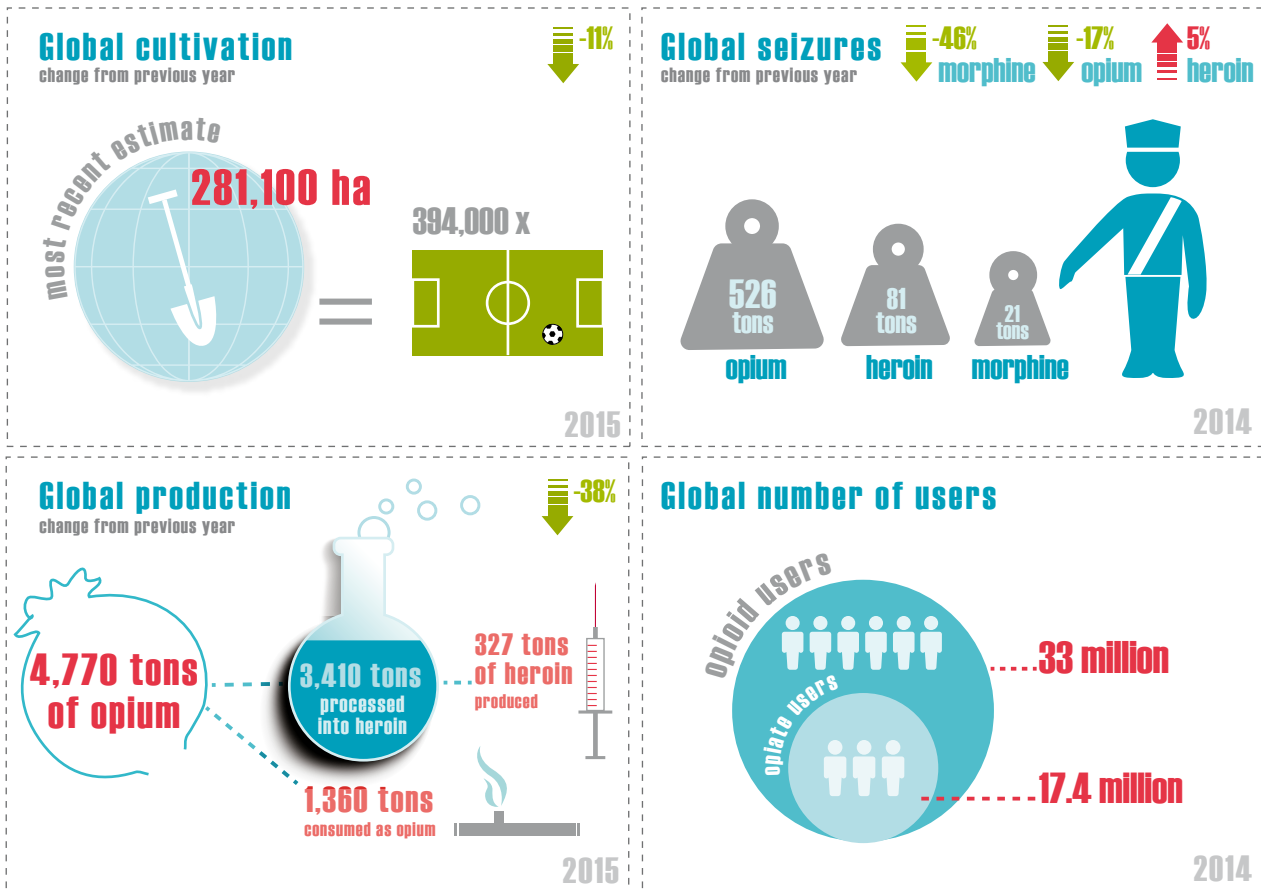


D. MARKET ANALYSIS BY DRUG TYPE

OPIATES

Key figures



Note: Opioids include the non-medical use of prescription opioids and opiates (opiates include opium and heroin).

Opiate market developments

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

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

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

Global opium production in 2015 fell by 38 per cent from the previous year, to some 4,770 tons¹⁴⁴ (i.e. to the level of the late 1990s). The decrease was primarily the result of a decline in opium production in Afghanistan (-48 per cent compared with the previous year), mainly attributable to poor yields in the country's southern provinces.

¹⁴⁴ Data for 2015 are preliminary, as information from a number of smaller opium-producing countries is still missing. For the purposes of the present report, it is assumed that global opium poppy cultivation and opium production remained unchanged from 2014 to 2015.

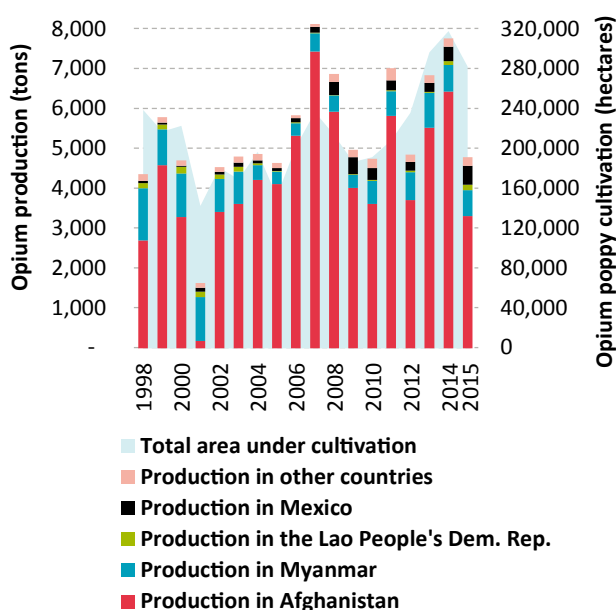
First results of the opium poppy cultivation survey in Mexico, 2014-2015

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

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

^a The Government of Mexico does not validate the estimates provided by the United States up to 2014, as they are not part of its official figures and it does not have information on the methodology used to calculate them.

FIG. 27 Opium poppy cultivation and opium production, 1998-2015

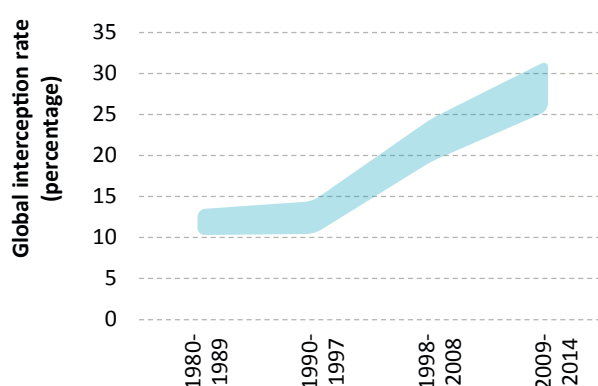


Source: Calculations based on UNODC illicit crop monitoring surveys and responses to the annual report questionnaire.
Note: Data for 2015 are preliminary, as production data for a few countries in South America are still missing.

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

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

FIG. 28 Trends in the global interception rate for opiates, 1980-2014



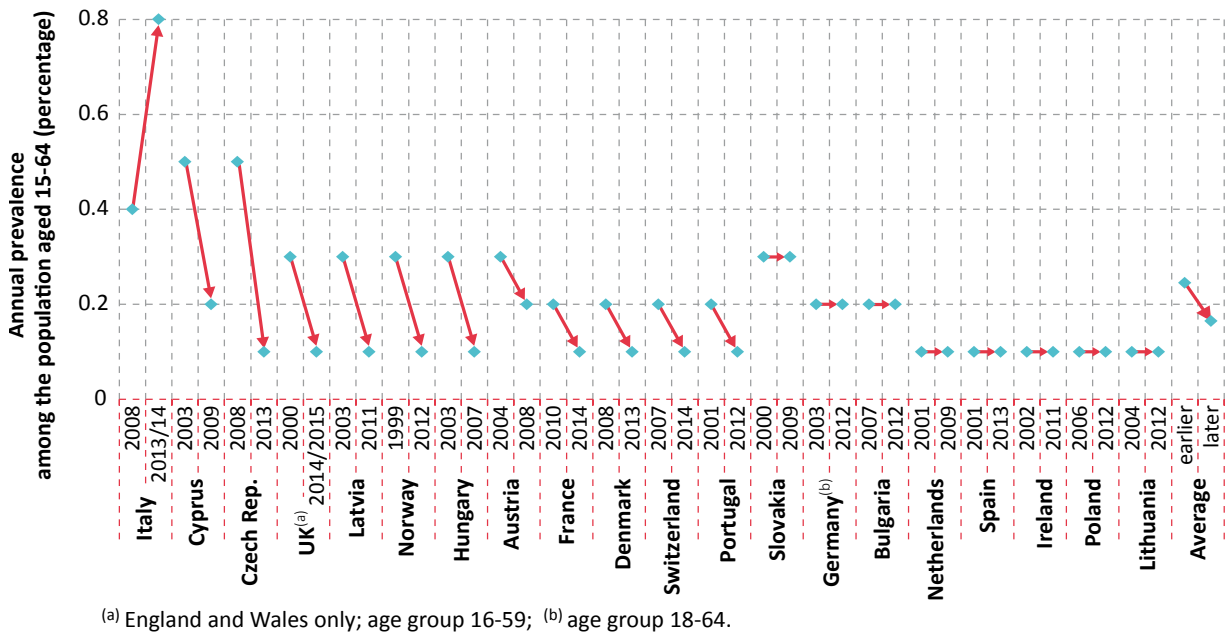
Source: Calculations based on responses to the annual report questionnaire and UNODC opium poppy cultivation surveys.
Note: For details of the calculation methods see the online methodology section of the present report.

Global opiate market appears to be stable despite important regional changes

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

There are indications of a recent increase in heroin use in some markets in Western and Central Europe, suggesting that the long-term downward trend in heroin use may have come to an end. In fact, heroin use has been stable or declining in Western and Central Europe since the late 1990s. This can be seen, inter alia, in household survey data, even though they only cover a certain proportion of all heroin users. Recently, however, some increases in large-scale seizure cases and rising heroin purity indicate that

FIG. 29 Prevalence of past-year heroin use according to household surveys in Europe, selected countries, 1999-2014



(a) England and Wales only; age group 16-59; (b) age group 18-64.

Source: Responses to the annual report questionnaire.

supply may have increased.¹⁴⁵ In at least one major European heroin market (the United Kingdom),^{146, 147} heroin-related deaths also increased markedly between 2012 and 2014. In addition, estimates of problem opiate users in France showed a marked increase in recent years. Moreover, heroin prevalence rates in Italy, based on household surveys, showed a significant increase between 2008 and 2014.

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

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

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

Source: Istituto de Fisiologia Clinica del Cnr, *Italian Report for the European School Survey Project on Alcohol and Other Drugs (ESPAD)*, Pisa, quoted in *Corriere Della Sera*, "Il Raporto ESPAD – Droga a Scuola: Cresce il consumo de eroina tra i 15enni", 8 April 2016.

145 EMCDDA and Europol, *EU Drug Markets Report*, In-depth Analysis, Lisbon and The Hague 2016, pp. 73-94.

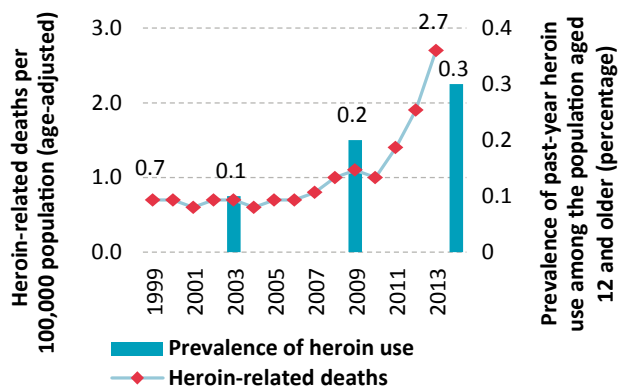
146 Office for National Statistics, *Statistical Bulletin: Deaths Related to Drug Poisoning in England and Wales: 2014 registrations*, 3 September 2015.

147 National Records of Scotland, *Drug-related deaths in Scotland in 2014*, revised 15 March 2016.

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

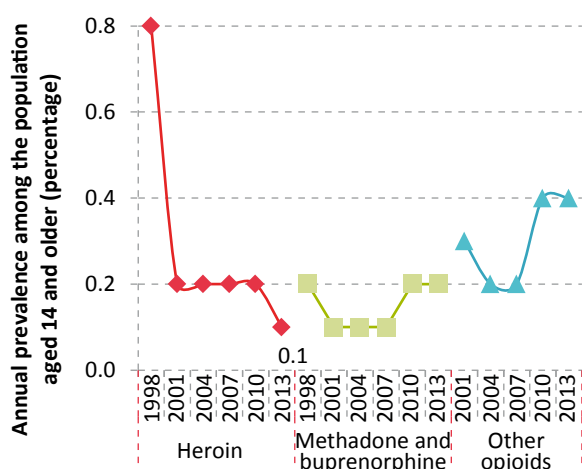
Opiate use in Asia, however, is reported to have remained largely unchanged over the period 1998-2014, whereas opiate use in Oceania declined. The decline in opiate use in Oceania largely reflects changes in Australia, the largest opiate market in the region, where prevalence of past-year

FIG. 30 Prevalence of past-year heroin use and number of heroin-related deaths per 100,000 population in the United States, 1999-2014



Source: United States, Center for Behavioral Health Statistics and Quality, *Behavioral Health Trends in the United States: Results from the 2014 National Survey on Drug Use and Health*, HHS Publication No. SMA 15-4927, NSDUH Series H-50 (Rockville, Maryland, 2015); and Office of National Drug Control Policy, *National Drug Control Strategy: Data Supplement 2015*.

FIG. 31 Prevalence of past-year opioid use in Australia, 1998-2013



Source: Australian Institute of Health and Welfare, *National Drug Strategy Household Survey Detailed Report 2013*, Drug statistics series No. 28 (Canberra, 2014).

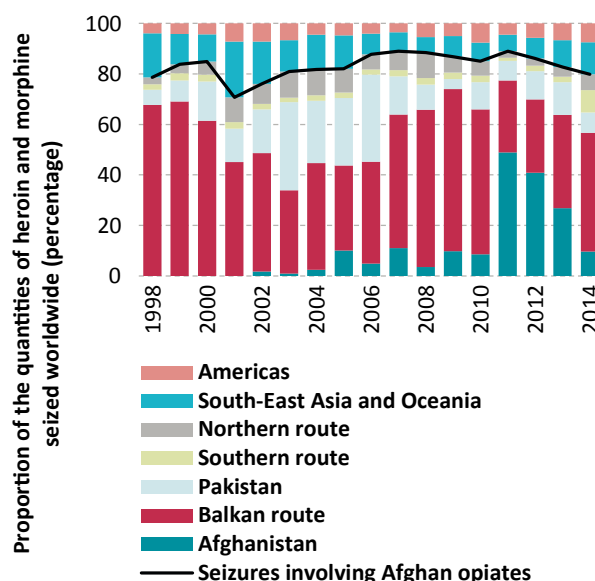
heroin use declined from a peak of 0.8 per cent in 1998 to 0.2 per cent in 2001 (following a “heroin drought” induced by intensified law enforcement activity) before falling further to 0.1 per cent by 2013, more than offsetting increases in the non-medical use of synthetic opioids.

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

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

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

FIG. 32 Quantities of heroin and morphine seized worldwide, by trafficking route, 1998-2014



Source: Responses to the annual report questionnaire.

route, which accounts for almost half of all heroin and morphine seizures worldwide, continues to be the world’s most important opiate trafficking route.

The Balkan route is the most important conduit for heroin trafficking

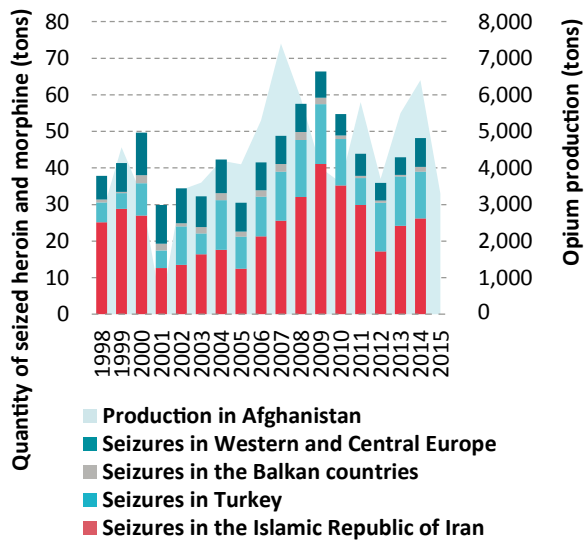
A recent UNODC study on opiate trafficking on the Balkan route suggests that the majority of the opiates leaving Afghanistan over the period 2009-2012 were smuggled on the Balkan route (i.e. through Iran (Islamic Republic of) and Turkey via South-Eastern Europe to Western and Central Europe).¹⁴⁸ Seizures of heroin and morphine on the Balkan route amounted to some 48 tons in 2014, up from 36 tons in 2012, but down from a peak of 66 tons in 2009. While the Balkan route is the main heroin trafficking route leading to Western and Central Europe, not all of the heroin smuggled to that subregion arrives via that trafficking route. The authorities of the United Kingdom, for example, reported that, although most of the heroin entering that country continues to be smuggled on the Balkan route towards the Netherlands and France before being shipped into the United Kingdom, significant amounts of heroin also enter the United Kingdom each year on direct flights from Pakistan. Similarly, Belgium and Italy reported that important quantities of heroin had been trafficked via the southern route in recent years.

The southern route has grown in importance

Changes in seizures, supported by intelligence reports, suggest that the smuggling of Afghan opiates via the southern route (i.e. leaving Pakistan or the Islamic Republic of Iran by sea for shipment to the Gulf region, Africa (par-

148 UNODC, *Drug Money: the illicit proceeds of opiates trafficked on the Balkan route* (Vienna, 2015), p. 72.

FIG. 33 Opium production in Afghanistan and heroin and morphine seizures in key countries along the Balkan route, 1998-2015



Source: UNODC Afghanistan opium survey, 2015 and previous years; and responses to the annual report questionnaire.

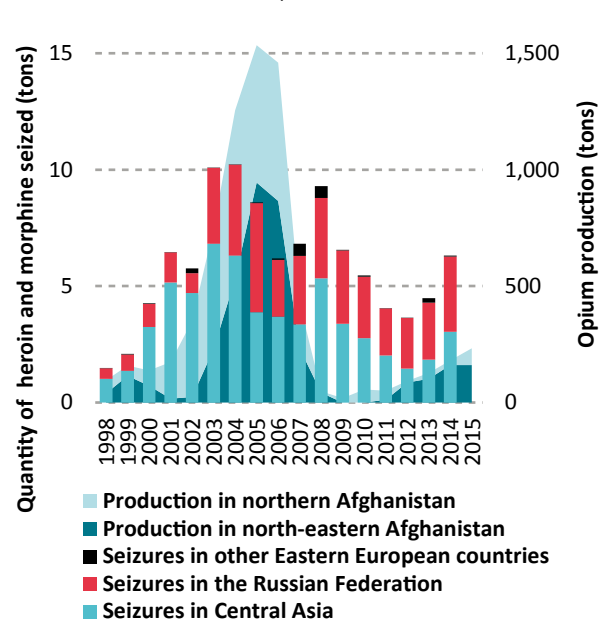
ticularly Eastern Africa), South Asia and, to a lesser extent, South-East Asia, Oceania and North America) have increased in recent years.¹⁴⁹

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

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

The northern route leaves Afghanistan for neighbouring countries in Central Asia, the Russian Federation and other members of the Commonwealth of Independent States. Traditionally, the northern route was mainly supplied by opium produced in the north-eastern and northern provinces of Afghanistan, although over the past decade the route has also been supplied by opium produced in southern Afghanistan. Following strong increases in trafficking over the period 1998-2004, in line with

FIG. 34 Opium production in northern and north-eastern Afghanistan and quantities of heroin and morphine seized in key countries and subregions along the northern route, 1998-2015



Source: Responses to the annual report questionnaire.

major increases in opium production in northern parts of Afghanistan, seizures declined between 2004 and 2012, in parallel with declines in opium production, before starting to recover in the subsequent years, reaching 6.3 tons in 2014, having returned to the level reported in 2009.

Trafficking in opiates from the Golden Triangle is on the increase

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

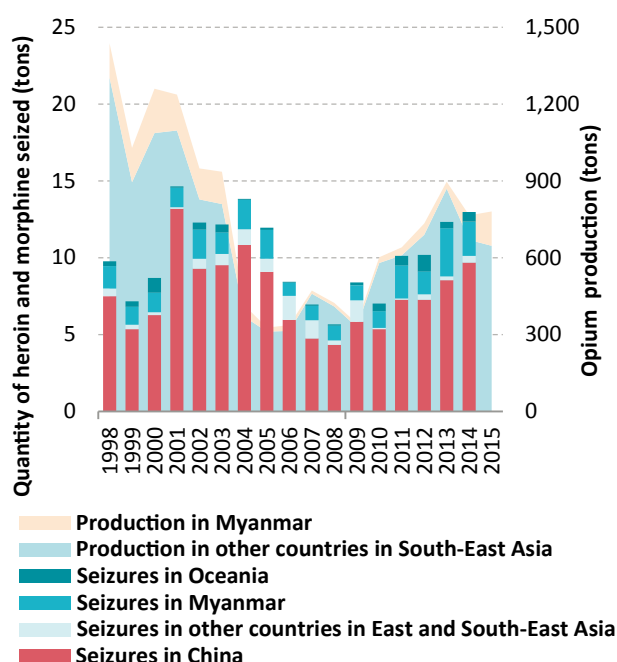
Not all of the opiates seized in South-East Asia and Oceania originated in Myanmar. In the responses to the annual report questionnaire submitted by countries in South-East Asia and Oceania, Afghanistan and Pakistan accounted for 27 per cent of all the countries mentioned as countries of origin or departure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

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

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

150 China, National Narcotics Control Commission, *Annual Report on Drug Control in China 2011 and previous years*; UNODC,

FIG. 35 Opium production in South-East Asia and quantities of heroin and morphine seized in key countries and regions affected by that production, 1998-2014



Source: UNODC opium surveys in South-East Asia; and responses to the annual report questionnaire.

Afghanistan had fallen to 10 per cent, and by 2014, Afghanistan was no longer mentioned among the key source countries of shipments of opiates to China; the “new” main source countries for heroin shipments were Myanmar, followed by the Lao People’s Democratic Republic and Viet Nam.

Based on the forensic analysis of seizures, a similar trend was reported by Australia. Traditionally, almost all of the heroin found in Australia originated in South-East Asia. Heroin originating in South-East Asia accounted for 79 per cent of the total in 2005, but that proportion fell to just 26 per cent in 2008 before recovering in subsequent years to 72 per cent of the total over the period January-June 2014.¹⁵¹

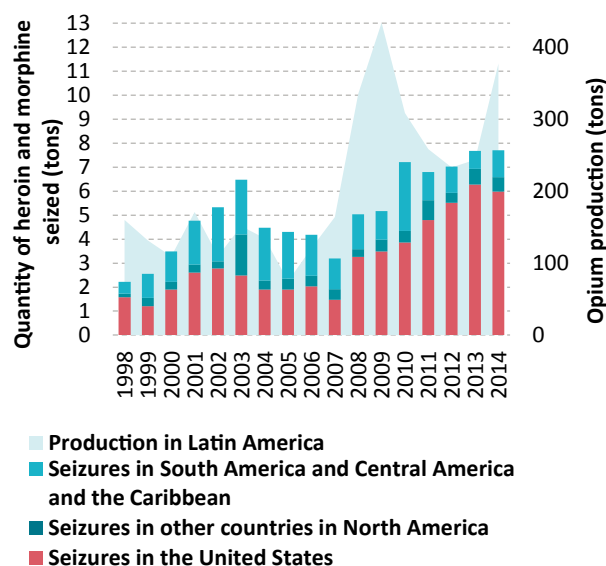
Heroin trafficking in the Americas continues to increase

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

Transnational Organized Crime in East Asia and the Pacific: A Threat Assessment (2013); and Afghan Opiate Trafficking.

151 Australian Crime Commission, Annual Report 2013-2014 (Canberra, 2014).

FIG. 36 Quantities of heroin and morphine seized in the Americas and opium production in Latin America, 1998-2014



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

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

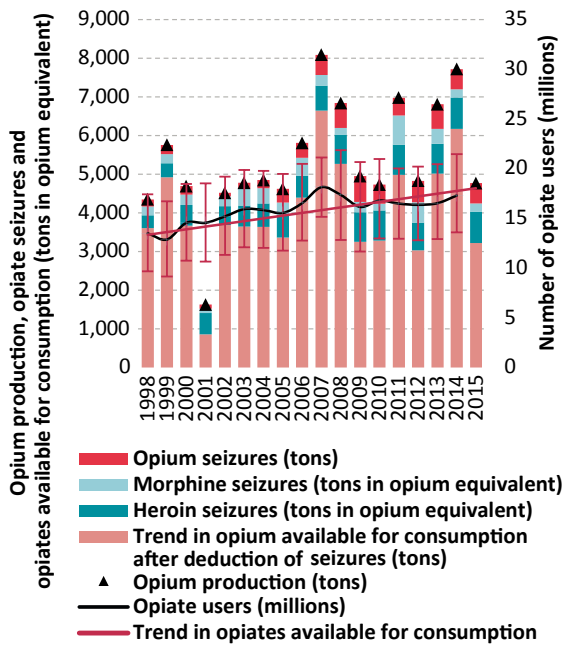
Given the volatile nature of opium production, what is happening in the heroin market?

While the amount of opiates available for consumption, expressed in opium equivalent (calculated on the basis of opium production from which seizures of opiates were deducted), showed strong annual fluctuations (declining by more than 75 per cent in one year and increasing four-fold in the next year), changes in the number of opiate users were far less marked over the period 1998-2014. The number of opiate users seems to follow the long-term linear trend of opiates available for consumption rather than the annual increases and decreases in the amount of opium available. How can that be explained?

One hypothesis is that the number of drug users changes in line with the year-on-year availability of opium, but those changes are not reflected in estimates of the number of opiate users because of limitations in the data. Another hypothesis is that the likely number of opiate users may

152 2015 National Drug Threat Assessment Summary, U.S. Department of Justice. Drug Enforcement Administration.

FIG. 37 Opium production, opiate seizures, opiates available for consumption and number of opiate users, 1998-2015



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

Note: A conversion ratio of 10 kg of opium for 1 kg of morphine or heroin was used. Estimates for 2015 are preliminary; seizure data from 2014 were used as a proxy for seizures in 2015, and consumption estimates for 2014 were used as a proxy for consumption in 2015.

be correct but per capita use changes in line with availability. The third hypothesis is that stockpiling of inventories smoothes year-on-year variations in production. While the first two hypotheses basically assume that the consumption of opiates reacts to year-on-year changes in supply, the third hypothesis suggests that the short-term adjustments are in the form of changes in inventories held along the supply chain.

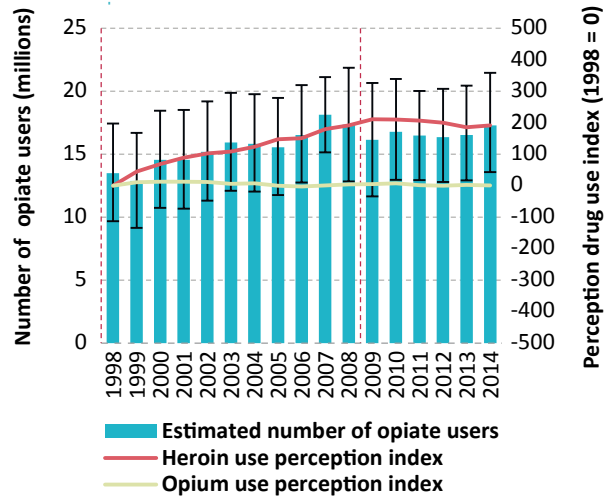
Hypothesis 1. The number of opiate users changes regularly in line with the availability of opium

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

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

UNODC also received data on perceived trends from a far larger number of countries over the period 1998-2014. Transforming the answers into a simple index¹⁵³ reveals a largely stable level of opium use over the period 1998-2014 and suggests that after some initial increases over the period 1998-2008, heroin use may have stabilized over the period 2009-2014. Moreover, these data do not indicate any sharp upward or downward year-on-year movement and are broadly in line with estimates of opiate use (and trends in heroin seizures).

FIG. 38 Global trends in the number of past-year opiate users and the heroin and opium use perception indices, 1998-2014



Source: World Drug Report, 2000-2016; UNODC, Global Illicit Drug Trends, 2001-2003; and responses to the annual report questionnaire.

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

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

Opiate users may adjust their consumption patterns to the amounts available. Opiates available for consumption rose by an annual increase of more than 30 per cent six times

153 See the online methodology section of the present report.

over the period 1998-2015, and by more than 50 per cent four times. Increases of such magnitude in supply would most likely have resulted in strong increases in opiate purity levels and, as a consequence, in increasing drug-related deaths in specific years, but there is no evidence of this. Even taking into consideration that the capacity of the human body to adjust may be rather strong, dramatic increases in opiate consumption would still lead to an increase in drug-related deaths.

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

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

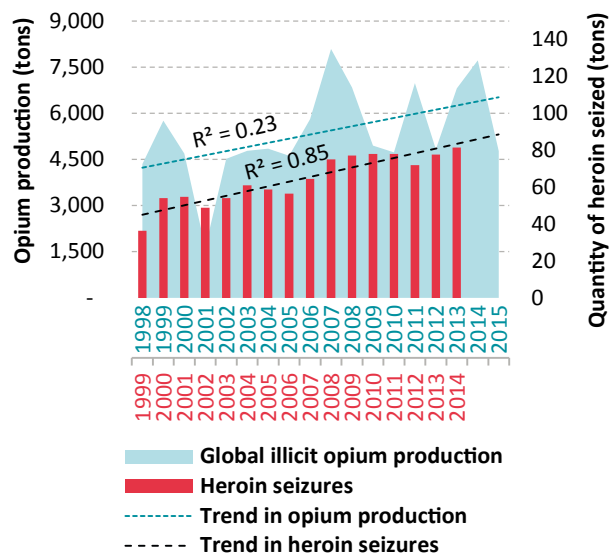
Finally, there is the possibility that not all of the opium produced in a given year is actually consumed and that inventories change accordingly. Such inventories are common in all types of trade, with stored wholesale material used to top up irregular supply to help satisfy stable demand. In addition,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

Several UNODC and World Bank studies have indicated the existence of opium inventories in Afghanistan, and a number of opium price changes in Afghanistan since 1998 can only be explained once such inventories have been considered.¹⁵⁵ Their existence became most obvious in

154 Doris Buddenberg and William A. Byrd, eds., *Afghanistan's Drug Industry: Structure, Functioning, Dynamics, and Implications for Counter-Narcotics Policy* (UNODC and World Bank, 2006); William A. Byrd, "Responding to Afghanistan's opium economy challenge: lessons and policy implications from a development perspective", Policy Research Working Paper No. 4545 (Washington, D.C., World Bank, March 2008).

155 *The Opium Economy in Afghanistan: An International Problem* (United Nations publication, Sales No. E.03.X.6); William A. Byrd and Christopher Ward, *Drugs and Development in Afghanistan*, World Bank Social Development Papers, Paper No. 18, December 2004; *Afghanistan's Drug Industry*, "Responding to Afghanistan's opium economy challenge"; UNODC and Ministry of Counter Narcotics of Afghanistan, *Afghanistan: Opium Winter Rapid Assessment Survey* (February, 2008); *World Drug Report 2010* (United Nations publication, Sales No. E.10.XI.13); *Addiction, Crime and*

FIG. 39 Illicit opium production compared with the quantity of heroin seized in the following year, 1998-2015



Source: UNODC opium surveys in key opium-producing countries; and responses to the annual report questionnaire.

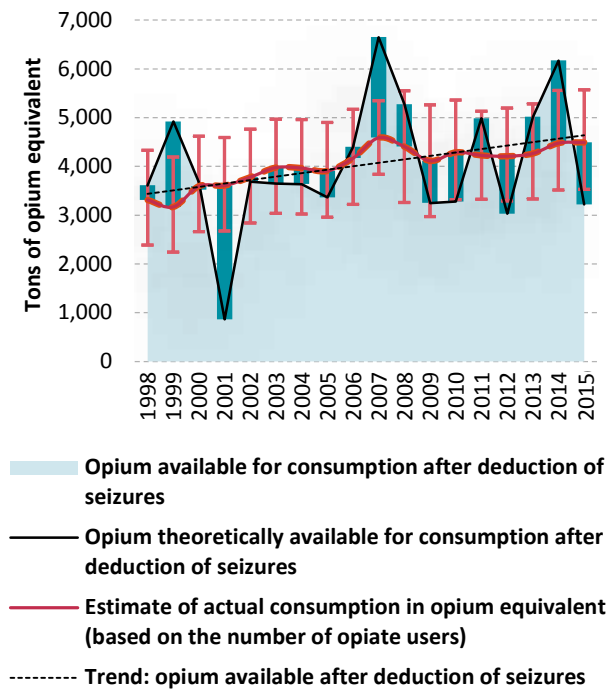
Note: Standard deviation of changes on a year earlier over the period 1998-2014: Opium production: 0.53; Heroin seizures: 0.14.

2001, when an opium ban was enforced in Taliban-controlled territory, resulting in a massive decline in opium production in Afghanistan and a decline of 65 per cent in global opium production. Global consumption, however, did not decline by such a large percentage and the total quantity of heroin seized worldwide did not decrease. Even a year later, in 2002, heroin seizures declined by only 11 per cent before recovering again in 2003. All of this can only be explained by the previous build-up of large opium stocks in Afghanistan that were subsequently used to guarantee the supply of heroin to the consumer markets. Thus, heroin seizures do not change much from year to year, even though global opium production is highly volatile.

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

Insurgency: The Transnational Threat of Afghan Opium (United Nations publication, Sales No. E.09.IV.15); *The Global Afghan Opium Trade: A Threat Assessment* (United Nations publication, Sales No. E.11.XI.11); and *World Drug Report 2014*.

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



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

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

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

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

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

Inventories need not be held by one individual or organization; they can be dispersed among a large number of players, including opium poppy growers, laboratory owners, small-, medium- and large-scale opium traffickers (both in and outside the opium-producing countries) or local warlords. There is no recent information about possible inventories about opium in Afghanistan. However, a UNODC and World Bank study in 2005 suggested that, when they had inventories, opium poppy growers (of whom there are several hundred thousand in Afghanistan) typically held in stock 2-10 kg of opium as a financial reserve, accumulated over several years. The study also suggested that some 40 per cent of opium purchases were kept as inventory for sale until the next harvest and that large-scale traffickers, purchasing 2 tons of opium per year, may have built up a total long-term stock of opium of at least 1 ton over the previous 4-5 years.¹⁵⁶

Strong decline in opium production in 2015 is unlikely to lead to major shortages in the global heroin market

It is likely that none of the three hypotheses of reaction patterns to changes in opium supply can be completely refuted. Indeed, these hypotheses are in no way mutually exclusive. All three hypotheses may help to explain how the market reacts to changes in supply. There can be adaptations to changes in supply by changes in the number of opiate users, by increases or decreases in per capita consumption and by building up or depleting inventories.

The massive decline in opium production of almost 40 per cent in 2015 is unlikely, however, to result in a decline of the same magnitude within a year in either the global number of opiate users or the average per capita consumption of opiates. It seems more likely that inventories of opiates, built up in previous years, will be used to guarantee the manufacture of heroin (some 450 tons of heroin per year would be needed to cater for annual consumption) and that only a period of sustained decline in opium production could have any real effect on the global heroin market.

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