 11 tons, from 2015 to 2016, the smallest quantity seized since 1997, reflecting a decrease of 11 per cent in West and Central Europe, a decrease of 31 per cent in South-Eastern Europe, and a decrease of 67 per cent in Eastern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

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

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

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

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



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

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

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

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

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

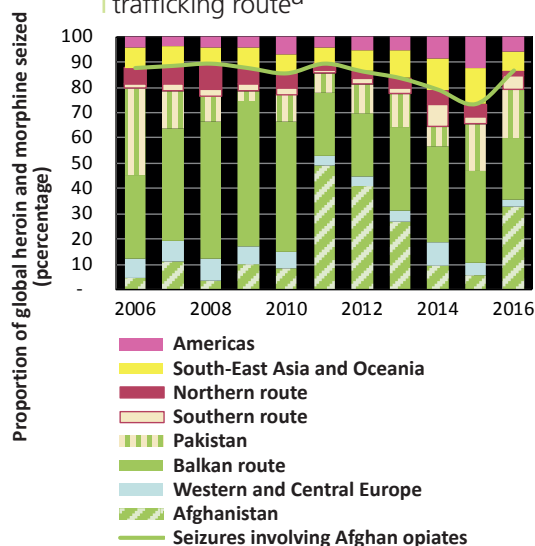
per cent of the total quantity of heroin and morphine seized worldwide in 2016, with a further 4 per cent seized by countries in Western and Central Europe. Most of the heroin and morphine seized on the Balkan route was seized in the Islamic Republic of Iran (32.0 tons), while smaller quantities were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

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

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

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

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



Source : UNODC, responses to the annual report questionnaire.

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

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

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

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

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

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

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

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

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

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

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

⁸ UNODC, annual report questionnaire data.

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

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

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

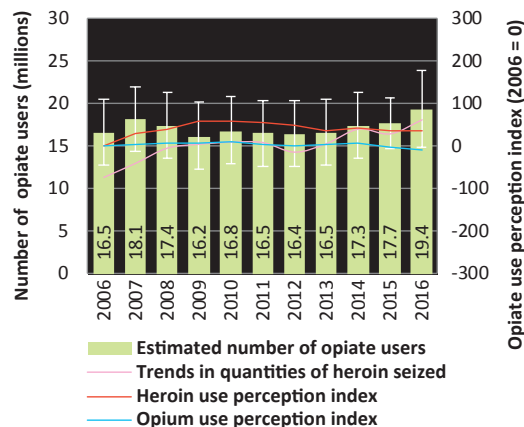
The global opiate market is on the increase again

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

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

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

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



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

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

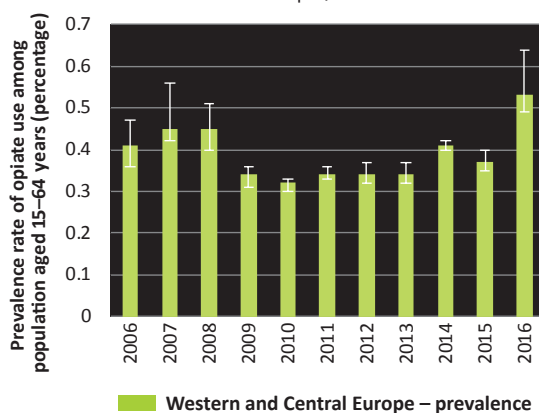
In parallel, there have been reports of rising drug-related deaths in various European countries in recent years, often linked to the use of opiates, although the ageing of drug-using cohorts may also have played a role. In England and Wales, for example, opioid-related deaths rose by more than 58 per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

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

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

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

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

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

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

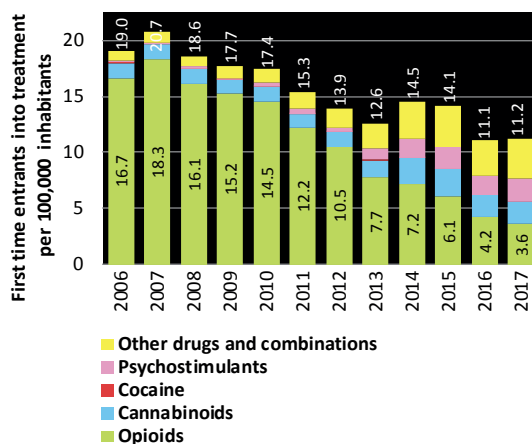
sible for the bulk of all drug-related deaths, the number rose from 944 deaths in 2012 to 1,333 deaths in 2016.¹⁴

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

The opiate market in Eastern Europe continues to shrink

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

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

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

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

*Data for 2017 are still preliminary.

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

Mixed signals from the opiate market in North America

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

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

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

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

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

Heroin use appears to be on the increase in Africa

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

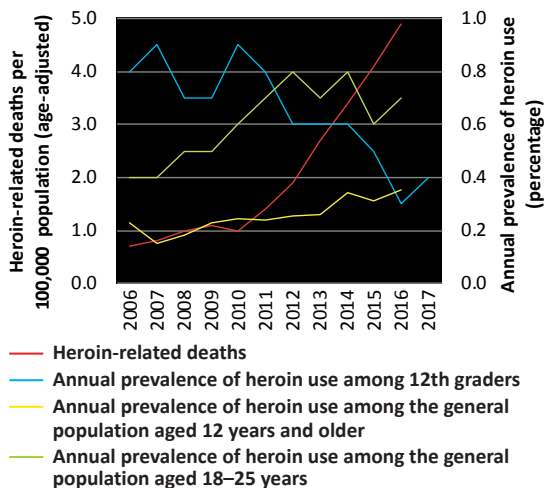
In Asia, data on expert perceptions suggest a decline in heroin use since 2011, particularly since 2014.

17 This is based on some 9 million drug tests made of workers of the federally mandated workforce and the general workforce in the United States in 2015 and 2016 (Quest Diagnostics Drug Testing Index, full year 2016 tables (May, 2017) and results of the previous year).

18 John Schulenberg and others, *Monitoring the Future National Survey Results on Drug Use, 1975-2016: 2016—College Students and Adults Ages 19-55*, vol. 2 (Ann Arbor, Michigan, University of Michigan, 2017), p. 49.

19 National Institute of Drug Abuse, *Monitoring the Future survey, 2017 data from in-school surveys of 8th, 10th and 12th grade students*.

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



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

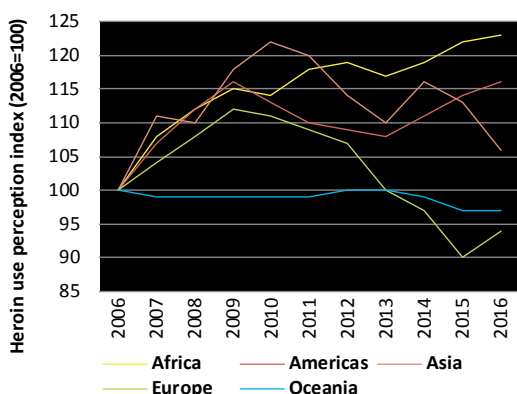
Declines in heroin use in 2016 were mainly reported in countries in East and South-East Asia, notably China (Hong Kong Special Administrative Region), Indonesia, the Republic of Korea and Thailand. By contrast, several countries in the Near and Middle East/South-West Asia reported increases in 2016,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

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

Heroin use in Oceania remains limited

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

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



Source: UNODC, responses to the annual report questionnaire.

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

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

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

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

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

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

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

Africa continues to dominate global seizures of pharmaceutical opioids

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

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

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

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

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

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

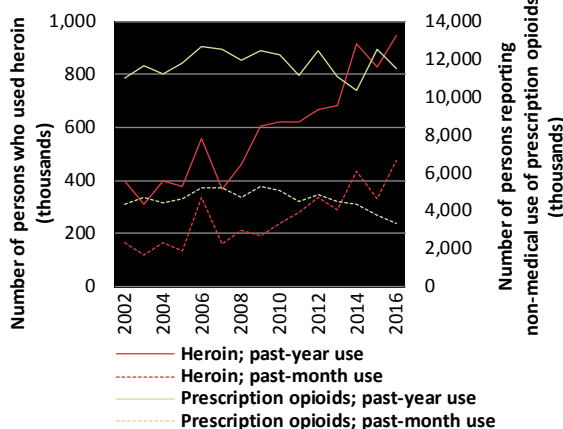
The pharmaceutical opioids seized in Africa consisted mainly of tramadol, followed by codeine. In Asia, seizures of pharmaceutical opioids were dominated by codeine, followed by tramadol, while in Europe they were dominated by tramadol, followed by methadone and codeine. Large tramadol seizures in Europe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

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

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

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

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



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

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

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

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

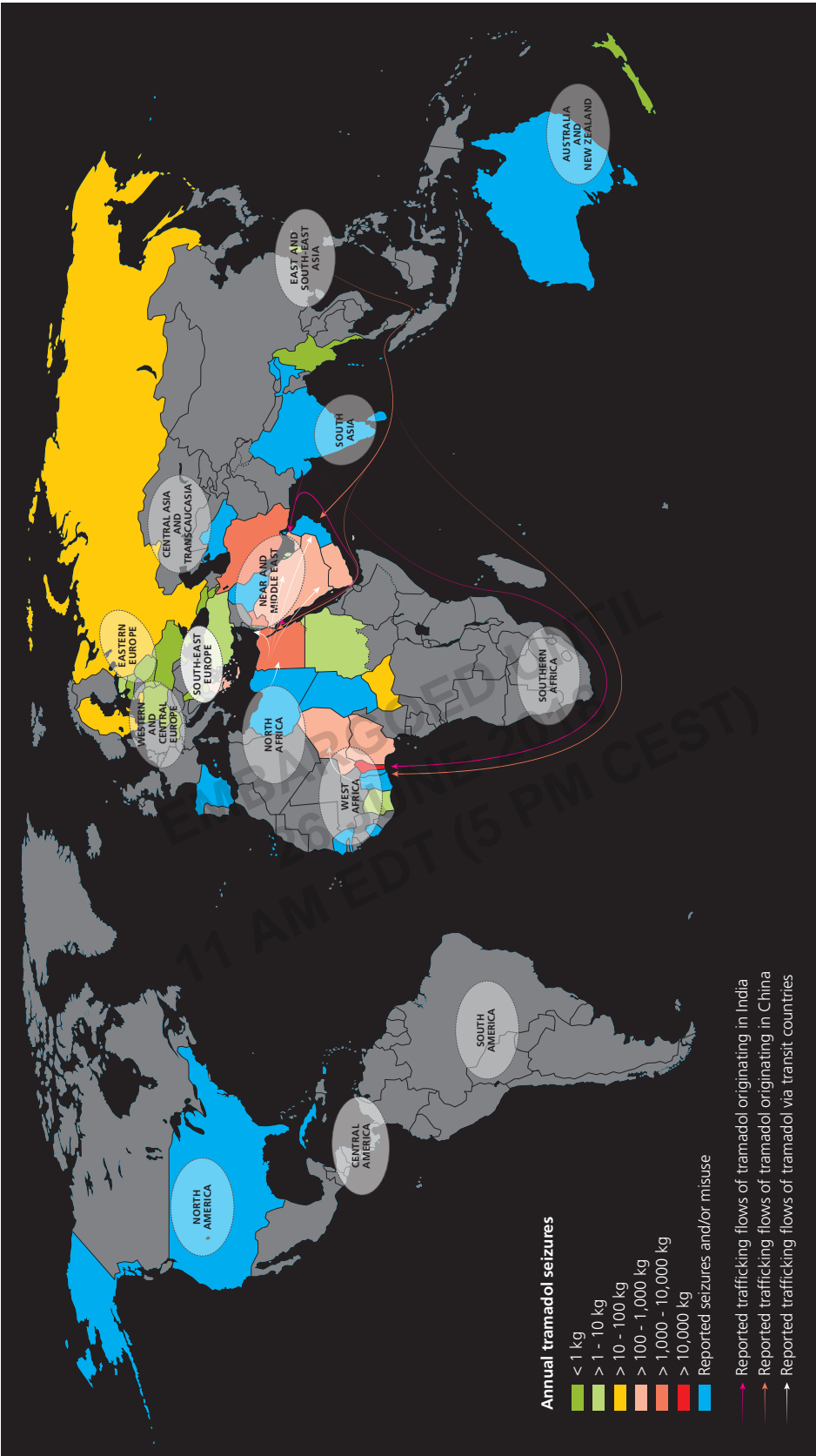
25 Detailed calculations are provided in the online methodological annex.

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

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

28 Drug Enforcement Administration, 2017 National Drug Threat Assessment.

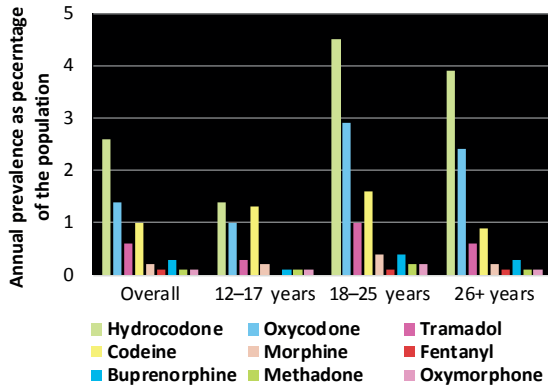
MAP 2 | Reported tramadol seizures (and/or misuse) and major tramadol trafficking/diversion flows, 2012–2016



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

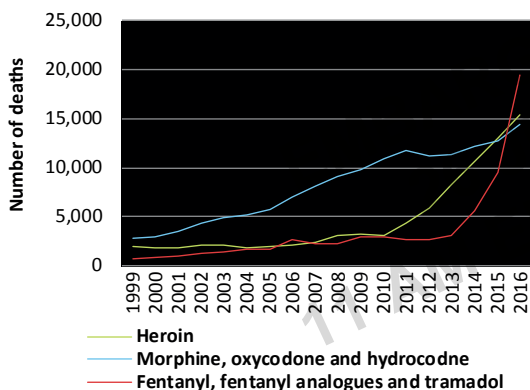
Notes: The boundaries shown on this map do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by the parties. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. The final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

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



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

FIG. 14 Opioid overdose deaths in the United States



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

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

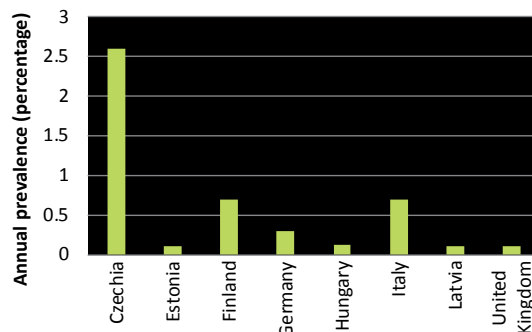
In Western and Central Europe, the non-medical use of pharmaceutical opioids is not at the same level as that reported in North America, but the emergence of new synthetic opioids (mostly fentanyl and its derivatives) is of concern in the subregion.²⁹ Although few countries in Western and Central Europe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

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

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

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

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



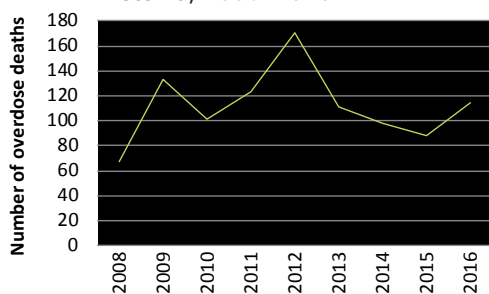
Source: UNODC, based on responses to the annual report questionnaire.

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

30 Ibid.

31 Ibid.

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



Source: Estonian causes of death registry, 2017.

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

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

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

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

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

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

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

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

32 Ibid.

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

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

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

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

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

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

Tramadol

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

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

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

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

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

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

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

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

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

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

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

Tramadol in Ghana, 2016–2017

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

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

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

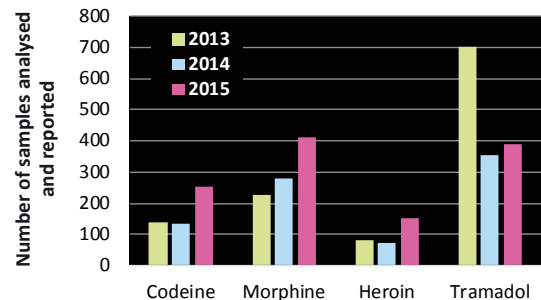
Police raids on markets in the suburbs of Accra and analyses of drugs seized by the laboratory of the Food and Drug Authority of Ghana revealed that capsules of high tramadol content, far above the usual adult medical dose (50–100 mg per capsule), are increasingly being sold. Most (40 per cent) of the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

Source: Food and Drugs Authority, Ghana.

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

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

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



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

⁴⁰ Ibid.

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