COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

Summary

After a sharp increase in global stocks and production of opium in 2017, there was a decrease in 2018 in both stocks and manufacture, thus continuing the overall decreasing trend of the 20-year period 1999–2018 and further signalling the eventual elimination of opium from the international market for opiate raw materials. However, utilization and imports increased in 2018.

Overall utilization of poppy straw and concentrate of poppy straw derived from the morphine-rich variety of poppy straw decreased in 2018 compared with 2017. Global manufacture of morphine in 2018, at less than 400 tons, followed a development that began in 2017, contrary to the situation in the previous decade, when global manufacture of morphine was always above 400 tons. In 2018, global manufacture of morphine amounted to 388.2 tons, over 80 per cent of which was converted into other narcotic drugs or into substances not covered by the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol. About 8 per cent of the remaining amount was used mainly for palliative care purposes, the rest being utilized for preparations in Schedule III of the Convention.

The differences in the consumption levels of countries continued to be very significant. In 2018, 79 per cent of the world's population, mainly people in low- and middle-income countries, consumed only 13 per cent of the total amount of morphine used for the management of pain and suffering, or 1 per cent of the 388.2 tons of morphine manufactured worldwide. Although that was an improvement over 2014, when 80 per cent of the world's population consumed only 9.5 per cent of the morphine used for the management of pain and suffering, the disparity in the consumption of narcotic drugs for palliative care continues to be a matter of concern.

In 2018, the use of poppy straw rich in thebaine increased; during the same period, there was a decrease in the use of concentrate of poppy straw rich in thebaine. Global manufacture of thebaine remained high, at 127.7 tons, but considerably below the record level of 156 tons in 2016. The demand for medicines derived from thebaine may have been affected by the restrictions on prescription drugs imposed in the main market, the United States of America, in response to the abuse of such drugs and the high number of overdose deaths caused by them. Nonetheless, the data continued to indicate a high level of demand.

Of the semi-synthetic opioids, global manufacture of oxycodone and hydrocodone decreased in 2018, while the manufacture of others remained relatively stable.

In the case of synthetic opioids, global manufacture of fentanyl continued to fluctuate, decreasing substantially to 1.9 tons in 2018. However, the manufacture of each of the fentanyl analogues (alfentanil, remifentanil and sufentanil) increased. There was no report of manufacturing of dextropropoxyphene in 2018. The manufacture of ketobemidone was reported in 2018 after no manufacture of that substance had been reported for some years. Diphenoxylate continued to be manufactured in much smaller quantities than before. The manufacture of tilidine decreased further, reaching a record low of 27 tons, in 2018. The manufacture of pethidine and trimeperidine continued to fluctuate, increasing in 2018 after having decreased in 2017. The manufacture of methadone remained relatively stable in 2018.

The licit use of cannabis has been increasing considerably since 2000. Before 2000, licit use of cannabis was restricted to scientific research and was reported only by the United States. Since 2000, more and more countries have started to use cannabis and cannabis extracts for medical purposes, as well as for scientific research. In 2000, total licit production of cannabis was 1.4 tons; by 2018, it had increased to 289.5 tons. Since the licit cultivation of cannabis for medical and scientific purposes has increased considerably in recent years and the yield and manufacturing processes are not standardized, some data are being clarified with the relevant Governments in order to ensure consistency.

Peru has been the only country to export coca leaf for the global market since 2000. In 2018 its exports amounted to 127.8 tons. The United States was the leading importing country, importing 148.3 tons of coca leaf and accounting for nearly 100 per cent of global imports.

The other major licit producer of coca leaf, the Plurinational State of Bolivia, accounted for 92 per cent of global production. The cultivation of coca bush for the chewing of coca leaf and the consumption and use of coca leaf in its natural state for cultural and medicinal purposes, such as preparing infusions, is allowed in the Plurinational State of Bolivia, in accordance with the reservation made by that State in 2013, when it reacceded to the 1961 Convention as amended.

The licit manufacture of cocaine continued to fluctuate, as it had done for more than 20 years. In 2018, global manufacture of cocaine decreased by more than half compared with 2017. However, the licit consumption of cocaine, which had been stable for 20 years, nearly doubled in 2018 compared with 2017, reaching a record high of 394.1 kg.

1. The present comments are intended to facilitate the use of the statistical information on the licit production, manufacture, consumption,[1] utilization[2] and stocks of, as well as trade in, opiate raw materials, the main opioids, including synthetic narcotic drugs under international control, and cannabis, coca leaf and cocaine that is presented in the tables of reported statistics (see pages 143–269 and annexes III and IV, pages 329–476). Unless otherwise indicated, the comments refer to developments during the period 1999–2018.

2. The tables of reported statistics in part four and annexes IV and V of the present report contain data furnished by Governments to the International Narcotics Control Board (INCB) in accordance with article 20 of the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol. The most recent statistical data reflected in the comments are those relating to 2018. The failure by some Governments to submit reports or to provide precise and complete reports may have a bearing on the accuracy of some of the information presented in this report.[3] The most pertinent conclusions and recommendations of INCB based on the analysis of statistical data are included in chapter II of the annual report of the Board.[4]

[1]For the purposes of the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol, a drug is regarded as "consumed" when it has been supplied to any person or enterprise for retail distribution, medical use or scientific research; and "consumption" is construed accordingly (art. 1, para. 2).

[2]Pursuant to article 20 of the 1961 Convention, the parties furnish the International Narcotics Control Board (INCB) with statistical returns on the utilization of narcotic drugs for the manufacture of other drugs, of preparations in Schedule III of the Convention and of substances not covered by the Convention and on the utilization of poppy straw for the manufacture of drugs.

[3]Details on the submission of statistical reports by individual Governments are contained in annex I to the present publication.

[4]E/INCB/2019/1.

Opiate raw materials

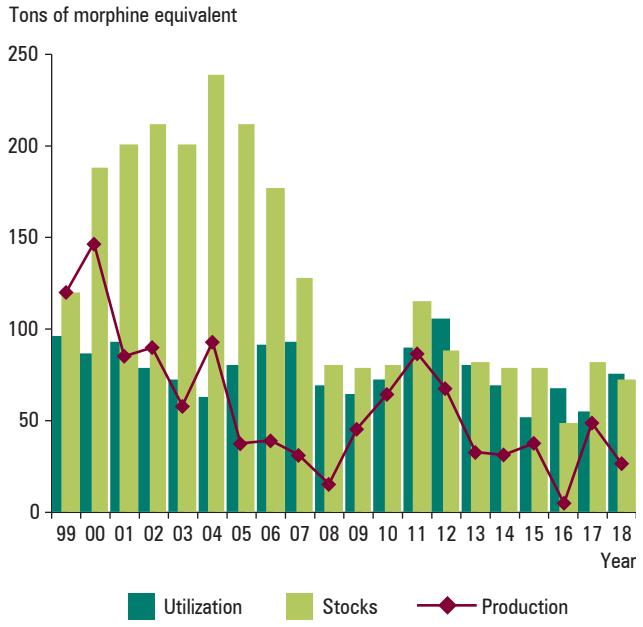
3. Opium and poppy straw are the raw materials obtained from the opium poppy plant (*Papaver somniferum*), from which alkaloids such as morphine, thebaine, codeine and oripavine are extracted. Concentrate of poppy straw is a product obtained in the process of extracting alkaloids from poppy straw. It is controlled under the 1961 Convention. Detailed information on the supply of opiate raw material and demand for opiates for medical and scientific purposes is provided in part three of the present publication.

Opium

4. Opium (also called "raw opium") is the latex obtained by making incisions on the green capsules of opium poppy plants. For statistical and comparison purposes, data on the production of and trade in opium are reported at 10 per cent moisture content. When appropriate, the data on opium are also expressed in morphine equivalent,[5] in order to enable comparison between opium and poppy straw. Figure 1 shows the licit production, stocks and use (consumption and utilization) of opium during the period 1999–2018, expressed in morphine equivalent.

5. Opium production was over 1,000 tons in 2000, but has, for the most part, followed a downward trend since then. There was an increase in 2011, with 789.1 tons in gross weight (86.8 tons in morphine equivalent), but, subsequently, production continued to decrease, reaching its lowest level in 20 years, 42.3 tons (4.6 tons in morphine equivalent) in 2016. Production increased again in 2017, to 439.3 tons (48.3 tons in morphine equivalent), and subsequently decreased again, reaching 232 tons (25.5 tons in

Figure 1. Opium: global production, stocks[a] and use (consumption and utilization),[b] in morphine equivalent, 1999–2018



[a]Stocks as at 31 December of each year.

[b]Including the utilization of seized opium in Iran (Islamic Republic of) and Myanmar.

[5]The morphine or thebaine equivalent is calculated by INCB on the basis of the industrial yield of each alkaloid obtained from opium or poppy straw. Lesser alkaloids contained in opium or poppy straw that are convertible into morphine or thebaine have also been included, adjusted by appropriate conversion rates, whenever the Board has been informed of their extraction in commercially significant quantities.

morphine equivalent) in 2018. Imports of opium increased slightly from their lowest level in 20 years, from 37.3 tons (4.1 tons in morphine equivalent) in 2017 to 53.5 tons (5.9 tons in morphine equivalent) in 2018. After 2012, the level of opium stocks continued to fluctuate at an average of 700 tons (77 tons in morphine equivalent), except in 2016, when it reached its lowest level in 20 years, 444.5 tons (48.9 tons in morphine equivalent). In 2018, the level of opium stocks was 651.7 tons (71.7 tons in morphine equivalent) (see figure 1).

6. In 2018, India was the main producer of raw opium (in addition to being the only country legally exporting raw opium), producing 225.4 tons (24.8 tons in morphine equivalent) and accounting for 97.1 per cent of global production. It was followed by China, which produced 6.6 tons (0.7 ton in morphine equivalent). In China, opium had been the main raw material used in the manufacture of alkaloids until 2000; after that, it was replaced by poppy straw. Japan also produced smaller amounts of opium in 2018, to be used exclusively for scientific purposes. India accounted for 96 per cent of opium exports in 2018. The remaining 4 per cent was accounted for by re-exports of opium by countries that had initially imported the opium from India.

7. Opium imports from India, which had fluctuated in the period 2009–2014, decreased significantly in 2015 and then stabilized, amounting to 53.5 tons in 2018 (see figure 2). The main countries importing opium in 2018 were Japan (36 tons, or 67.3 per cent) followed by France (11.1 tons, or 20.7 per cent) and the Islamic Republic of Iran (5 tons, or 9.3 per cent). The United States, which had been the main importer of opium, reported the import of only a negligible amount of opium from India in 2018.

8. In 2018, as in previous years, the bulk of opium was used for the extraction of alkaloids, with only a small amount (22.9 tons, or 2.5 tons in morphine equivalent) being used for the manufacture of preparations in Schedule III. Utilization of opium (including the utilization of seized opium in Iran (Islamic Republic of) and Myanmar) increased from 491.5 tons (54.1 tons in morphine equivalent) in 2017 to 692.7 tons (76.2 tons in morphine equivalent) in 2018.[6] In 2018, the main countries reporting utilization of opium for the extraction of alkaloids were the Islamic Republic of Iran (511.8 tons, or 56.3 tons of morphine equivalent), India (138.5 tons, or 15.2 tons in morphine equivalent) and Japan (41.6 tons, or 4.6 tons in morphine equivalent) (see figure 3). The opium reported as utilized by the Islamic Republic of Iran originated from seized material. In 2018, the Democratic People's Republic of Korea continued to report limited utilization of opium (0.4 ton, or 0.04 ton in morphine equivalent). Details on the utilization of opium for the extraction of alkaloids and the alkaloids obtained are provided in part four, table III, of the present publication.

Figure 2. Opium: imports from India, in morphine equivalent, 2009–2018

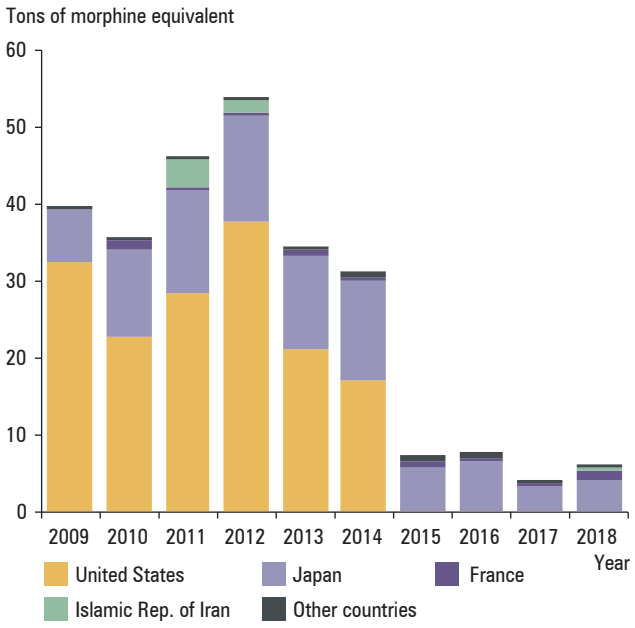
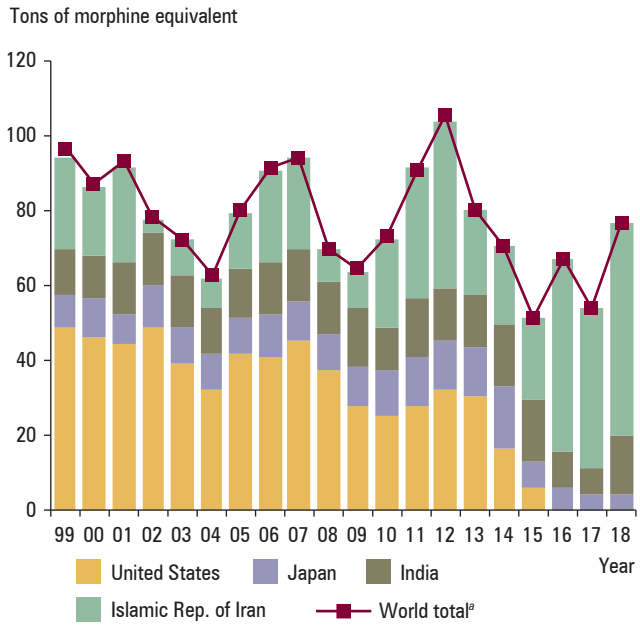


Figure 3. Opium: utilization for the extraction of alkaloids, in morphine equivalent, 1999–2018



Note: The United States utilized almost 500 kg of opium in 2018.

[a]Including the utilization of seized opium in the Islamic Republic of Iran and Myanmar.

[6]In the Islamic Republic of Iran, in addition to licitly produced opium imported from India (in the years 2004, 2006, 2007, 2011, 2012 and 2016 only), seized opium is used regularly in large quantities for licit purposes (i.e. for the extraction of alkaloids). The extraction yield from seized opium is usually less than that from licitly produced opium.

9. While the majority of opium is used for the extraction of alkaloids, opium is also consumed in some countries in the form of preparations, mainly for the treatment of diarrhoea and coughs. Most of those preparations are included in Schedule III of the 1961 Convention.[7] Global consumption of opium for those purposes has fluctuated since 2001. In 2018, the consumption and the utilization of opium for the manufacture of preparations in Schedule III amounted to 23.4 tons, including 9 tons (almost 1 ton in morphine equivalent) in China, 6.8 tons (0.8 ton in morphine equivalent) in France and 6.7 tons (0.7 ton in morphine equivalent) in India.

10. Global stocks of opium reached a peak in 2004 (2,176.2 tons, or 239.3 tons in morphine equivalent). Then they began to decrease (see figure 1), falling to 651.7 tons (71.7 tons in morphine equivalent) in 2018. India continued to maintain the largest stocks of opium (529.7 tons, or 58.3 tons in morphine equivalent, representing 81.3 per cent of the world total); it was followed by Japan (102.9 tons, or 11.3 tons in morphine equivalent), France (8.7 tons, or almost 1.0 ton in morphine equivalent) and China (8.5 tons, or 0.9 ton in morphine equivalent).[8] The United States, which had kept larger stocks of opium in the recent past, had only limited stocks in 2018 – 0.7 ton, or 0.1 ton in morphine equivalent.

Poppy straw

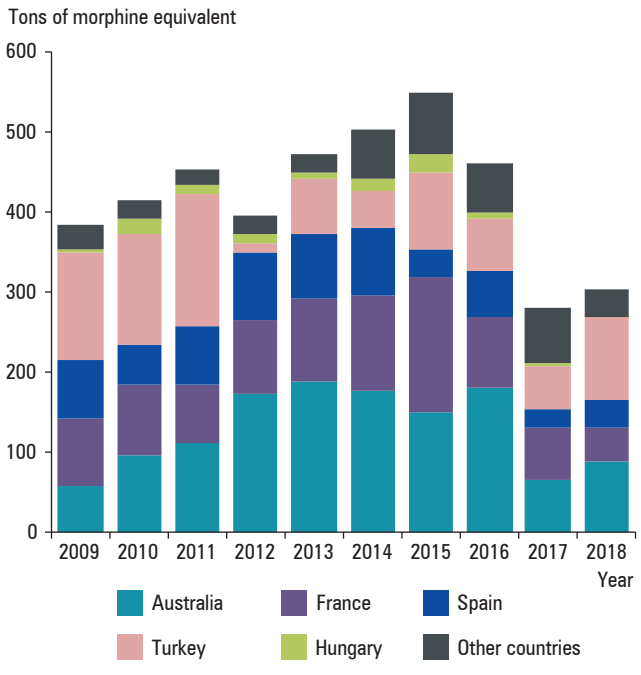
11. Poppy straw consists of all parts of the opium poppy plant after mowing, except the seeds. Morphine is the predominant alkaloid found in the varieties of the opium poppy plant cultivated in most producing countries. Commercial cultivation of the opium poppy plant with high thebaine content started in the second half of the 1990s. In the present publication, poppy straw produced from varieties of the opium poppy plant rich in morphine is referred to as "poppy straw (M)", poppy straw produced from varieties of the opium poppy plant rich in thebaine is referred to as "poppy straw (T)", poppy straw produced from varieties of the opium poppy plant rich in codeine is referred to as "poppy straw (C)", poppy straw produced from varieties of the opium poppy plant rich in oripavine is referred to as "poppy straw (O)" and poppy straw produced from varieties of the opium poppy plant rich in noscapine is referred to as "poppy straw (N)". Some of those varieties contain, in addition to the main alkaloid (morphine, thebaine, codeine or noscapine), other alkaloids that can be extracted.

12. The concentration of alkaloids in poppy straw varies significantly among the producing countries. Production levels of poppy straw among those countries can be compared only by using a common denominator, which is the morphine or thebaine equivalent of the quantity of poppy straw produced in each country. Commercial cultivation of opium poppy plants with a high codeine content started in Australia in 2009 and in France in 2013.

Poppy straw produced mainly[9] from opium poppy rich in morphine

13. Although the submission of statistics on the production of poppy straw is voluntary, most countries cultivating opium poppy plants for the extraction of alkaloids provided such statistics in 2018. Global production of poppy straw (M) expressed in morphine equivalent followed an increasing trend in the two decades prior to 2018. Over the years, production fluctuated sharply, mainly because of unstable weather conditions and in response to the demand in manufacturing countries. It reached about 430 tons in morphine equivalent in 2003, decreased to about 218 tons in 2008, but then increased again significantly, reaching 549 tons in 2015 before decreasing again to 304 tons in 2018 (see figure 4). Throughout the two decades prior to 2018, Australia, France, Spain and Turkey had been the

Figure 4. Total anhydrous morphine alkaloid contained in all poppy straw varieties: production in the main producing countries, in morphine equivalent, 2009–2018



[7] Preparations included in Schedule III of the 1961 Convention are exempt from several control measures that are otherwise mandatory for preparations containing narcotic drugs, including reporting on their consumption and international trade.

[8] For further information on the production and stocks of and demand for opium, see part three of the present publication.

[9] Morphine and codeine alkaloids (expressed in morphine equivalent) contained in other varieties of poppy straw such as poppy straw (T) and poppy straw (C) are also included in the total production figures in this subsection, where applicable.

main countries producing poppy straw (M). In 2018, the main countries producing poppy straw (M) were Turkey (102 tons in morphine equivalent), followed by Australia (88 tons), France (42 tons), Spain (37 tons) and Hungary (2 tons). Other producers of poppy straw (M) in 2018 together accounted for the remaining 33 tons of global production. For accounting purposes, quantities of poppy straw (C), rich in codeine, were included in the calculation of the quantities in morphine equivalent. Such quantities have become more significant in recent years. Changes in the area cultivated with opium poppy plants, the amounts of poppy straw (M) harvested and the yields obtained in producing countries are shown in part four, table II.

14. International trade in poppy straw (M) as a raw material continues to be limited. In 2018, Hungary was the main exporter of poppy straw (M) for the extraction of alkaloids; it was followed by Australia, Slovakia and the United Kingdom of Great Britain and Northern Ireland (see annex IV, table 1).

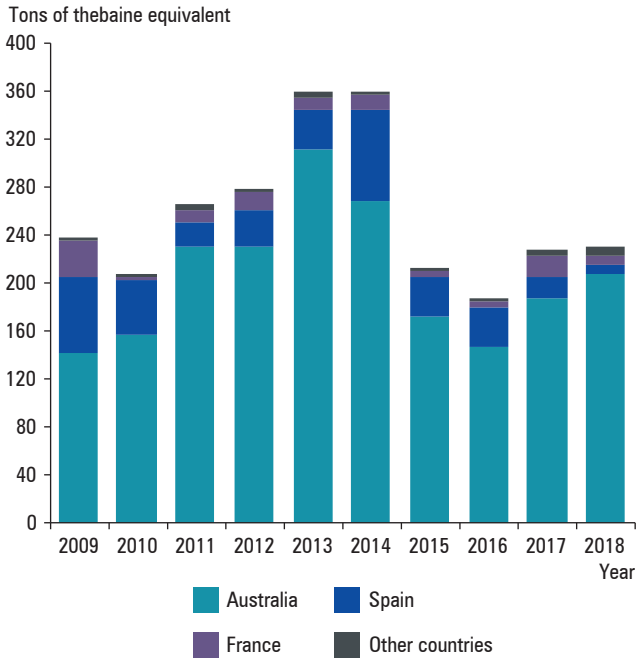
15. In 2018, the main countries utilizing poppy straw (M) were Turkey (17,253.0 tons in gross weight), Spain (7,384.5 tons), France (5,710.1 tons), Australia (3,452.3 tons), Slovakia (1,644.4 tons) and China (1,361.7 tons). Belgium and North Macedonia[10] each utilized less than 1,000 tons of poppy straw (M) in 2018. Further details on the utilization of poppy straw (M) for the extraction of alkaloids and the yields obtained are contained in table IV.

Poppy straw produced mainly[11] from opium poppy rich in thebaine

16. Australia and France started to report the production of poppy straw (T) to INCB in 1999. Spain reported the production of poppy straw (T) for the first time in 2004. China and Hungary have reported sporadic production in recent years. More details on the production of poppy straw (T) can be found in table II.

17. Production of poppy straw (T) in the main producing countries during the period 2009–2018, expressed in thebaine equivalent, is shown in figure 5. Global production increased slightly between 2017 and 2018, from 229 to 230 tons in thebaine equivalent. In 2018, Australia remained the leading producer, with 207 tons in thebaine equivalent, an increase from 187 tons in 2017. It was followed by Spain, with 9 tons in thebaine equivalent, and France, with 8 tons in thebaine equivalent.

Figure 5. Total anhydrous thebaine alkaloid contained in all poppy straw varieties: production in the main producing countries, in thebaine equivalent, 2009–2018



18. All poppy straw (T) is used in the producing and manufacturing countries for the extraction of alkaloids. The quantities used, the alkaloids obtained from poppy straw (T) and the yields are shown in table V.

Poppy straw produced from opium poppy rich in codeine

19. Australia reported the production of poppy straw (C), rich in codeine, for commercial purposes for the first time in 2009; and France reported such production for the first time in 2013. This new variety was cultivated specifically to meet the high global demand for codeine. Its production increased steadily, from 415.3 tons (expressed in gross weight) in 2010 to 6,706.9 tons in 2015, then dropped considerably, to 1,313.2 tons, in 2016 and increased in 2017 and 2018. It reached 4,218.7 tons in 2018. Australia accounted for 54.1 per cent of global production of poppy straw (C), while Spain accounted for the remaining 45.9 per cent. Australia also accounted for most of its utilization (87.2 per cent); it was followed by Spain (12.8 per cent). Stocks of poppy straw (C) were held only by Spain (55.1 tons), France (35.3 tons) and Australia (9.6 tons).

Poppy straw produced from opium poppy rich in noscapine

20. In recent years, an increase in the production of poppy straw (N) has been reported in some countries. Noscapine

[10] Since 14 February 2019, "North Macedonia" has replaced "The former Yugoslav Republic of Macedonia" as the short name used in the United Nations.

[11] The quantities in thebaine equivalent of the thebaine and oripavine alkaloids contained in other varieties of poppy straw such as poppy straw (M) and poppy straw (C) are also included in the total production figures in this subsection, where applicable.

is not under international control, but this variety contains opiates under international control and it needs to be monitored in accordance with the requirements of the 1961 Convention. In 2018, however, France was the only country to report the production of poppy straw (N): 1,172.1 tons of poppy straw (N) (expressed in gross weight). Australia and Hungary were the only countries to report stocks of poppy straw (N): the stocks of those two countries together amounted to 692 tons (expressed in gross weight).

Poppy straw used for decorative purposes

21. The poppy plant is cultivated for culinary and decorative purposes in some countries, mainly Austria, Czechia, Germany, the Netherlands, Poland and Ukraine.

Concentrate of poppy straw

22. Most countries using poppy straw for the extraction of alkaloids first manufacture an intermediate product called "concentrate of poppy straw", although in some countries morphine or thebaine is manufactured directly from poppy straw in a continuous process, which may involve a number of other intermediate products (for details, see tables IV and V). Until the second half of the 1990s, only concentrate of poppy straw containing morphine as the main alkaloid was manufactured. Since then, concentrate of poppy straw containing mainly thebaine, oripavine or codeine has started to be manufactured. Concentrate of poppy straw may contain a mixture of alkaloids, and more alkaloids than just the principal alkaloid may be extracted in industrial processes. The different types of concentrate of poppy straw are distinguished by the main alkaloid contained in them.[12]

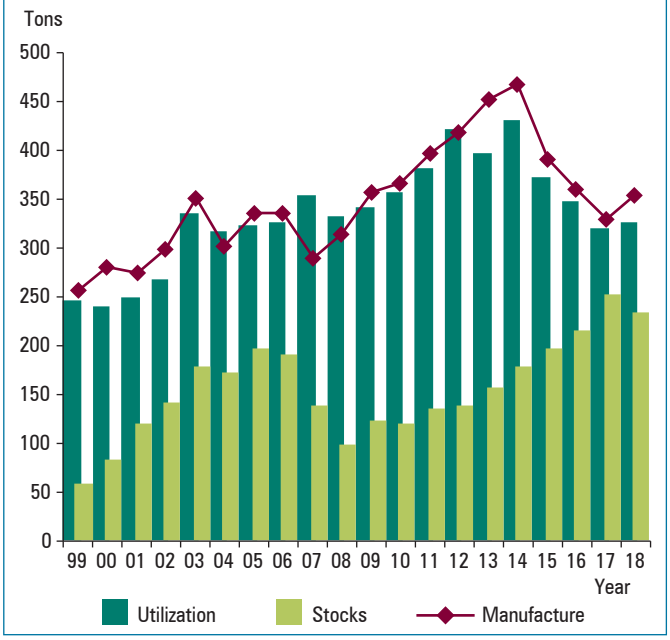
23. Since the actual content of alkaloids in concentrate of poppy straw may vary significantly, for the purposes of comparison and for statistical purposes, all data referring to concentrate of poppy straw are expressed in terms of the quantity of the relevant anhydrous alkaloid contained in the material. The quantities of anhydrous morphine alkaloid contained in concentrate of poppy straw are referred to as AMA (CPS), those of anhydrous thebaine alkaloid as ATA (CPS), those of anhydrous oripavine alkaloid as AOA (CPS) and those of anhydrous codeine alkaloid as ACA (CPS). The totals of all the individual alkaloids contained in concentrate of poppy straw are examined below, expressed in terms of 100 per cent of anhydrous alkaloid content.

[12]Currently, the following types are traded: *(a)* concentrate of poppy straw containing morphine as the main alkaloid; *(b)* concentrate of poppy straw containing thebaine as the main alkaloid; *(c)* concentrate of poppy straw containing oripavine as the main alkaloid; and *(d)* concentrate of poppy straw containing codeine as the main alkaloid.

Anhydrous morphine alkaloid contained in concentrate of poppy straw

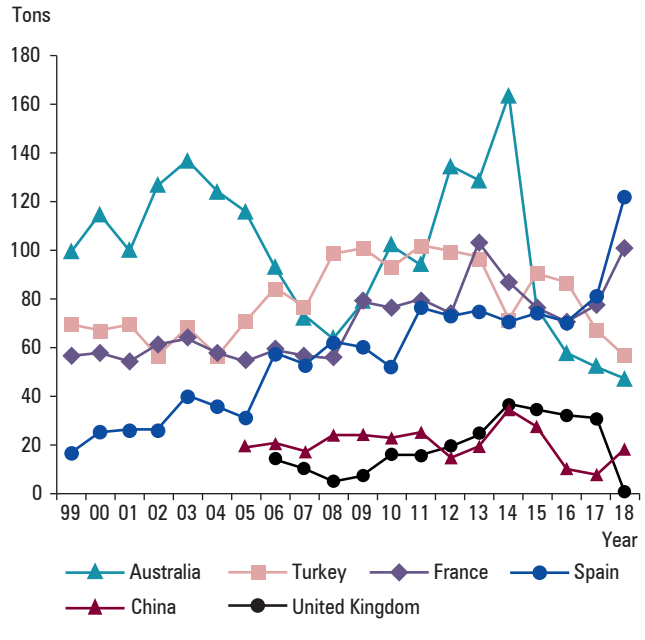
24. AMA (CPS) continues to be the most important and most widely used of the alkaloids contained in concentrate of poppy straw. Figure 6 shows the trends in its manufacture, stocks and utilization during the period 1999–2018.

Figure 6. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: global manufacture, stocks[a] and utilization, 1999–2018



[a]Stocks as at 31 December of each year.

Figure 7. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: manufacture in the main manufacturing countries, 1999–2018



25. Global manufacture of AMA (CPS) increased continuously from 2007 to 2014, when it reached its highest level ever (466.3 tons). Its manufacture then decreased gradually, reaching 327.9 tons in 2017. However, in 2018, it increased again, reaching 351.6 tons. Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 1999–2018 are presented in figure 7.

26. Prior to 2017, Australia and Turkey had been the leading manufacturers of AMA (CPS). Then Spain reported that it had manufactured the largest quantity of AMA (CPS) in 2017 and again in 2018 (121.5 tons, accounting for 34.5 per cent of global manufacture); it was followed by France (101.1 tons, or 28.7 per cent), Turkey (56.6 tons, or 16.1 per cent), Australia (47.4 tons, or 13.4 per cent) and China (18.2 tons, or 5.1 per cent).

27. After reaching a record high of 239 tons in 2012, global exports of AMA (CPS) began to decrease; such exports amounted to 154.5 tons in 2018. Spain exported the largest quantity of AMA (CPS) in 2018 (74.4 tons, or 48.1 per cent); it was followed by Australia (34.8 tons, or 22.5 per cent), Turkey (20.5 tons, or 13.3 per cent), Belgium (15.9 tons, or 10.3 per cent) and France (9 tons, or 5.8 per cent). As in recent years, the leading importers of AMA (CPS) were, in descending order of the amounts imported, the United Kingdom, France and the United States, together accounting for 69.7 per cent of the world total in 2018. Other countries importing AMA (CPS) in 2018 were, in descending order of the amounts imported, Australia, Japan, Norway, Italy and North Macedonia. Further details on international trade in AMA (CPS) can be found in annex IV, tables 1 and 2.

28. AMA (CPS) is an intermediate product used for the manufacture of morphine. It is also used in continuous manufacturing processes for the manufacture of codeine. Utilization of AMA (CPS) followed an increasing trend until 2014 but has decreased since then (see figure 8). In 2018, global utilization amounted to 322.8 tons, a notable decrease from 428.8 tons in 2014. France accounted for 99.7 tons, or 30.9 per cent of global utilization of AMA (CPS); it was followed by the United Kingdom (80.8 tons, or 25 per cent) and Australia (47.3 tons, or 14.6 per cent).

29. Global stocks of AMA (CPS) continuously increased until 2017, reaching 250.4 tons, but decreased slightly to 232.3 tons in 2018 (see figure 9). Turkey held in stock 90.7 tons of AMA (CPS), accounting for 39.1 per cent of global stocks; it was followed by China (34.1 tons, or 14.7 per cent of global stocks), the United States (29.1 tons, or 12.5 per cent), Spain (28.7 tons, or 12.4 per cent), Australia (27.3 tons, or 11.8 per cent), the United Kingdom (12.6 tons, or 5.4 per cent) and Japan (7.4 tons, or 3.2 per cent).

Figure 8. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: utilization for the manufacture of opiates, 1999–2018

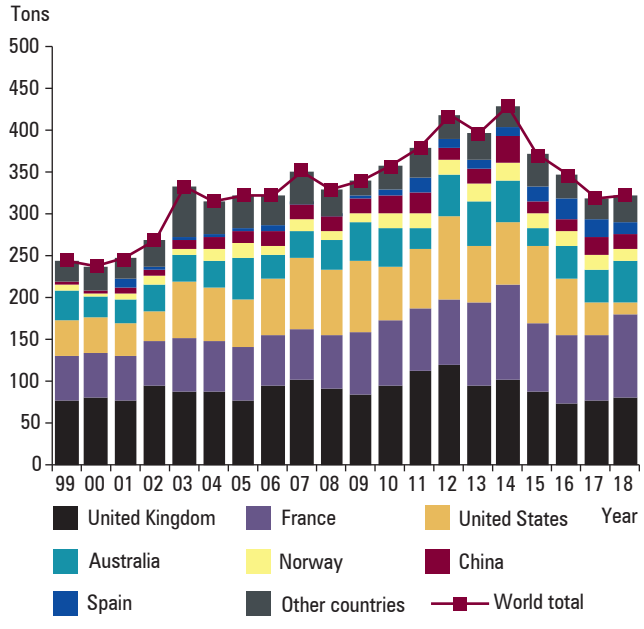
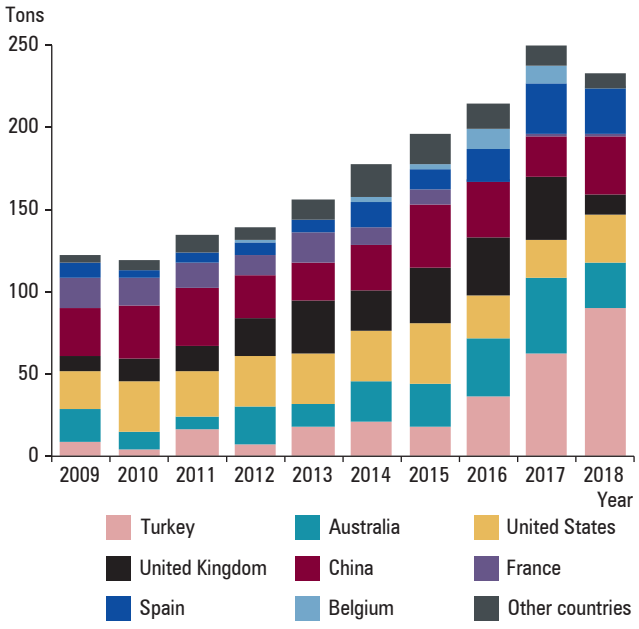


Figure 9. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: stocks,[a] 2009–2018



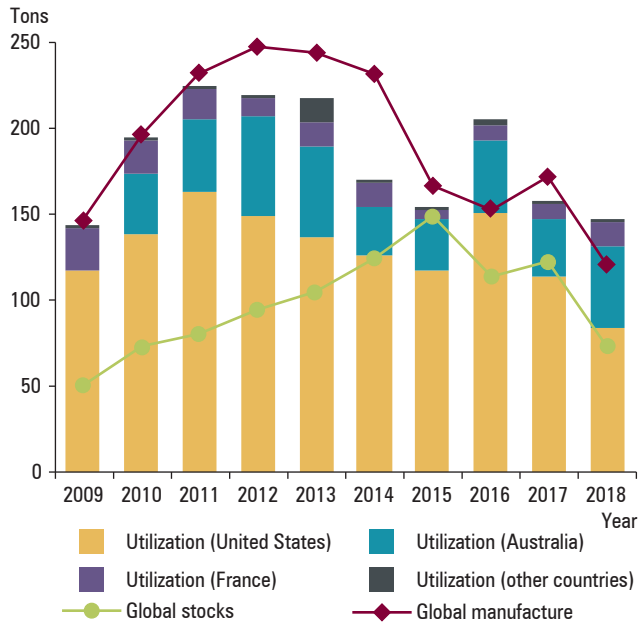
[a]Stocks as at 31 December of each year.

Anhydrous thebaine alkaloid contained in concentrate of poppy straw

30. Figure 10 provides an overview of the manufacture, stocks and utilization of ATA (CPS) during the period 2009–2018. Industrial manufacture of ATA (CPS), which started in 1998, increased rapidly before levelling off at 245 tons in 2012 and then decreased considerably to 120.6 tons in 2018. The only countries manufacturing ATA (CPS) in 2018 were Australia (107 tons, or 88.7 per cent of global manufacture), France (7.4 tons, or 6.2 per cent) and Spain (6.2 tons, or 5.1 per cent). Australia was also the main exporter, accounting for 88.6 per cent of global exports, or 59.2 tons. Spain, the only other exporter, accounted for 11.4 per cent, or 7.6 tons. The United States has been the leading importer of ATA (CPS) for many years; in 2018, it accounted for 99.4 per cent of global imports.

31. ATA (CPS) is an intermediate product used for the manufacture of thebaine. Global utilization of ATA (CPS) increased sharply from 2001 to 2011, when it peaked at 225.9 tons. After that, it decreased steadily, reaching 146 tons in 2018. This trend reflects the reduction in the demand for thebaine and for narcotic drugs obtained from it, such as oxycodone and hydrocodone, particularly in the North American market (see paras. 66, 67, 70 and 71 below). However, despite this reduction, in 2018, the United States continued to be the main user of thebaine (accounting for 57.9 per cent of global utilization, or 84.5 tons). It was followed by Australia (32.9 per cent, or 48 tons), France (9 per cent, or 13.1 tons), Hungary (0.3 per cent, or 0.4 ton) and Japan (0.1 per cent, or 0.1 ton). Global stocks of ATA (CPS) stood at 73.6 tons in 2018; those stocks were held primarily by the United States (60.1 tons, or 81.6 per cent), France (7.0 tons or 9.4 per cent), Australia (6.1 tons, or 8.2 per cent) and Spain (0.5 ton, or 0.6 per cent).

Figure 10. Total anhydrous thebaine alkaloid contained in all varieties of concentrate of poppy straw: utilization, global manufacture and global stocks,[a] 2009–2018



[a]Stocks as at 31 December of each year.

Anhydrous oripavine alkaloid contained in concentrate of poppy straw

32. Manufacture of AOA (CPS) in commercially usable quantities started in 2001. Australia was the main country manufacturing AOA (CPS) in 2018, with a total of 23.3 tons (99.2 per cent of the world total). Spain manufactured only 0.2 ton. Global utilization of AOA (CPS) in 2018 reached 28.0 tons. Global stocks of AOA (CPS) have been fluctuating since 2001. In 2018, global stocks of AOA (CPS) decreased to 40 tons; those stocks were held mainly by Australia (74.7 per cent, or 30 tons) and the United States (24.9 per cent, or 10 tons).

Anhydrous codeine alkaloid contained in concentrate of poppy straw

33. Manufacture of ACA (CPS) increased from 2001 until 2015, when it reached a record 108.9 tons, nearly double the amount manufactured (57.7 tons) in 2014. After decreasing to 56.1 tons in 2016, it increased again, reaching 69.9 tons in 2018. ACA (CPS) is used for the extraction of codeine. The only countries that manufactured ACA (CPS) in 2018 were Australia (accounting for 67 per cent of global manufacture), Spain (14.7 per cent), France (14.3 per cent) and Turkey (4 per cent). Global utilization of ACA (CPS) steadily increased to 79.2 tons in 2015. It then decreased to 35.8 tons in 2018. The United States was the main country utilizing ACA (CPS) (accounting for 61.0 per cent of global utilization, or 21.4 tons); it was followed by France (27.6 per cent, or 20.9 tons) and Norway (9.0 per cent or 3.2 tons). Other countries utilized only very small amounts. In 2018, global stocks of ACA (CPS) increased to the highest amount ever recorded (68.6 tons). Those stocks were held in the United Kingdom (accounting for 28.6 tons, or 41.6 per cent of global utilization), the United States (17.4 tons, or 25.3 per cent), Australia (14 tons, or 20.4 per cent), Turkey (5.2 tons, or 7.6 per cent) and Spain (3.2 tons, or 4.7 per cent); other countries held only small amounts.

Opiates and opioids

34. "Opiate" is the term generally used to designate drugs derived from opium and their chemically related derivatives, such as semi-synthetic alkaloids, while "opioid" is a more general term for both natural and synthetic drugs with morphine-like properties, although the chemical structure may differ from that of morphine.[13]

35. Opioids are used mostly for their analgesic properties to treat severe pain (fentanyl, hydromorphone, methadone, morphine and pethidine), moderate to severe pain (buprenorphine[14] and oxycodone) and mild to moderate pain (codeine, dihydrocodeine and dextropropoxyphene), as well as to induce or supplement anaesthesia (fentanyl and fentanyl analogues such as alfentanil and remifentanil). They are also used as cough suppressants (codeine, dihydrocodeine and, to a lesser extent, pholcodine and ethylmorphine), to treat gastrointestinal disorders, mainly diarrhoea (codeine and diphenoxylate), and to treat opioid dependence (buprenorphine and methadone).

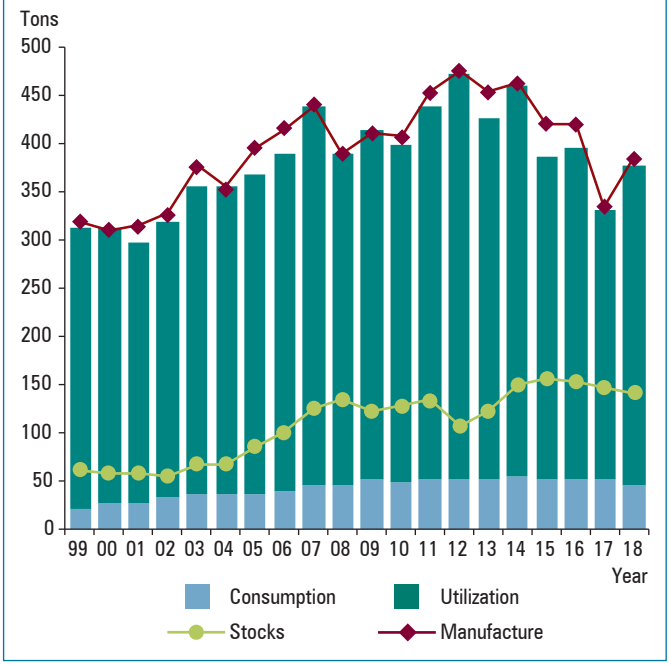
Natural alkaloids

36. Morphine, codeine, thebaine, noscapine, oripavine, papaverine and narceine are alkaloids contained in opium or poppy straw. Morphine and codeine are under international control because of their potential for abuse, while thebaine and oripavine are under such control because they can be converted into opioids subject to abuse. Noscapine, papaverine and narceine are not under international control. Morphine is the prototype of natural opiates and many opioids and, because of its strong analgesic potency, it is used as a reference parameter for comparative purposes.

Morphine

37. In the 20-year period 1999–2018, the manufacture[15] of morphine increased considerably from the 319.7 tons manufactured in 1999. After stabilizing at about 450.0 tons between 2011 and 2014, the manufacture of morphine decreased to 419.6 tons in 2015, remained at roughly the same level (422.0 tons) in 2016, decreased to 340.0 tons in 2017 and slightly increased to 388.2 tons in 2018 (see figure 11). In 2018, 85 per cent of the morphine manufactured globally was converted into other narcotic drugs or into substances not covered by the 1961 Convention (see paras. 45 and 46 below). The rest was used for medical purposes (for direct consumption or for the manufacture of preparations listed in Schedule III), mainly for palliative care.

Figure 11. Morphine: global manufacture, stocks,[a] consumption and utilization, 1999–2018



[a]Stocks as at 31 December of each year.

38. In 2018, the leading morphine manufacturing country was France (86.4 tons, or 22.3 per cent of global manufacture), followed by the United Kingdom (83.7 tons, or 21.6 per cent), Australia (50.5 tons, or 13 per cent), the Islamic Republic of Iran (38.5 tons, or 9.9 per cent), Norway (21.1 tons, or 5.4 per cent), China (18.2 tons, or 4.7 per cent), the United States (17.7 tons, or 4.6 per cent), Japan (16.4 tons, or 4.2 per cent), Spain (13.1 tons, or 3.4 per cent) and India (12.0 tons, or 3.1 per cent). Together, those 10 countries accounted for 92.2 per cent of global manufacture of morphine.

39. Between 2009 and 2018, exports of morphine reached their highest level, 35.4 tons in 2015. Morphine exports decreased to 23.4 tons in 2016, before increasing again, to 28.1 tons, in 2017 and then decreasing again, to 24.7 tons, in 2018. The main exporting countries in 2018 were the United Kingdom (31.6 per cent), France (15.4 per cent), Switzerland (9.8 per cent), Germany (9.4 per cent),

[13]From a clinical point of view, opioids may be classified according to their actions compared with those of morphine: similar affinity (agonist), competitive (antagonist) or mixed (agonist/antagonist) for the same receptor sites (the so-called "opioid receptors") in the central and peripheral nervous systems.

[14]Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971. Comments on its licit movement are contained in para. 99 below.

[15]In Australia, China, Italy, Norway, Turkey and the United Kingdom, concentrate of poppy straw is used in continuous industrial processes for the manufacture of other narcotic drugs, without first separating morphine. For statistical and comparative purposes, the theoretical quantity of morphine involved in such conversions is calculated by INCB and included in the present publication in the statistics on global manufacture and utilization of morphine.

Figure 12. Morphine: percentage share of total exports, by country, 2009–2018

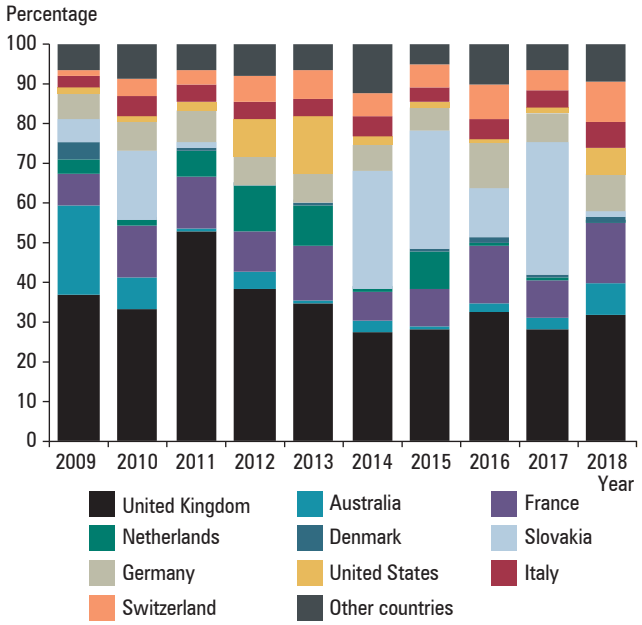
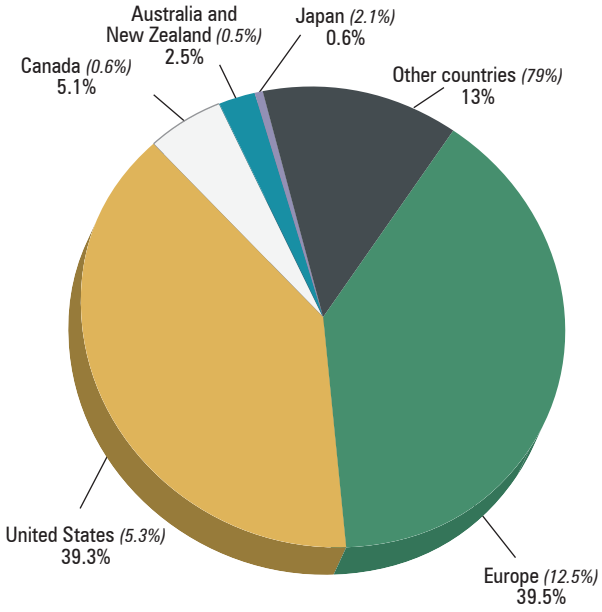


Figure 13. Morphine: distribution of consumption, 2018



Note: The percentage in parentheses refers to the share of the total population of all countries that submitted data on morphine consumption.

Australia (7.9 per cent), Italy (6.9 per cent) and the United States (6.6 per cent). Other countries accounted for less than 2 per cent of total exports of morphine (see figure 12). The main importing countries in 2018 were the United Kingdom (5.0 tons, or 19.6 per cent), Germany (4.5 tons, or 17.6 per cent), Austria (2.5 tons, or 9.9 per cent), Hungary (2.1 tons, or 8.3 per cent), Canada (1.7 tons, or 6.8 per cent), Australia (1.6 tons, or 6.1 per cent) and Switzerland (1.3 tons, or 5.2 per cent). Other countries imported less than 1 ton of morphine. Further details on imports and exports of morphine can be found in annex IV, tables 3 and 4.

40. In 1999, morphine used for direct consumption accounted for 6.4 per cent of global manufacture of morphine; and 20 years later, in 2018, it accounted for 11.4 per cent. Despite the increase, many countries continue to report difficulties in procuring medications containing morphine.

41. The differences in consumption levels between countries continued to be very significant (see figure 13 and table XIV), owing to various economic, knowledge, regulatory and other factors influencing the use of morphine for the treatment of pain. Although most countries and territories reported morphine consumption in 2018, many people still had limited access to morphine.

42. In the 20-year period 1999–2018, on average only 8.7 per cent of the total amount of morphine utilized globally was reported to have been used for palliative care directly. A smaller amount (2.1 per cent on average) was used for the manufacture of Schedule III preparations containing morphine. The majority (84.4 per cent on average) was converted into other narcotic drugs (mostly codeine) or into substances not covered by the 1961 Convention. Further details on the utilization of morphine can be found in part four, table VI.

43. In 2018, 79 per cent of the world population, mainly persons in low- and middle-income countries, consumed only 13 per cent of the total amount of morphine used for the management of pain and suffering. Although the situation improved in the previous 20 years, the disparity in consumption of narcotic drugs for palliative care continues to be a matter of concern, particularly in relation to access and availability of affordable opioid analgesics such as morphine. The remaining 87 per cent of the total consumption of morphine, excluding preparations in Schedule III of the 1961 Convention, continued to be concentrated in a small number of countries, mainly in Europe and North America. In 2018, European countries as a whole and the United States accounted for the highest share of global morphine consumption (39.5 per cent and 39.3 per cent respectively); they were followed by Canada (5.1 per cent), Australia and New Zealand (2.5 per cent) and Japan (0.6 per cent).

44. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention. In 2018, the countries using morphine for that purpose in significant quantities were China (accounting

for 7.3 tons, or 56.3 per cent of the total), the United Kingdom (4.5 tons, or 34.7 per cent) and Italy (1.2 tons, or 9 per cent).

45. The largest share of morphine is used for conversion into other opiates, such as codeine, ethylmorphine and pholcodine (see table VI), although it is important to note that codeine is increasingly being obtained directly from opium poppy rich in codeine. The amounts utilized for conversion into other opiates, which fluctuated at about 200 tons per year until the beginning of the 1990s, increased steadily until 2012, but then decreased, reaching 330.1 tons in 2018. Morphine is also used for the manufacture of substances not controlled under the 1961 Convention, such as noroxymorphone and apomorphine. The quantity of morphine utilized for that purpose fluctuated considerably in the period 1999–2018, reaching 2.1 tons in 2018, most of which was used by France and the United Kingdom.

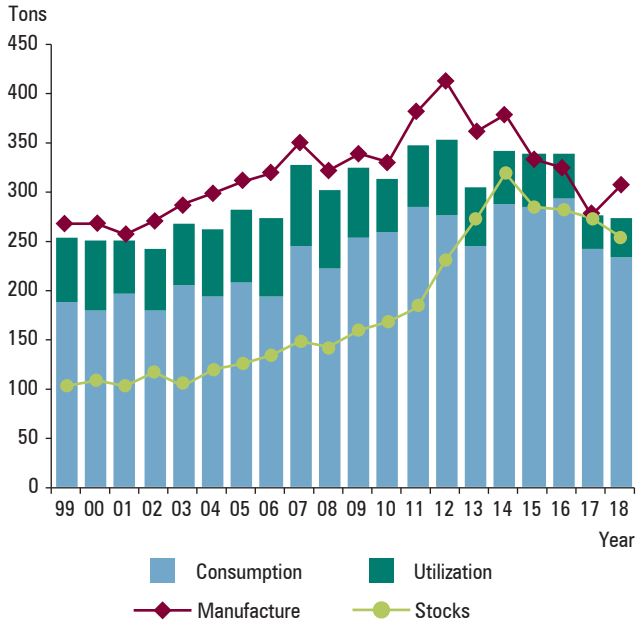
46. Global stocks of morphine stood at 141.2 tons in 2018, a slight decrease from the level in 2017 (148.4 tons). The largest stocks of morphine were held by France (47.8 tons, or 33.9 per cent of global stocks), followed by the United States (36.9 tons, or 26.1 per cent), Japan (12.7 tons, or 9.0 per cent), the United Kingdom (10.7 tons, or 7.6 per cent), Hungary (8.0 tons, or 5.7 per cent), Slovakia (5.9 tons, or 4.2 per cent) and Switzerland (4.8 tons, or 3.4 per cent). Each of the other countries holding stocks of morphine accounted for less than 2 per cent of global stocks.

Codeine

47. Codeine is a natural alkaloid of the opium poppy plant, but most of the codeine currently being manufactured is obtained from morphine through a semi-synthetic process. As reported above, there has been an increase in the cultivation of the opium poppy variety that is rich in codeine, and in the manufacture of ACA (CPS), which is used for the extraction of codeine. Codeine is used mainly for the manufacture of preparations in Schedule III of the 1961 Convention, while a smaller quantity is used for the manufacture of other narcotic drugs, such as dihydrocodeine and hydrocodone. The trends in global manufacture, consumption, utilization and stocks of codeine during the period 1999–2018 are shown in figure 14.

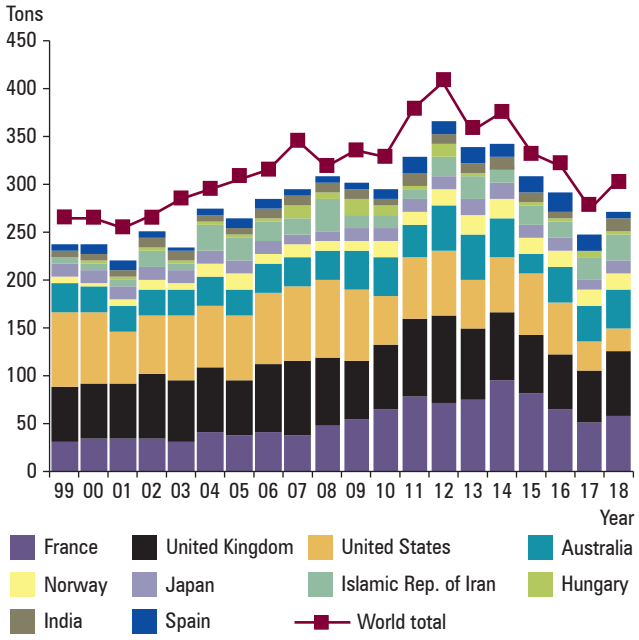
48. Global manufacture of codeine increased from 1999 until 2012, when it reached a peak of 411.9 tons. After 2012, global manufacture decreased, reaching 308.2 tons in 2018. The main countries manufacturing codeine were the United Kingdom (accounting for 68.3 tons, or 22.2 per cent of global manufacture), France (60.0 tons, or 19.5 per cent), Australia (40.7 tons, or 13.2 per cent), the Islamic Republic of Iran (22.2 tons, or 7.2 per cent) and the United

Figure 14. Codeine: global manufacture, stocks,[a] consumption and utilization, 1999–2018



[a]Stocks as at 31 December of each year.

Figure 15. Codeine: manufacture, 1999–2018



States (21.9 tons, or 7.1 per cent). Smaller, but still considerable, quantities of codeine were manufactured in 2018 in the following countries, listed in descending order of the amounts manufactured: Norway, Japan, India, Spain, South Africa, Turkey, China, Slovakia, Italy, Hungary, North Macedonia, Denmark, Croatia, Argentina and Germany (see figure 15). In recent years, various national and regional organizations and regulatory bodies have issued warnings related to codeine use and the occurrence of adverse effects in children. Such warnings might have been partly

Figure 16. Codeine: exports, 1999–2018

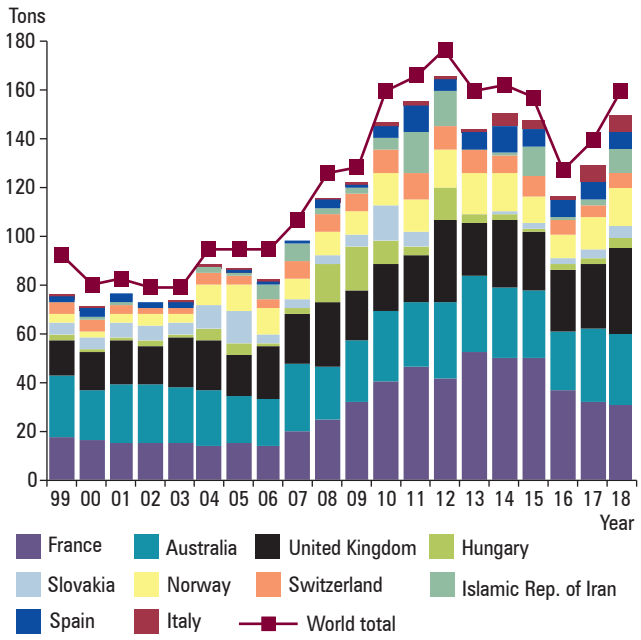
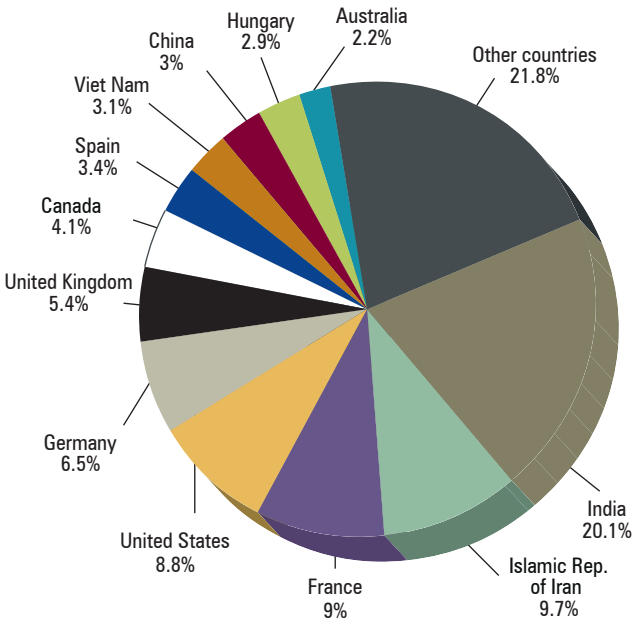


Figure 17. Codeine: utilization for the manufacture of preparations listed in Schedule III of the 1961 Convention, 2018



responsible for the decrease in manufacture. Also, there have been reports of an increase in the misuse of Schedule III preparations containing codeine in a number of countries (such as Bangladesh, India, Japan, Nigeria and the United States) and territories (such as Hong Kong, China).

49. After 2014, global stocks of codeine decreased, reaching 253.9 tons in 2018. The countries keeping significant quantities of codeine in stock were the United Kingdom (accounting for 42.5 tons, or 16.7 per cent of global stocks), France (40.5 tons, or 16.0 per cent), the United States (29.7 tons, or 11.7 per cent), India (28.8 tons, or 11.4 per cent), Australia (22.2 tons, or 8.8 per cent), Spain (14.9 tons, or 5.9 per cent), Canada (10.1 tons, or 4.0 per cent) and Japan (7.8 tons, or 3.1 per cent). Four additional countries (in descending order, Slovakia, Hungary, South Africa and Germany) each accounted for at least 2 per cent of all reported stocks of codeine.

50. In 2018, world exports of codeine increased to 158.8 tons, compared with 139.2 tons in 2017, almost reaching the peak of 176.5 tons recorded in 2012 (see figure 16), and the United Kingdom became, for the first time, the main country exporting codeine (accounting for 35.2 tons, or 22.2 per cent of the global exports). It was followed by France (30.5 tons, or 19.2 per cent), Australia (29.5 tons, or 18.6 per cent), Norway (15.8 tons, or 9.9 per cent), the Islamic Republic of Iran (10.4 tons, or 6.6 per cent), Spain (6.6 tons, or 4.2 per cent), Italy (6.6 tons, or 4.1 per cent), Switzerland (5.9 tons, or 3.7 per cent), Slovakia (4.4 tons, or 2.8 per cent) and Hungary (3.9 tons, or 2.5 per cent). A number of other countries each accounted for less than 2 per cent of all reported exports of codeine.

51. The 10 main countries importing codeine in 2018 were India (35.9 tons), Germany (19.1 tons), Canada (11.7 tons), the United Kingdom (9.5 tons), Brazil (9.2 tons), Italy (8.8 tons), Hungary (7.0 tons), Viet Nam (6.7 tons), Switzerland (4.9 tons) and Oman (4.4 tons). More details on the international trade in codeine can be found in annex IV, tables 3 and 4.

52. In 2018, codeine used for the manufacture of preparations listed in Schedule III accounted for 98.5 per cent of global consumption[16] of codeine. The use of codeine for that purpose grew from 172.2 tons in 1999 to 224.3 tons in 2018 (see figure 14). Countries reporting the utilization of codeine for the manufacture of such preparations are not necessarily the countries in which those preparations are consumed. The countries manufacturing those preparations in larger quantities for subsequent export are reflected in figure 17.

53. In 2018, global consumption of codeine (including preparations in Schedule III of the 1961 Convention) stood at 227.6 tons (see figure 14). According to the data reported for 2018, codeine was consumed mainly in India (46.1 tons, or 20.2 per cent of global consumption), the Islamic Republic of Iran (22.2 tons, or 9.8 per cent), France

[16] "Global consumption" is a term used by INCB to reflect the total of the amount of a drug that is directly consumed and the amount that is utilized for the manufacture of preparations listed in Schedule III of the 1961 Convention.

(20.6 tons, or 9.1 per cent), the United States (20.1 tons, or 8.8 per cent), Germany (15 tons, or 6.6 per cent), the United Kingdom (12.4 tons, or 5.5 per cent) and Canada (11.1 tons, or 4.9 per cent). The level of codeine consumption was between 2 and 10 tons, in descending order of the amounts consumed, in Spain, China, Viet Nam, Hungary, Australia, Norway, South Africa, Ireland, Turkey, Ukraine, Algeria, Italy, Morocco, Colombia and Hong Kong, China.

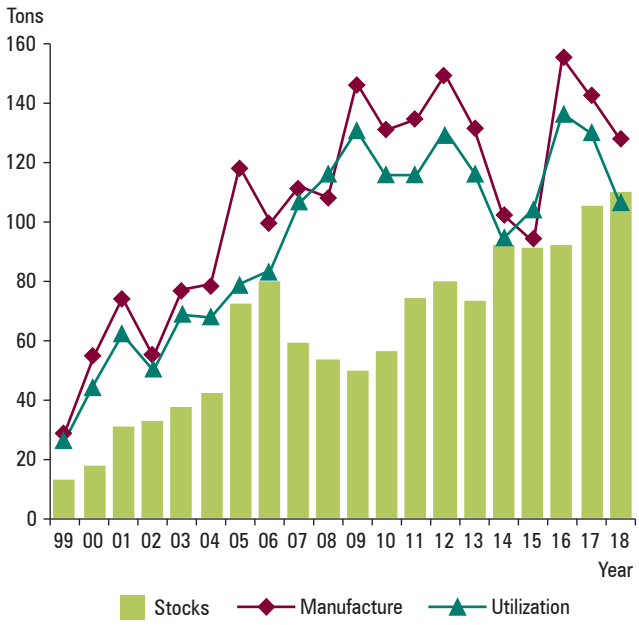
54. Utilization of codeine for the manufacture of other narcotic drugs, mainly dihydrocodeine and hydrocodone, increased steadily until reaching its highest level in 2007 (81.8 tons). Subsequently, utilization gradually declined, amounting to 40.0 tons in 2018. In 2018, 12.2 tons, or 30.4 per cent of global utilization, were reported by Japan, 12.0 tons, or 29.9 per cent, by the United Kingdom, 7.6 tons, or 19.0 per cent, by Italy, 4.6 tons, or 11.6 per cent, by the United States and 1.5 tons, or 3.7 per cent, by Hungary.

Thebaine

55. Until the 1990s, thebaine was manufactured mainly from opium; since 1999, it has been obtained primarily from poppy straw. Thebaine may also be obtained through the conversion of oripavine or from semi-synthetic opioids, such as hydrocodone. Thebaine itself is not used in therapy, but it is an important starting material for the manufacture of a number of opioids, mainly codeine, dihydrocodeine, etorphine, hydrocodone, oxycodone and oxymorphone (all of which are substances controlled under the 1961 Convention) and buprenorphine (a substance controlled under the Convention on Psychotropic Substances of 1971), as well as substances not under international control, such as the derivatives naloxone, naltrexone, nalorphine and nalbuphine.

56. Global manufacture of thebaine has increased sharply since the late 1990s, as a consequence of the growing demand for oxycodone and other drugs and substances that may be derived from it. In 2018, after some fluctuations in the preceding years, global manufacture of thebaine remained high, at 127.7 tons, though considerably below the record level of 156.0 tons reached in 2016 (see figure 18). The demand for medicines derived from thebaine, after decreasing in the previous years, appears to have increased in 2018, despite restrictions on prescription drugs recently imposed in the main market (the United States) in response to their abuse and the high number of overdose deaths caused by them. In 2018, the main manufacturer of thebaine continued to be the United States (50.6 tons, or 39.6 per cent of global manufacture). It was followed by Australia (46.2 tons, or 36.2 per cent), Spain (24.5 tons, or 19.1 per cent) and France (4.6 tons, or 3.6 per cent). China, India and Japan manufactured smaller

Figure 18. Thebaine: global manufacture, utilization and stocks,[a] 1999–2018



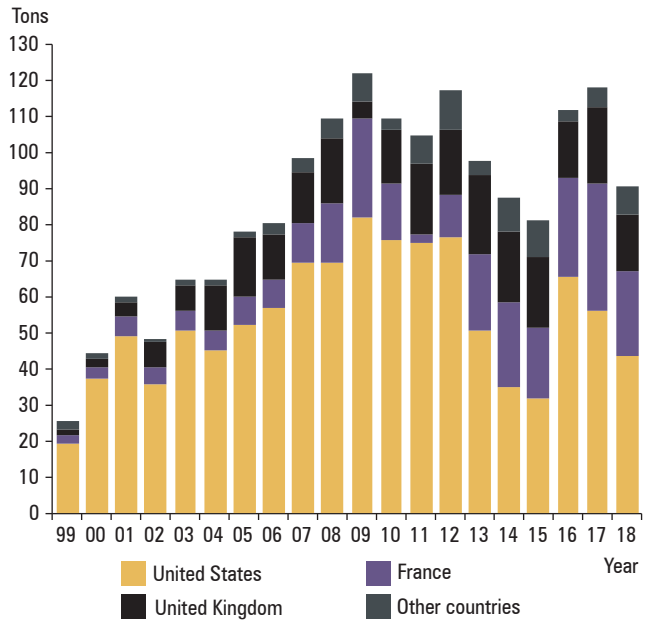
[a]Stocks as at 31 December of each year.

quantities. After declining to 64.1 tons in 2016, exports of thebaine increased to 76.1 tons in 2018. The only two exporting countries in 2018 were Australia (40.9 tons, or 53.5 per cent of total exports) and Spain (35.4 tons, or 46.5 per cent). The main countries importing thebaine were the United Kingdom (30.1 tons, or 39.8 per cent), France (29 tons, or 38.3 per cent), Hungary (10 tons, or 13.2 per cent), Czechia (3.0 tons, or 4.0 per cent), Germany (1.6 tons, or 2.1 per cent), Denmark (1.5 tons, or 2.0 per cent) and India (0.5 ton, or 1.0 per cent).

57. Following the manufacturing trend, the utilization of thebaine for the manufacture of other narcotic drugs decreased to 90.7 tons in 2018 (see figure 19 and table VII of part four). The United States was the main country utilizing thebaine during the 20-year period 1999–2018. In 2018, the United States reported having used 43.6 tons of thebaine, accounting for 48.1 per cent of global utilization. It was followed by France (23.3 tons, or 25.7 per cent) and the United Kingdom (15.8 tons, or 17.4 per cent). The quantity of thebaine reported as having been used for the manufacture of substances not covered under the 1961 Convention (mainly buprenorphine) fluctuated during the 10-year period 2009–2018; after reaching a peak of 117.9 tons in 2016, it decreased to 15.8 tons in 2018. The United States, Czechia, Germany, the United Kingdom, Switzerland, Denmark, India, China and Sweden, in that order, accounted for 100 per cent of the world total.

58. After an overall fluctuating upward trend in the period following 2000, global stocks of thebaine reached a record level of 110.2 tons in 2018. Major stocks were held

Figure 19. Thebaine: utilization for the manufacture of opioids, 1999–2018



in the United States (28.2 tons, or 25.6 per cent of global stocks), Australia (23.6 tons, or 21.4 per cent), Spain (17.1 tons, or 15.5 per cent), France (16.9 tons, or 15.3 per cent), the United Kingdom (9.5 tons, or 8.6 per cent), Hungary (7.4 tons, or 6.7 per cent), Germany (1.6 tons, or 1.5 per cent), Japan (1.6 tons, or 1.4 per cent), Denmark (1.3 tons, or 1.2 per cent) China (1.1 tons, or 1.0 per cent) and Switzerland (1.0 ton, or 1.0 per cent).

Oripavine

59. In 2007, oripavine was included in Schedule I of the 1961 Convention. From 2008 to 2016, global manufacture of oripavine fluctuated between 2.2 and 22.4 tons. In 2018, a combined total of 33.9 tons was manufactured in only three countries: the United States (21.1 tons, or 62.2 per cent of global manufacture), Switzerland (8.9 tons, or 26.3 per cent) and Spain (3.9 tons, or 11.6 per cent). The use of oripavine in significant quantities for the manufacture of other drugs was reported in 2018 by the sole manufacturer, the United States (20.4 tons). The drugs manufactured were mainly hydromorphone, oxymorphone and buprenorphine. In 2016, global stocks of oripavine reached their highest level, 18.1 tons. Subsequently, global stocks of oripavine decreased, reaching 14.2 tons in 2018. Of the stocks reported for 2018, Germany held 7.1 tons, or 49.9 per cent of global stocks. It was followed by Spain (4.0 tons, or 30 per cent), Italy (1.8 tons, or 12.3 per cent) and the United States (1.4 tons, or 9.5 per cent). Small quantities were held by (in descending order) Switzerland, Canada, India, Slovakia and Ukraine.

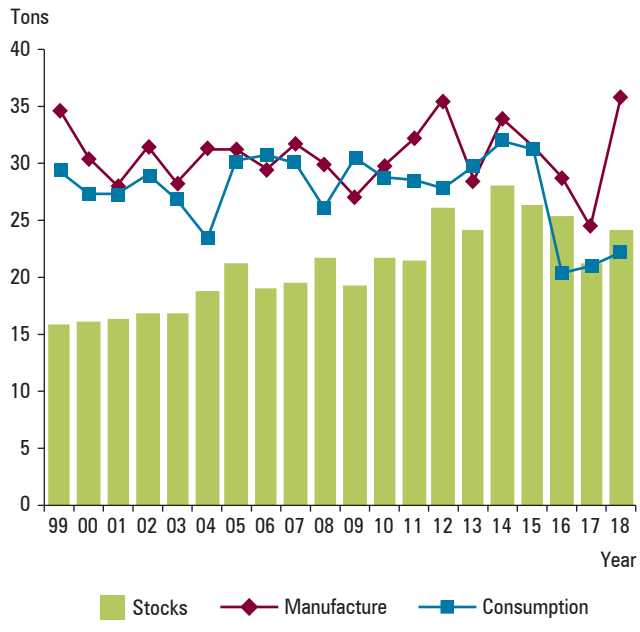
Semi-synthetic opioids

60. Semi-synthetic opioids are made by means of relatively simple chemical modifications of natural opiates such as morphine, codeine and thebaine. Some examples of semi-synthetic opioids are dihydrocodeine, ethylmorphine, heroin, hydrocodone, oxycodone and pholcodine. Some of the main manufacturers have reported that large losses occur during the processing of some semi-synthetic opioids.[17] Those manufacturing losses account for the difference between the total quantities of hydrocodone and oxycodone manufactured and those consumed, which are reflected in figures 22 and 23.

Dihydrocodeine

61. Global manufacture of dihydrocodeine fluctuated between 24.8 and 35.9 tons in the 20-year period 1999–2018. In 2018, the quantity manufactured worldwide stood at 35.9 tons (see figure 20). The main countries manufacturing significant quantities of dihydrocodeine continued to be Japan (12.7 tons, or 35.2 per cent of global manufacture), the United Kingdom (11.9 tons, or 33.1 per cent), Italy

Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

[17]Manufacturing losses are those occurring: *(a)* during the process of refining a drug; *(b)* during the process of transformation of a drug into its salts, isomers, esters and ethers, as applicable according to the Schedules; and *(c)* during the manufacture of preparations other than those included in Schedule III. They may also be due to the chemical decomposition of a drug, leakage, evaporation, quality requirements or accidents.

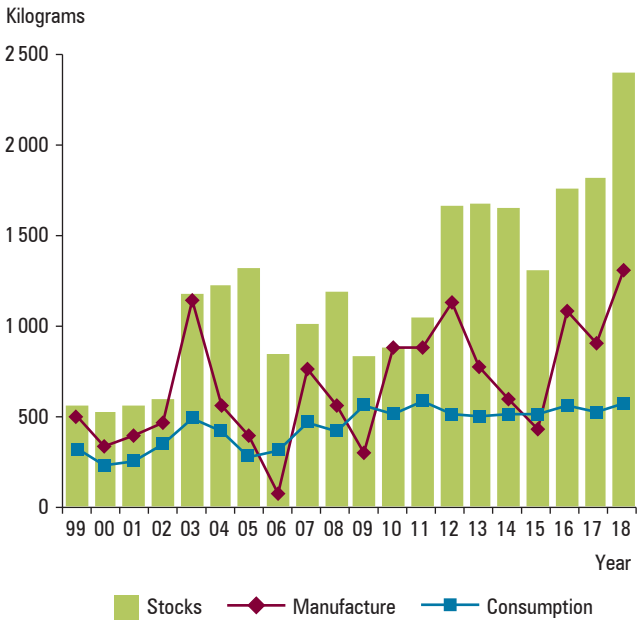
(6.3 tons, or 17.6 per cent), Hungary (1.4 tons, or 4.0 per cent) and Turkey (1.3 tons, or 3.5 per cent), which together accounted for 93.4 per cent of global manufacture in 2018. Global exports of dihydrocodeine amounted to 11.9 tons in 2018. The main country exporting dihydrocodeine was Italy (5.6 tons, or 47.4 per cent of global exports), followed by the United Kingdom (1.8 tons, or 15.4 per cent), Hungary (1.5 tons, or 13 per cent), Slovakia (1.4 tons, or 11.8 per cent), Belgium (0.6 ton, or 5.4 per cent), France (0.5 ton, or 4.5 per cent) and Turkey (0.2 ton, or 2.0 per cent). In 2018, the United Kingdom was the leading importing country for dihydrocodeine (4.7 tons, or 43.5 per cent of global imports). Other major importers were the Republic of Korea (3.4 tons, or 31.0 per cent), Colombia (0.7 ton, or 6.5 per cent), France (0.6 ton, or 5.9 per cent), and China and India (each with 0.4 ton, or 3.7 per cent).

62. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention, which accounted for 82 per cent of total consumption in 2018. That year, global manufacture of dihydrocodeine reached 35.9 tons. The main countries using dihydrocodeine were, in descending order of the amounts used, Japan, the Republic of Korea, and the United Kingdom; they each used more than 1 ton and together accounted for 86 per cent of the world total. In 2018, global stocks of dihydrocodeine amounted to 24.1 tons; major stocks were held in Japan (11.5 tons, or 47.8 per cent of global stocks), the United Kingdom (7.1 tons, or 29.6 per cent), the Republic of Korea (1.3 tons, or 5.3 per cent) and Italy (1.2 tons, or 4.8 per cent).

Ethylmorphine

63. The manufacture of ethylmorphine showed an overall downward trend over the 20-year period 1999–2018 and was stable at about 1 ton for several years. In 2018, global manufacture of ethylmorphine was 1.2 tons, well below the peak of 4.6 tons reached in 1997. France and Turkey were the only two countries manufacturing ethylmorphine in 2018. France manufactured 1.1 tons, accounting for 93.6 per cent of global manufacture, and Turkey manufactured 0.1 ton, or 6.4 per cent. France was also the leading exporting country (0.5 ton), accounting for over 86 per cent of global exports. The largest importer of ethylmorphine in 2018 was Sweden, which imported 0.3 ton, accounting for 54.6 per cent of global imports. Belgium imported 0.1 ton, or 25.7 per cent, while (in descending order) Poland, Finland and Hong Kong, China, each imported quantities of considerably less than 0.1 ton, or 9 per cent. About 88 per cent of global consumption of ethylmorphine is in the form of preparations listed in Schedule III of the 1961 Convention. Global consumption of ethylmorphine (consumption and utilization for the manufacture of preparations in Schedule III) reached 669.1 kg in 2018. The main countries consuming

Figure 21. Heroin: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

ethylmorphine in 2018 were Sweden, which consumed 323.3 kg, accounting for 48.3 per cent of global consumption, and Belgium, which consumed 156.9 kg, or 23.5 per cent. Less than 100 kg but more than 10 kg of ethylmorphine were consumed in (listed in descending order of the amount consumed) Hungary, France, Poland, India, Bulgaria and Hong Kong, China. In 2018, global stocks of ethylmorphine totalled 1.7 tons; the largest holders of stocks of more than 0.1 ton each, were (in descending order) France, India, Sweden, Belgium and Hungary, which together accounted for 90 per cent of global stocks, or 1.6 tons.

Heroin

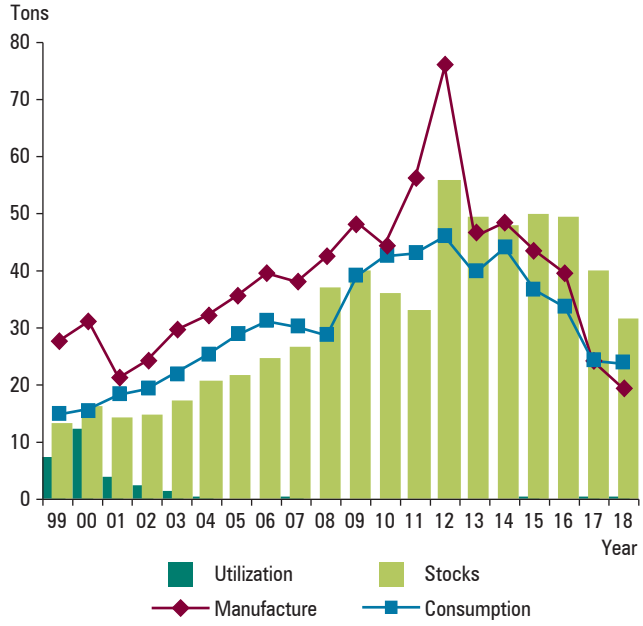
64. In the 20-year period 1999–2018, the licit manufacture of heroin averaged 700 kg, with peaks of over 1,000 kg in 2003, 2012, 2016 and 2018. In 2018, a total of 1,342.3 kg of heroin was manufactured, mostly by the United Kingdom (924.8 kg, or 68.9 per cent of global manufacture), Switzerland (374.9 kg, or 27.9 per cent) and Spain (42.6 kg, or 3.2 per cent) (see figure 21). The two main countries exporting heroin were the United Kingdom (313.0 kg, or 71.3 per cent of global exports) and Switzerland (118.3 kg, or 26.9 per cent). In 2018, the main importing country was the Netherlands (167 kg, or 38.4 per cent of global imports), followed by Switzerland (121.8 kg, or 28.0 per cent), Germany (54.4 kg, or 12.5 per cent), Denmark (39.3 kg, or 9.1 per cent), the United Kingdom (28.3 kg, or 6.5 per cent), Canada (16.5 kg, or 3.8 per cent) and Luxembourg (7.3 kg, or 1.7 per cent).

65. Global consumption of heroin remained relatively stable, at 579 kg, in 2018. Switzerland, where heroin is prescribed for individuals with long-term opiate dependence, reported heroin consumption of 281.8 kg for 2018 (accounting for 48.7 per cent of global consumption). Other countries that reported the controlled prescription of heroin to people with a history of long-term dependence in 2018 were the Netherlands (111.3 kg, or 19.2 per cent), Germany (110.9 kg, or 19.2 per cent), the United Kingdom (34.3 kg, or 5.9 per cent) and Denmark (28.3 kg, or 4.9 per cent). In the United Kingdom, heroin is also prescribed for the treatment of pain related to certain medical conditions. Global stocks of heroin reached 2,462.4 kg in 2018, the highest level ever. The countries holding significant stocks of heroin in 2018 were Switzerland (1,116.7 kg, or 45.4 per cent of global stocks), the United Kingdom (771.5 kg, or 31.3 per cent), the Netherlands (245.1 kg, or 10.0 per cent), Spain (241.4 kg, or 9.8 per cent), Denmark (47.4 kg, or 1.9 per cent) and Germany (33.3 kg, or 1.5 per cent).

Hydrocodone

66. In 2018, global manufacture of hydrocodone decreased to 19.4 tons, from 24.1 tons in the previous year, continuing the declining trend that started after the peak of 75.9 tons was reached in 2012 (see figure 22). The United States accounted for almost all (99.9 per cent) of global manufacture.

Figure 22. Hydrocodone: global manufacture, consumption, utilization[a] and stocks,[b,c] 1999–2018



[a]Utilization for the manufacture of other drugs.
[b]Stocks as at 31 December of each year.
[c]Considerable losses occur in the process of manufacturing this substance. This explains some gaps between the data for manufacture and the corresponding data for consumption and/or stocks, which are reflected in the figure.

67. Global consumption of hydrocodone continued to decline in 2018, reaching 23.5 tons, down from 24.2 tons in 2017. This continued decrease is related to the rescheduling of hydrocodone combination products in 2014 in the United States, where the number of prescriptions for liquid and tablet formulations declined. In 2018, the country with the highest consumption of hydrocodone continued to be the United States, with 23.3 tons, accounting for 99.1 per cent of global consumption. In the past, hydrocodone was used in the United States in the manufacture of thebaine for the purpose of manufacturing other narcotic drugs; no such use was reported after 2003, as direct extraction of thebaine from poppy straw gradually replaced the use of hydrocodone in the manufacture of thebaine after the late 1990s. While most of the consumption of hydrocodone took place in the United States, some quantities of hydrocodone were exported almost exclusively by the United States to China (77.7 per cent), Colombia (18.3 per cent), Canada (2.7 per cent), the Republic of Korea (0.9 per cent) and Guatemala (0.4 per cent). In 2018, global stocks of hydrocodone stood at 31.4 tons, 99.4 per cent of which was held by the United States.

Hydromorphone

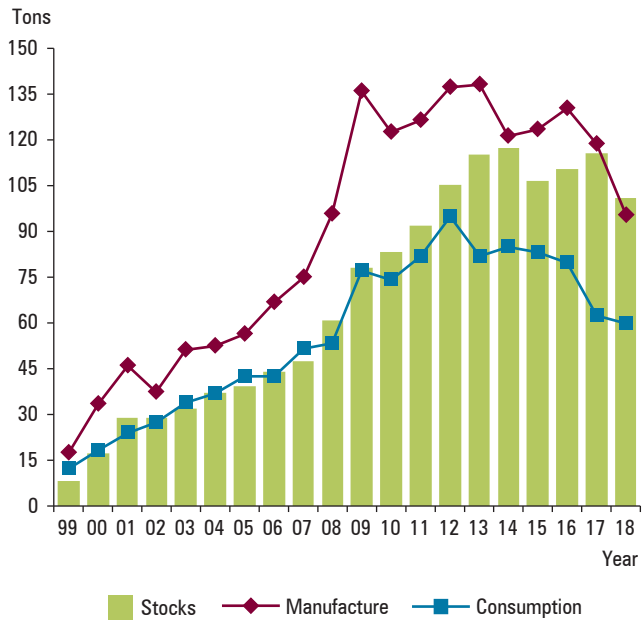
68. Global manufacture of hydromorphone increased sharply to 6.8 tons in 2013, the highest level ever recorded; it dropped to 5.1 tons in 2015 and then remained above that level, reaching 6.1 tons in 2018. The leading manufacturing countries in 2018 were the United Kingdom (2.8 tons, or 45.6 per cent of global manufacture), the United States (2.6 tons, or 42.0 per cent), Slovakia (0.6 ton, or 9.9 per cent) and Belgium (0.1 ton, or 1.5 per cent). Global exports of hydromorphone increased to 3.3 tons in 2018. The leading exporting countries were the United Kingdom (1.6 tons, or 49.7 per cent of global exports), Slovakia (0.6 ton, or 16.9 per cent), Switzerland (0.4 ton, or 11.1 per cent), Belgium (0.2 ton, or 5.8 per cent), Germany (0.2 ton, or 5.3 per cent), the United States (0.2 ton, or 5.2 per cent) and Italy (0.1 ton, or 3.6 per cent). In 2018, Canada continued to be the main importing country (1.3 tons, or 37.2 per cent); it was followed by Germany (1.1 tons, or 30.8 per cent), Switzerland (0.5 ton, or 13.1 per cent), Italy (0.2 ton, or 4.8 per cent) and Austria (0.2 ton, or 4.0 per cent).

69. In 2018, consumption of hydromorphone increased to 4.3 tons. The United States continued to be the main country consuming hydromorphone in 2018 (1.9 tons, or 44.9 per cent of global consumption); it was followed by Canada (1.0 ton, or 23.6 per cent) and Germany (0.9 ton, or 20.3 per cent). Global stocks of hydromorphone increased to 7.9 tons in 2018, of which 3.9 tons (or 49.5 per cent of global stocks) were held in the United States, 1.2 tons (or 15.2 per cent) were held in Canada and 0.8 ton (or 11.3 per cent) was held in the United Kingdom.

Oxycodone

70. Oxycodone is one of the drugs commonly associated with overdose deaths in relation to prescription drug abuse, in particular in North America. Global manufacture of oxycodone increased sharply until 2013, when it reached a record high of 138 tons. After a considerable decrease in 2014 and 2015, manufacture of oxycodone increased again in 2016, to 130.2 tons, but dropped in 2017 and again in 2018, when it reached 95.4 tons (see figure 23). The fluctuations in global manufacture of oxycodone in recent years may be attributable to stricter control measures introduced in some countries where the risk of overdose deaths and abuse of oxycodone is significant. In 2018, the United States accounted for 60.5 per cent of global manufacture of oxycodone, or 57.7 tons; it was followed by France (20.5 tons, or 19.6 per cent), the United Kingdom (11.5 tons, or 12 per cent), Hungary (5.6 tons, or 5.9 per cent) and Japan (0.8 ton, or 0.8 per cent). In 2018, exports of oxycodone increased to a record high level of 41.1 tons. That increase was attributable mainly to the United Kingdom, which continued to be the main exporting country in 2018 (17.7 tons, or 43 per cent of global exports); it was followed by the United States (8.6 tons, or 21 per cent), Switzerland (4.7 tons, or 11.5 per cent), France (2.2 tons, or 5.3 per cent), Bulgaria (1.8 tons, or 4.5 per cent), the Netherlands (1.5 tons, or 3.6 per cent), Germany (1.4 tons, or 3.4 per cent) and Austria (1.3 tons, or 3.1 per cent). The main importing countries were the United Kingdom (8.6 tons, or 21.1 per cent of global imports), Germany (5.7 tons, or 14 per cent), Switzerland (4.2 tons, or 10.2 per cent), Canada (2.5 tons, or 6.1 per cent) and Bulgaria and France (each with 2.3 tons, or 5.7 per cent). Further details on exports and imports of oxycodone are contained in annex IV, tables 3 and 4.

Figure 23. Oxycodone: global manufacture, consumption and stocks,[a,b] 1999–2018



[a]Stocks as at 31 December of each year.

[c]Considerable losses occur in the process of manufacturing this substance. This explains some gaps between the data for manufacture and the corresponding data for consumption and/or stocks, which are reflected in the figure.

71. In line with the decrease in its manufacture in 2018, global consumption of oxycodone also decreased, from 62.6 tons in 2017 to 59.8 tons in 2018. Consumption of oxycodone was concentrated in the United States (37.9 tons, or 63.4 per cent of the world total). Other major countries consuming oxycodone in 2018 were, in descending order of the amounts consumed, Germany (3.5 tons, or 5.8 per cent of the world total) Canada (3.0 tons, or 5.8 per cent), Australia (3.0 tons, or 5.0 per cent), the United Kingdom (1.7 tons, or 2.8 per cent), France (1.6 tons, or 2.7 per cent), China (1.2 tons, or 2 per cent) and Spain (1.0 ton, or 1.7 per cent). Global stocks of oxycodone reached 100.1 tons, with the United States holding 61.6 tons, or 61.1 per cent of the world total.

Pholcodine

72. During the 20-year period 1999–2018, pholcodine manufacture and consumption were characterized by a volatile trend. Global manufacture dropped from its peak, 13 tons in 2012, to 7 tons in 2015, before increasing to 9 tons in 2017 and decreasing to its lowest level, 4 tons, in 2018 (see figure 24). The fluctuations may be related to concerns that the use of pholcodine puts people at risk of developing anaphylaxis (severe allergic reactions) to neuromuscular blocking agents used during surgery. In some countries, those concerns have led to the withdrawal of pholcodine from the market. However, a review carried out in 2012 by the European Medicines Agency concluded that the evidence for such a risk was weak and that it was outweighed by the benefits of pholcodine. The Agency therefore recommended that all marketing authorizations for medicines containing pholcodine should be maintained throughout the European Union. In 2015, renewed concerns were raised by anaesthetists in Australia and New Zealand, who campaigned for cough medicines containing pholcodine to become prescription-only products. The main manufacturing countries in 2018 were France (2.3 tons, or 58.6 per cent of global manufacture), Norway (0.6 ton, or 15.6 per cent) and the United Kingdom (0.5 ton, or 11.9 per cent). Global exports of pholcodine decreased from 8 tons in 2017 to 7 tons in 2018. Those exports, in 2018, originated mostly in France (2.9 tons, or 41.4 per cent of global exports), Norway (1.5 tons, or 20.9 per cent), Hungary (1.2 tons, or 16.7 per cent) and Italy (0.9 ton, or 12.5 per cent). The main destinations were Hong Kong, China (2.5 tons, or 47.5 per cent of global imports), Italy (0.8 ton, or 15.2 per cent), Australia (0.7 ton, or 14.1 per cent), Pakistan (0.4 ton, or 6.8 per cent) and

the United Kingdom (0.2 ton, or 4.5 per cent). Further details on exports and imports of pholcodine are provided in annex IV, tables 3 and 4.

73. In 2018, global consumption of pholcodine (consumption and utilization for the manufacture of preparations in Schedule III of the 1961 Convention) stood at 6.7 tons. In 2018, consumption of pholcodine was mainly accounted for by Hong Kong, China (2.6 tons, or 38.3 per cent), Italy (1.0 ton, or 14.4 per cent) and Australia (0.7 ton, or 10.1 per cent). In 2018, global stocks of pholcodine stood at 6.2 tons. Major stocks were held by Hong Kong, China (1.6 tons, or 25.6 per cent), the United Kingdom (1.3 tons, or 21.1 per cent), Slovakia (0.7 ton, or 11.3 per cent), Hungary (0.6 ton, or 9.7 per cent) and China (0.4 ton, or 6.5 per cent).

Synthetic opioids

74. Synthetic opioids are used in the treatment of chronic, moderate and severe pain. They are also used for the induction of general anaesthesia and in the treatment of specific conditions such as gastrointestinal disorders. In addition, methadone is used in treatment related to drug dependence.

Dextropropoxyphene

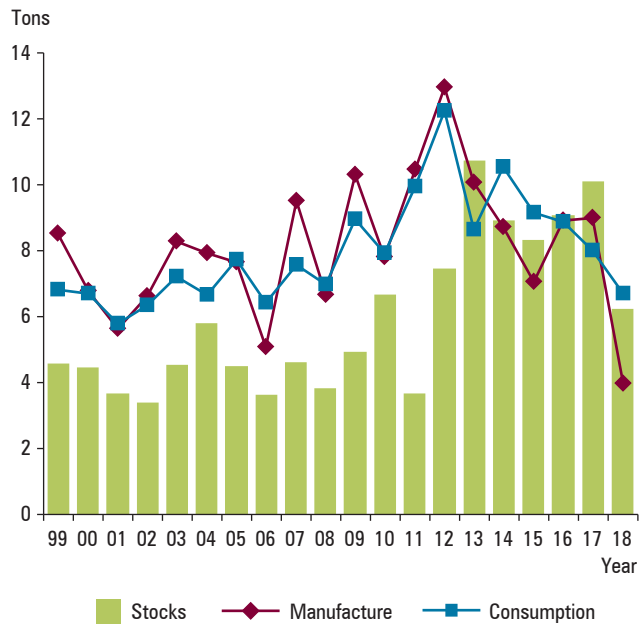
75. Global manufacture of dextropropoxyphene followed a downward trend from 2005, when 314 tons were manufactured, to 2014, when there was no reported manufacture of that substance. Global manufacture continued to be nil or negligible in the years that followed. The decline is attributable to the fact that the substance has been banned in several countries owing to concerns over serious side effects.

Diphenoxylate

76. Diphenoxylate is used mostly as an antidiarrhoeal agent. It works by decreasing bowel activity. Global manufacture of diphenoxylate increased after 2003, reaching a peak of 24.2 tons in 2011, but dropped afterwards, reaching a low of 4.6 tons in 2018 (see figure 25). Most of the drop in manufacture of diphenoxylate over the period 2011–2018 may be attributable to regulatory measures introduced in India following concerns related to its potential abuse. In 2018, global manufacture of diphenoxylate decreased to 4.6 tons; the main countries manufacturing the substance were India (2.4 tons, or 52.6 per cent), China (1.5 tons, or 32.3 per cent) and the United States (0.7 ton, or 15.2 per cent). India was also the leading exporter of diphenoxylate (1.0 ton, or 88.7 per cent of global exports). The main importing country in 2018 was Pakistan (0.4 ton, or 50.1 per cent of global imports), followed by the Islamic Republic of Iran (0.2 ton, or 27.3 per cent).

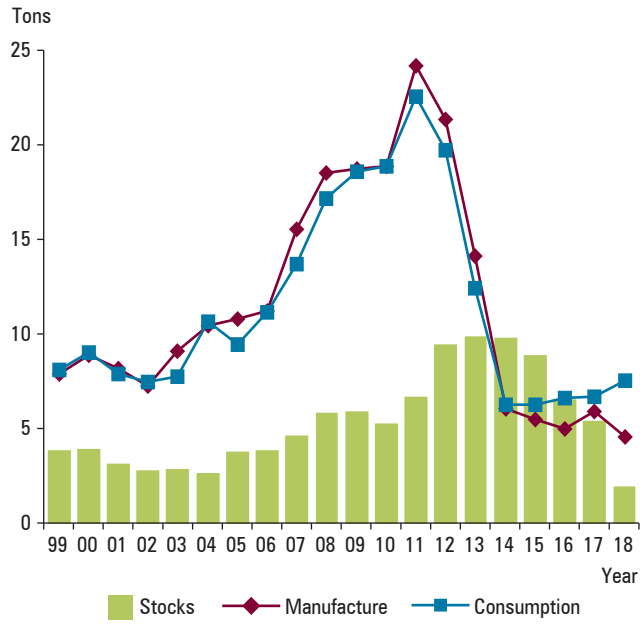
77. Diphenoxylate was consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (99.8 per cent of total consumption in 2018). Global utilization of diphenoxylate in 2018 reached 7.6 tons. The countries reporting the highest utilization (consumption and the utilization of diphenoxylate for the manufacture of preparations

Figure 24. Pholcodine: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

Figure 25. Diphenoxylate: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

in Schedule III) in 2018 were India (4.6 tons, or 61.2 per cent of global utilization), China (1.8 tons, or 23.4 per cent) and the United States (0.8 ton, or 10.6 per cent). In 2018, global stocks of diphenoxylate decreased to 2.0 tons, the majority of which were held by India (1.0 ton, or 51.1 per cent), followed by China (0.8 ton, or 40 per cent).

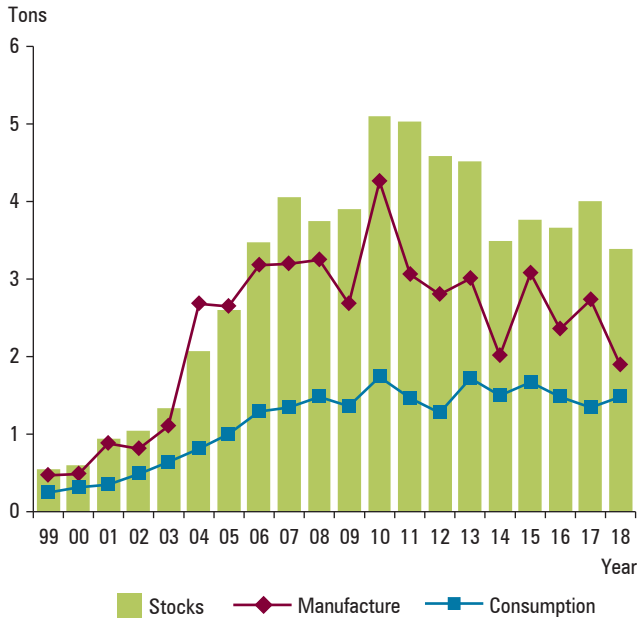
Fentanyl

78. Fentanyl, when used as an analgesic, is about 100 times as potent as morphine and therefore used only in very small doses (for example, 0.005–0.1 mg in injectable form). Until the 1980s, fentanyl was used mainly for the induction of anaesthesia and, in combination with other substances, for balanced anaesthesia in short-term surgical interventions. Since the early 1990s, however, controlled-release preparations (patches) of fentanyl and new delivery methods, including a sublingual spray for cancer patients, have been increasingly used in all parts of the world for the treatment of severe pain.

79. Global manufacture of fentanyl increased rapidly in the period 1999–2010, reaching a record level of 4.3 tons in 2010. It then decreased to 2.0 tons in 2014. After that, it fluctuated and then decreased sharply to 1.9 tons in 2018 (see figure 26). In 2018, fentanyl was mainly manufactured by the United States (740.7 kg, or 39.1 per cent of global manufacture), followed by Germany (548.3 kg, or 28.9 per cent), South Africa (238.4 kg, or 12.6 per cent), Belgium (229.8 kg, or 12.1 per cent) and the United Kingdom (94.7 kg, or 5.0 per cent). The principal exporting countries were Germany (417.1 kg, or 44.6 per cent of global exports), Belgium (241.7 kg, or 25.9 per cent), the United States (90.7 kg, or 9.7 per cent) and the United Kingdom (64.3 kg, or 6.9 per cent). Germany was also the principal importing country for fentanyl in 2018 (434.7 kg, or 35.5 per cent of global imports); it was followed by Spain (125.1 kg, or 10.2 per cent), the United Kingdom (111.2 kg, or 9.1 per cent), France (73.9 kg, or 6.0 per cent), Italy (54.6 kg, or 4.5 per cent) and the Netherlands (53.2 kg, or 4.3 per cent). Further details on exports and imports of fentanyl are contained in annex IV, tables 3 and 4.

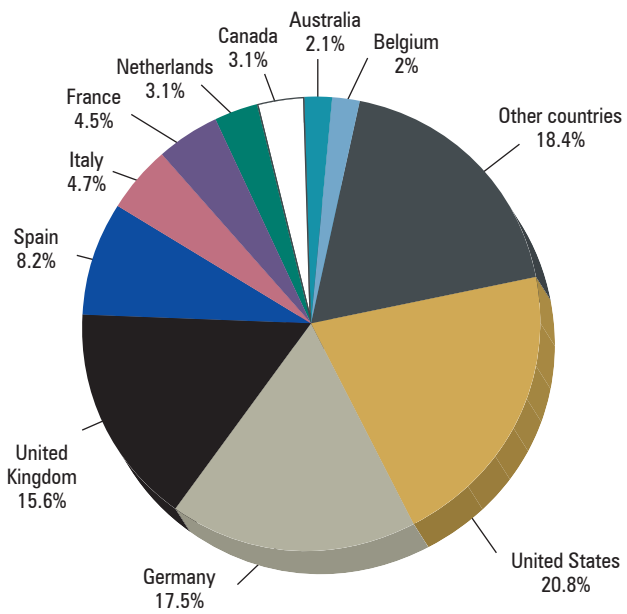
80. Since 2005, global consumption of fentanyl has fluctuated between 1.0 and 1.7 tons. In 2018, it amounted to 1.5 tons. The downward trend following 2013, when a peak of 1.7 tons was reached, may reflect concerns about the increase in the number of overdose deaths attributed to abuse of fentanyl or fentanyl-type substances, mainly in North America. Even though, in many cases, the substances causing overdose deaths are illicitly manufactured and trafficked and not necessarily diverted from licitly prescribed medications, national authorities have placed further restrictions on the prescription of fentanyl. In 2018, most of the consumption of fentanyl (81.7 per cent) was concentrated in 10 countries, all of which were high-income countries (see figure 27). The three largest consumers of fentanyl were the United States (accounting for 20.8 per cent of global consumption, or 307.9 kg), Germany (17.6 per cent, or 259.4 kg) and the United Kingdom (15.6 per cent, or 230.6 kg). Other major consumers of fentanyl were, in descending order of the amounts consumed, Spain, Italy, France, the Netherlands, Canada, Australia and Belgium.

Figure 26. Fentanyl: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

Figure 27. Fentanyl: distribution of consumption, 2018



81. In 2018, the level of global stocks of fentanyl was 3.4 tons, below the level of 2017 (4.0 tons) and significantly below the peak reached in 2010 (5.1 tons). The largest stocks of fentanyl were held by the United States (accounting for 32.8 per cent of global stocks, or 1.1 tons), Germany (32.4 per cent, or 1.1 tons) and Belgium (12.4 per cent, or 0.4 ton).

Fentanyl analogues

82. The fentanyl analogues alfentanil, remifentanil and sufentanil are used mainly as anaesthetics.

Alfentanil

83. The manufacture of alfentanil has fluctuated significantly in the past 20 years. In 2009, global manufacture of alfentanil reached 5.6 kg, its lowest level; and in 2012, it peaked at 78.3 kg. Global manufacture more than tripled in 2015, when it reached 51.2 kg (compared with 15.2 kg in 2014), and then dropped to 17.2 kg in 2016; has after that, stabilized, reaching 17.9 kg in 2018. The only manufacturers of alfentanil in 2018 were Slovakia (16 kg, or 89.4 per cent of global manufacture) and the United States (1.9 kg, or 10.6 per cent).

84. In 2018, global consumption of alfentanil (22.0 kg) increased compared with the level of 2017 (19.3 kg). The United Kingdom was the main country consuming the substance (11.8 kg, or 53.6 per cent of global consumption); it was followed by Italy (2.6 kg, or 12 per cent), Germany (2.3 kg, or 10.3 per cent), France (1.2 kg, or 5.4 per cent) and the United States (0.5 kg, or 2.2 per cent). Detailed information on the consumption of fentanyl analogues is provided in table XIII.1. In the period 2015–2018, global stocks of alfentanil decreased by more than 65 per cent, from 183.2 kg in 2015 to 62.0 kg in 2018. Stocks of alfentanil were held mainly by Belgium (27.8 kg, or 44.8 per cent of global stocks), followed by Germany (9.9 kg, or 16.0 per cent), Italy (7.7 kg, or 12.4 per cent), the United States (6.5 kg, or 10.5 per cent) and the United Kingdom (5.9 kg, or 9.6 per cent).

Remifentanil

85. Remifentanil is a potent, short-acting synthetic opioid analgesic given to patients during surgery to relieve pain and as an adjunct to an anaesthetic. It is approximately twice as potent as fentanyl, and 100–200 times as potent as morphine. In 2002, 27.4 kg of remifentanil were manufactured. Since then, its manufacture has fluctuated considerably. In 2018, global manufacture of remifentanil reached a peak of 141.1 kg, attributable to a considerable increase in the level of manufacture in China. In 2018, the main manufacturing country was China (41.1 kg, or 32.0 per cent of global manufacture); it was followed by Spain (19.7 kg, or 14.0 per cent), South Africa (16.7 kg, or 11.8 per cent), Germany (15.7 kg, or 11.1 per cent) and Argentina (15.0 kg, or 10.6 per cent). The main exporting countries were, in descending order, Italy, Spain, Serbia, China and the United Kingdom; their remifentanil exports together amounted to 46.7 kg, accounting for 78 per cent of global exports of that substance. Germany was the main importing country (10.4 kg, or 17.1 per cent of global imports); it was followed by Japan (7.8 kg, or 12.9 per cent), France (5.5 kg, or 9.1 per cent), the Republic of Korea (3.8 kg, or 6.2 per cent) and Serbia (3.3 kg, or 5.5 per cent). Despite the increase in its manufacture, global consumption of remifentanil decreased from 92.4 kg in 2017 to 79.7 kg in 2018. The main countries consuming remifentanil were China (12.4 kg, or 15.5 per cent of global consumption), Germany (9.2 kg, or 11.6 per cent), Japan (7.7 kg, or 9.6 per cent), Italy (7.5 kg, or 9.5 per cent), Spain (6.9 kg, or 8.7 per cent) and Argentina (6.5 kg, or 8.1 per cent). In 2018, global stocks of remifentanil increased to 173.1 kg, compared with 135.5 kg in 2017. The largest stocks were held by China (48.1 kg, or 27.8 per cent of global stocks), Italy (34.0 kg, or 19.9 per cent), Germany (16.8 kg, or 9.7 per cent), Belgium (13.2 kg, or 7.6 per cent) and the United Kingdom (13.0 kg, or 7.5 per cent).

Sufentanil

86. In 2018, global manufacture of sufentanil increased by more than half to 9.7 kg from 4.0 kg in 2017. The only countries manufacturing sufentanil were China (6.7 kg, or 68.9 per cent of global manufacture), Slovakia (2.5 kg, or 25.7 per cent) and the United Kingdom (0.5 kg, or 5.4 per cent). The main exporting countries were Slovakia (1.6 kg, or 40.0 per cent of global exports), Belgium (0.9 kg, or 23.1 per cent) and the United Kingdom (0.4 kg, or 9.2 per cent). In 2018, global consumption of sufentanil increased slightly, reaching 4.8 kg. Consumption of sufentanil was concentrated, in descending order of the amounts consumed, in China, Germany, France, Italy and the United States, which together consumed 4.3 kg of the substance, accounting for 88.2 per cent of global consumption. In 2018, global stocks of sufentanil increased to 25.8 kg, the second highest level ever recorded, most of which were held by China (13.0 kg, or 50.2 per cent of global stocks), the United States (5.4 kg, or 21.0 per cent), Slovakia (2.4 kg, or 9.1 per cent), Germany (1.8 kg, or 6.9 per cent) and Belgium (1.3 kg, or 4.9 per cent).

Ketobemidone

87. Ketobemidone is a powerful opioid analgesic with an effectiveness against pain similar to morphine. Its

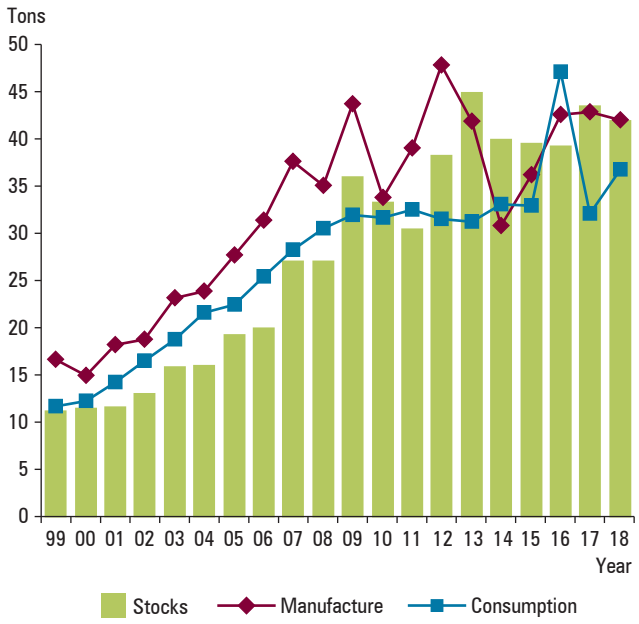
manufacture and use are concentrated in a small number of countries in Europe. Overall, its manufacture has been very volatile: in 2015, global manufacture of ketobemidone stood at 365.9 kg; in 2016 and 2017, there was no reported manufacture of the substance; in 2018, however, its manufacture surged, reaching 279.8 kg. Global stocks of ketobemidone decreased after 2015, falling from 196.2 to 97.6 kg in 2017, but then increased in 2018 to 269.2 kg, the highest level recorded in 10 years. Germany held stocks of ketobemidone amounting to 242.7 kg, accounting for 90.2 per cent of global stocks. In 2018, global exports of ketobemidone amounted to only 34.5 kg, the lowest level registered in 20 years. The substance was exported mainly by Germany (26.1 kg, or 75.7 per cent of global exports) and France (7.5 kg, or 21.6 per cent).

Methadone

88. Methadone, together with buprenorphine (which is controlled under the 1971 Convention), is sometimes used for pain management, but it is primarily used in the treatment of opioid dependence. As shown in figure 28, the trends related to its consumption, manufacture and stocks show a steady increase over the 20-year period 1999–2018, albeit with some fluctuations. The manufacture of methadone remained relatively stable, at 42 tons, in 2018. The main manufacturing countries were the United States (20.4 tons, or 48.6 per cent of global manufacture) and Switzerland (15.1 tons, or 36.0 per cent), followed by Germany (2.6 tons, or 6.1 per cent), Spain (1.6 tons, or 4.0 per cent), India (1.6 tons, or 3.7 per cent), China (1.2 tons, or 2.9 per cent) and Slovakia (1.1 tons, or 2.7 per cent). A smaller quantity of methadone, accounting for less than 1 per cent of global manufacture, was manufactured in 2018 by the following countries, in descending order of the amount manufactured: United Kingdom, North Macedonia, Italy and Norway. In 2018, Switzerland continued to be the main exporter of methadone (13.2 tons, or 64.9 per cent of global exports); it was followed by India (1.7 tons, or 8.2 per cent), the United States (1.2 tons, or 5.9 per cent), Slovakia and the Netherlands (each with 0.8 ton, or 4.1 per cent) and Italy (0.6 ton, or 3.1 per cent). The main importing countries were the United Kingdom (2.6 tons, or 12.5 per cent of global imports), Italy and Myanmar (each with 2.0 tons, or 9.7 per cent), Germany (1.4 tons, or 6.8 per cent), France and Canada (each with 1.4 tons, or 6.7 per cent), the Netherlands (1.3 tons, or 6.6 per cent) and Viet Nam (1.2 tons, or 5.9 per cent).

89. Consumption of methadone was concentrated in a few countries, and there were large differences in global consumption patterns. Global consumption stood at 36.7 tons in 2018, an increase from the level of 32.1 tons in 2017. The main countries consuming methadone were the United States (14.8 tons, or 40.4 per cent of global consumption), followed by the Islamic Republic of Iran (5.4 tons, or 14.7 per cent), Canada (1.9 tons, or 5.3 per cent), Viet Nam (1.8 tons, or 4.9 per cent), Germany (1.5 tons, or 4.1 per cent), Italy (1.2 tons, or 3.3 per cent) and Australia and France (each accounting for 1.2 tons, or 3.2 per cent). In most cases, the different levels of consumption were related to the proportion of the population accounted for by people who inject drugs. In some cases, though there were a number of people who injected drugs, little or no methadone (and buprenorphine) seemed to be consumed and few, if any, opiate substitution treatment services seemed to be available.

Figure 28. Methadone: global manufacture, consumption and stocks,[a] 1999–2018



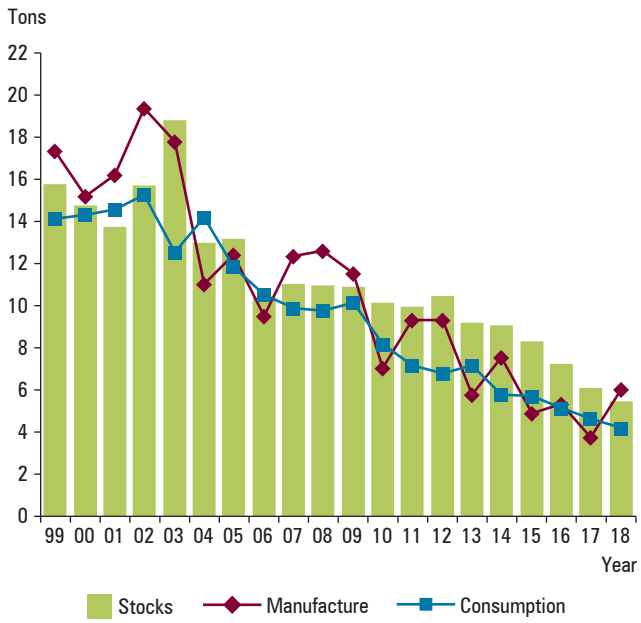
[a]Stocks as at 31 December of each year.

90. Global stocks of methadone amounted to 42.1 tons, held mainly by the United States (18.0 tons, or 42.9 per cent of global stocks), Switzerland (8.2 tons, or 19.4 per cent) and Germany (3.1 tons, or 7.5 per cent). Other countries holding stocks of more than one ton were, in descending order, Spain, Canada, Italy, France and the United Kingdom; their stocks together accounted for 16.1 per cent of global stocks of methadone.

Pethidine

91. The manufacture of pethidine has continued to fluctuate in the past 20 years. Global manufacture amounted to 6.1 tons in 2018 (see figure 29). Consumption of pethidine reached its highest level, 15.3 tons, in 2002 and then decreased steadily, reaching its lowest level, 4.2 tons, in 2018. Pethidine is used mostly for pain relief in childbirth. The

Figure 29. Pethidine: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

decrease in consumption is attributable to several factors, such as its low potency, short duration of action and unique toxicity (i.e. seizures, delirium and other neuropsychological effects), compared with other available opioid analgesics. It is considered an effective analgesic for acute pain but not useful for chronic pain. For these reasons, several countries have placed strict limits on its use, but some physicians continue to use it as a strong first-line opioid.

92. In 2018, manufacture of pethidine was concentrated in Spain (3,147 kg, or 52.0 per cent of global manufacture), Slovakia (2,250.9 kg, or 37.2 per cent), Germany (377.9 kg, or 6.2 per cent) and India (269.3 kg, or 4.5 per cent). The main exporting country was Spain (2,367.3 kg, or 44.6 per cent of global exports), followed by Slovakia (1,767.1 kg, or 33.3 per cent), India (276.3 kg, or 5.2 per cent) and the United Kingdom (270.3 kg, or 5.1 per cent). The main countries importing pethidine were the United Kingdom (925.4 kg, or 21.1 per cent of global imports), Brazil (426.7 kg, or 9.7 per cent), Austria (261 kg, or 6.0 per cent), Turkey (233.9 kg, or 5.3 per cent), the Islamic Republic of Iran (217.5 kg, or 5.0 per cent), Germany (209.9 kg, or 4.8 per cent) and India (174.2 kg, or 4.0 per cent). Further details on exports and imports of pethidine are contained in annex IV, tables 3 and 4.

93. Pethidine consumption amounted to 4.2 tons in 2018. The main countries consuming pethidine were the United States (997.7 kg, or 23.7 per cent of global consumption) and China (536 kg, or 12.7 per cent). Other countries consumed smaller quantities; those countries included, in descending order of the amounts consumed, Turkey, the Islamic Republic of Iran, South Africa, Canada, the Republic of Korea, Spain, the United Kingdom and Germany. As a consequence of the overall decline in manufacture and consumption, global stocks of pethidine also continued to decline, reaching 5.4 tons in 2018. The largest stocks were held by Slovakia (870.5 kg, or 16.0 per cent of global stocks), Spain (684.4 kg, or 12.6 per cent), Germany (616.9 kg, or 11.4 per cent), the United States (569 kg, or 10.5 per cent), South Africa (352.4 kg, or 6.5 per cent) and Canada (295.5 kg, or 5.4 per cent).

Tilidine

94. In 2018, as in previous years, Germany was the only manufacturer of tilidine. Manufacture continued to fluctuate, amounting to 27.0 tons in 2018, almost half of the level in 2017, 50.4 tons. Exports of tilidine increased to 64.2 tons in 2018 from 52.6 tons in 2017. As the sole manufacturer, Germany also continued to be the principal exporting country in 2018, accounting for 54.3 per cent of global exports. That represents a considerable reduction from the level of 2012, when Germany accounted for 98 per cent of global exports. Serbia was the second largest exporter of tilidine in 2018, accounting for 45.4 per cent of all reported exports of that substance.

95. After reaching a record level of 59.1 tons in 2012, consumption of tilidine dropped to 20.0 tons in 2013, but rose gradually, to 46.4 tons in 2018. Tilidine is mostly consumed in Germany (44.8 tons, or 96.5 per cent of global consumption), followed by Belgium (1.5 tons, or 3.2 per cent). In 2018, nearly all stocks of tilidine were held by Germany (41.7 tons, or 88.2 per cent of global stocks).

Trimeperidine

96. Before 2012, global manufacture of trimeperidine had fluctuated considerably for a number of years; from 2012 to 2018, it was more or less stable, at about 200 kg. In 2018, global manufacture stood at 253 kg. The only manufacturers of trimeperidine were the Russian Federation (133.6 kg, or 52.8 per cent of global manufacture) and India (119.5 kg, or 47.2 per cent). Trimeperidine was discovered around 1945 in the former Union of Soviet Socialist Republics (USSR) and, for many years, its consumption was concentrated there.

97. In 2018, the only exporters of trimeperidine were Latvia (52.3 kg, or 61.0 per cent of global exports), followed by Slovakia (13.7 kg, or 16.0 per cent), Czechia (10.6 kg, or 12.3 per cent), the Russian Federation (6.3 kg, or 7.4 per cent) and Ukraine (2.8 kg, or 3.3 per cent). The main importing countries in 2018 were the Russian Federation

(accounting for 47.3 per cent of global imports), Slovakia (23.6 per cent), Latvia (7.4 per cent), Kazakhstan (6.7 per cent), Czechia (5.7 per cent) and Uzbekistan (3.8 per cent). In 2018, global stocks of trimeperidine amounted to 330.6 kg; they were held mainly by the Russian Federation (227.0 kg, or 68.7 per cent of global stocks), Slovakia (45.3 kg, or 13.7 per cent), Kazakhstan (16.9 kg, or 5.1 per cent) and Ukraine (12.0 kg, or 3.6 per cent). Stocks of trimeperidine accounting for between 1 and 2 per cent of global stocks were held, in descending order of the amounts held, by Latvia, Belarus, India and Uzbekistan.

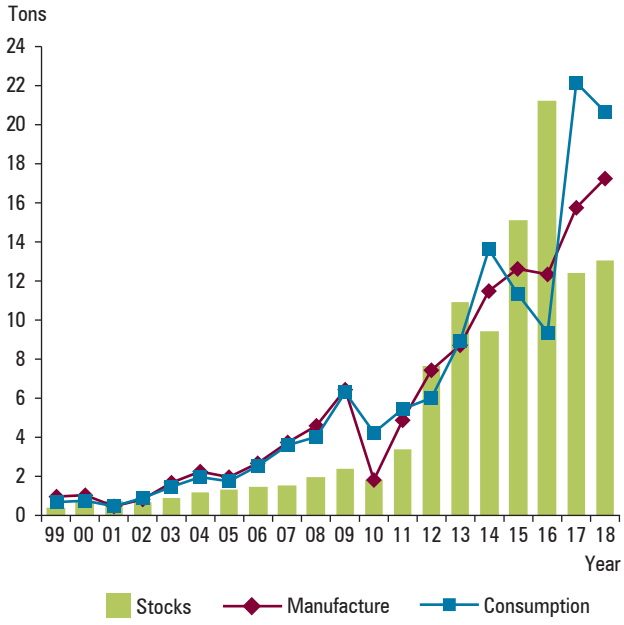
Opioid analgesics controlled under the 1971 Convention

98. Buprenorphine and pentazocine are opioid analgesics controlled under the 1971 Convention. Brief information on these opioids is included in the present publication; more detailed comments on statistics on buprenorphine and pentazocine can be found in the INCB technical report on psychotropic substances.[18]

Buprenorphine

99. Buprenorphine is an opioid agonist used as an analgesic and in detoxification and substitution treatment for opioid dependence. Buprenorphine produces effects similar to other opioids, but not as strong as those of heroin. For that reason, buprenorphine is used to produce a sufficient agonist effect to enable opioid-dependent individuals to discontinue the misuse of opioids without experiencing withdrawal symptoms. After the late 1990s, global manufacture of buprenorphine steadily increased (with the exception of 2010, when there was a sharp decrease), reaching a peak of 12.6 tons in 2015. Manufacture remained stable in 2016, at 12.4 tons, before increasing to 15.8 tons in 2017 and to 17.2 tons in 2018 (see figure 31). The only countries manufacturing buprenorphine in 2018 were the United Kingdom (11.9 tons, or 68.7 per cent of global manufacture), the United States (2.5 tons, or 14.6 per cent), Czechia (1.2 tons, or 7.2 per cent), Germany (0.8 ton, or 4.6 per cent), Switzerland (0.5 ton, or 2.9 per cent), India (0.3 ton, or 1.5 per cent) and Belgium (0.1 ton, or 0.5 per cent). In 2018, the main exporters were, in descending order of the amounts exported, Czechia, Germany, the United States, Switzerland, Belgium, France and India. The main countries importing buprenorphine in 2018 were, in descending order of the amounts imported, the United States, France, Germany, Switzerland, Canada, Italy, Spain, Poland, Austria, Sweden and the Netherlands.

Figure 30. Buprenorphine: calculated global consumption,[a] reported manufacture and stocks,[b] 1999–2018



[a]Approximate calculated global consumption, determined on the basis of statistical data submitted by Governments.

[b]Stocks as at 31 December of each year; data are provided on a voluntary basis and may therefore be incomplete.

Pentazocine

100. Pentazocine is an opioid analgesic with properties and uses similar to those of morphine. In 2018, global manufacture of pentazocine increased to 4.4 tons; the substance was mainly manufactured in India (3,515.6 kg, or 79.7 per cent of global manufacture) and Italy (892.7 kg, or 20.3 per cent). India was also the world's leading exporter of pentazocine in 2018 (1,097.65 kg, or 86.0 per cent of global exports); it was followed by Italy (177.8 kg, or 13.9 per cent). The main importers were Nigeria (1,021.1 kg, or 78.2 per cent of global imports), the United States (63.6 kg, or 4.9 per cent), Japan (60.1 kg, or 4.6 per cent), Portugal (53 kg, or 4.1 per cent), Pakistan (47.1 kg, or 3.6 per cent) and Canada (25.4 kg, or 1.9 per cent).

[18]E/INCB/2019/3.

Cannabis

101. The licit use of cannabis for medical and scientific purposes has been increasing considerably since 2000. Before 2000, licit use was restricted to scientific research and was reported only by the United States. Since 2000, more countries have started to use cannabis and cannabis extracts[19] for medical purposes, as well as for scientific research. In the 20-year period 1999–2018, global production of cannabis increased, from 1.1 tons in 1999 to 289.5 tons in 2018, reaching the second highest level of production after the peak of 2017 (408.5 tons). The considerable decrease registered in 2018 is probably attributable to the fact that some major producing countries did not provide information. Since the licit cultivation of cannabis to be used for medical and scientific purposes has increased considerably in recent years and the yield and manufacturing processes are not standardized, some data are being clarified with the relevant Governments in order to ensure consistency. In 2018, the United Kingdom was the main producer of cannabis, reporting the production of 289.5 tons (or 75.0 per cent of global production) of pharmaceutical preparations containing cannabis extracts; it was followed by Lesotho (30.7 tons, or 10.6 per cent of global production), Israel (20.8 tons, or 7.2 per cent) and the Netherlands (10.2 tons, or 3.5 per cent). Other countries produced less than 5 tons each. Those countries were, in descending order by the amount produced, North Macedonia, Spain, Australia, Colombia, Austria, the United States, Switzerland, New Zealand and Czechia (see the table below). The production figures presented below are reported as received and it should be noted that, in the extraction of cannabinoids from the cannabis plant, there may be large variations in the quantities used, owing to the different processes employed.

102. The United Kingdom continued to be the main exporter of cannabis (19.7 tons, or 77.8 per cent of global exports), mainly in the form of cannabis extracts or pharmaceutical preparations containing cannabis extracts; it was followed by the Netherlands (3.0 tons, or 11.9 per cent), Canada (1.8 tons, or 6.9 per cent) and Austria and Germany (each with 0.4 ton, or 1.4 per cent). A number of other countries each reported exports accounting for less than 1 per cent of the world total; those countries were, in descending order, Denmark, Australia, Belgium, Spain, Bhutan, Jamaica, the United States, France, Slovenia, Italy and Switzerland. In 2018, the United States imported 15.7 tons of cannabis, accounting for 54.9 per cent of global imports; it was followed by Germany (7.6 tons, or 26.7 per cent), Uruguay (1.3 tons, or 4.5 per cent), Italy (1.1 tons, or 3.8 per cent) and Australia (1.0 ton, or 3.4 per cent). The countries that each reported cannabis imports accounting for up to 1 per cent of global imports were, in descending order, Spain, Denmark, Belgium, Finland, Canada, Austria, Switzerland, the United Kingdom, Norway, Israel, France and the Netherlands. Most cannabis stocks were held by the United Kingdom (189.3 tons, or 92.2 per cent of global stocks), followed by North Macedonia (3.5 tons, or 1.7 per cent), the Netherlands (3.2 tons, or 1.6 per cent), Israel (2.4 tons, or 1.2 per cent) and Chile (2.3 tons, or 1.1 per cent). A number of countries each held stocks accounting for less than 1 per cent of global stocks; those countries were, in descending order, the United States, France, Australia, Germany, Uruguay, Switzerland, Czechia, Denmark and Belgium.

Table. Cultivation of cannabis plant and production of cannabis, 2015–2018

Country[a]	Year	Area harvested (hectares)	Quantity produced (kilograms)
Australia	2015	n/a	n/a
	2016	n/a	n/a
	2017	. .[b]	224
	2018	. .[b]	958
Austria	2015	0.04	59
	2016	0.09	116
	2017	. .	259
	2018	1.00	362
Canada	2015	. .	48 491
	2016	10.74	80 816
	2017	20.20	131 437
	2018	. .	. .
Chile	2015	. .	36
	2016	1.00	1 416
	2017	1.00	444
	2018	. .	. .
Colombia	2015	n/a	n/a
	2016	n/a	n/a
	2017	0.36[c]	. .
	2018	0.63	887
Czechia[d]	2015	n/a	n/a
	2016	. .	46
	2017	. .	95
	2018	. .	5
Israel	2015	7.45	7 758
	2016	8.45	9 263
	2017	9.03	10 424
	2018	18.00	20 786
Italy	2015	. .	. .
	2016	. .	315
	2017	. .	60
	2018	. .	. .
Japan	2015	0.57	. .
	2016	0.58	. .
	2017	0.05	. .
	2018	0.02	. .

[19] In statistical reports to INCB, data on cannabis extracts are expressed in terms of cannabis, using the conversion factors published by INCB in the list of narcotic drugs under international control ("yellow list").

Country[a]	Year	Area harvested (hectares)	Quantity produced (kilograms)
Lesotho	2015	n/a	n/a
	2016	n/a	n/a
	2017	9.00	16
	2018	18.50	30 738
Netherlands	2015	0.50	1 100
	2016	0.50	1 460
	2017	0.50	2 385
	2018	1.00	5 105
New Zealand	2015	n/a	n/a
	2016	n/a	n/a
	2017	n/a	n/a
	2018	0.01	5
North Macedonia[e]	2015	n/a	n/a
	2016	n/a	n/a
	2017	n/a	n/a
	2018	2.51	4 041
Portugal	2015	15.00	169
	2016	7.00	21 000
	2017	. .	. .
	2018	. .	. .
Spain	2015	n/a	n/a
	2016	n/a	n/a
	2017	0.66	2 079[f]
	2018	2.95	3 920
Switzerland	2015	. .	315
	2016	. .	453
	2017	. .	230
	2018	. .	106
United Kingdom	2015	. .	41 706
	2016	117.00	95 000
	2017	37.90	258 378
	2018	21.00	217 197
United States	2015	. .	566[g]
	2016	. .	. .
	2017	. .	73.943[g]
	2018	1.00	246.08[g]
Uruguay	2015	n/a	n/a
	2016	—	—
	2017	—	—
	2018	2.50	—
Total	**2015**	**23.56**	**100 200**
	2016	**145.35**	**209 885**
	2017	**78.70**	**406 104**
	2018	**69.12**	**284 356[h]**

Note: Two dots (. .) signify that statistical information was furnished but data were not submitted for this specific item; a dash (—) indicates that the amount is nil; and n/a indicates that there was no reported licit cultivation of cannabis in the year in question.

[a]In addition to the 19 countries listed in this table, 9 countries (Germany, Jamaica, Malawi, Malta, Peru, Saint Vincent and the Grenadines, South Africa, Thailand and Zimbabwe) furnished estimates for 2019 and/or 2020 on the cultivation of cannabis plant and the production of cannabis.

[b]Only the number of cannabis plants was reported; data on the area sown and harvested were not supplied.

[c]Data reported are for the area sown for scientific purposes only and are not included in the global total.

[d]Since 17 May 2016, "Czechia" has replaced "Czech Republic" as the short name used in the United Nations.

[e]Since 14 February 2019, "North Macedonia" has replaced "The former Yugoslav Republic of Macedonia" as the short name used in the United Nations.

[f]The manufactured quantity is being used exclusively for research purposes.

[g]These figures refer only to the cultivation of cannabis plant authorized at the federal level. The figures were reported by the Government on the annual statistical return.

[h]The amount given for total quantity produced in 2018 does not include the production data for Canada, which were not submitted by the Government.

Coca leaf and cocaine

Coca leaf

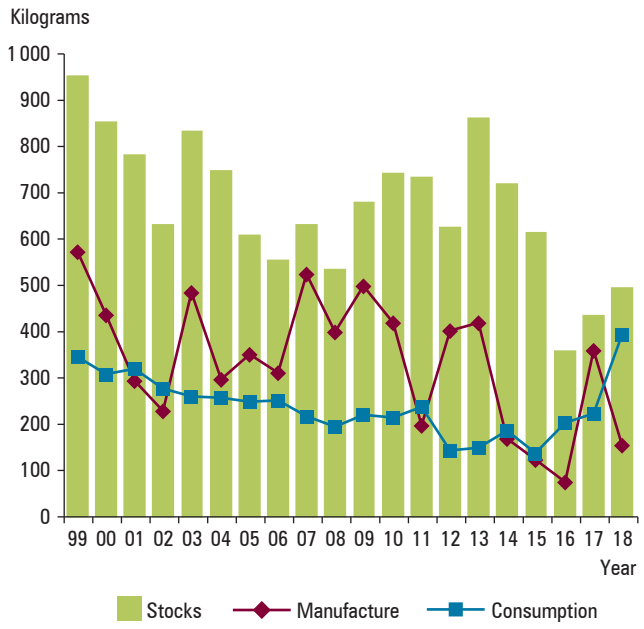
103. Peru has been the only country exporting coca leaf for the global market since 2000. In 2018, exports of coca leaf amounted to 127.8 tons. The United States was the leading importing country, importing 148.3 tons of coca leaf and accounting for nearly 100 per cent of global imports. The United States utilizes coca leaf for the extraction of flavouring agents and the manufacture of cocaine as a by-product. In 2018, the United States accounted for 65.9 per cent of global utilization of coca leaf; it was followed by Peru (63.4 tons, or 33.9 per cent of global utilization) and the United Kingdom (0.3 ton, or 0.2 per cent). Stocks of coca leaf were maintained almost exclusively by the United States (accounting for 80.4 per cent of global stocks) and Peru (19.6 per cent). The main licit producer of coca leaf, the Plurinational State of Bolivia, produced 24,178.4 tons of coca leaf, accounting for 92.0 per cent of global production. In the Plurinational State of Bolivia, the cultivation of coca bush for the chewing of coca leaf and the consumption and use of coca leaf in its natural state for cultural and medicinal purposes, such as preparing infusions, is allowed in accordance with the reservation made by that State in 2013, when it reacceded to the 1961 Convention as amended by the 1972 Protocol. Peru is the only other country in which coca leaf is produced; in 2018, it produced 2,114.5 tons of coca leaf, accounting for 8.0 per cent of global production.

Cocaine

104. The licit manufacture of cocaine continued to fluctuate, as it had done for more than 20 years, reaching 153.9 kg in 2018 (see figure 31). The main manufacturing country was the United Kingdom (122.8 kg, or 79.8 per cent of global manufacture), followed by the United States (31.1 kg, or 20.2 per cent). The main exporting country in

2018 was Peru (330 kg, or 77.4 per cent of global exports), followed by the United Kingdom (71.5 kg, or 16.8 per cent) and the Netherlands (16.4 kg, or 3.8 per cent). Switzerland, Germany and the United States each exported cocaine in quantities of more than 1 kg. The United Kingdom was the main importing country in 2018 (330.3 kg), accounting for 77.7 per cent of global imports of cocaine; it was followed by the Netherlands (40.3 kg, or 9.5 per cent), Canada (15.2 kg, or 3.6 per cent), Belgium (9.5 kg, or 2.2 per cent), Germany (6.1 kg, or 1.4 per cent) and Australia (5.0 kg, or 1.2 per cent). The licit consumption of cocaine, which had been stable for 20 years, averaging between 100 and 300 kg, peaked in 2018 at 724.1 kg. The main country consuming cocaine was the United States (169.2 kg, or 42.9 per cent of global consumption), followed by the United Kingdom (158.8 kg, or 40.3 per cent) and the Netherlands (11.9 kg, or 3.0 per cent). The largest stocks of cocaine were held by Peru (136.1 kg, or 27.5 per cent of global stocks), the United States (124.7 kg, or 25.2 per cent), the United Kingdom (93.4 kg, or 18.9 per cent), the Russian Federation (46.4 kg, or 9.4 per cent), the Netherlands (22.8 kg, or 4.6 per cent), Canada (22.5 kg, or 4.6 per cent) and Japan (10.7 kg, or 2.2 per cent).

Figure 31. Cocaine: global manufacture, consumption and stocks,[a] 1999–2018



[a]Stocks as at 31 December of each year.

Comparison of trends in the consumption of opioid analgesics

105. The analysis of the trends in the manufacturing, export, import and consumption of the individual substances was presented above. To gain an overview of the trends of the various substances and to analyse how and why the consumption of some of those substances is decreasing or increasing, it is important to consider them in a holistic way, in particular in the case of opioid analgesics that are used for pain management. The following analysis is based on the consumption of the main opioid analgesics (codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone), expressed in defined daily doses for statistical purposes (S-DDD).[20]

106. Countries reporting the highest average consumption of opioids for pain management in the period 2016–2018 were the United States (27,641 S-DDD), Germany (24,983 S-DDD), Austria (20,452 S-DDD), Canada (16,617 S-DDD) and Belgium (15,910 S-DDD).

107. A comparison of the trends in the consumption of individual substances is provided in figures 32 and 33. It is evident that there was an exponential increase in the consumption of fentanyl over the 20-year period 1999–2018. Compared with fentanyl, the consumption of oxycodone was at a lower level; however, it was increasing and, in 2009, it replaced morphine as the second most consumed opioid, reaching an all-time high of 45,717 S-DDD in 2018. The trend in the use of morphine, however, remained relatively stable after the late 1990s. In 2018, consumption of morphine increased slightly compared with the level of 2017, from 29,061 to 29,142 S-DDD. Hydrocodone consumption increased for some years but recently started to decline. Hydromorphone consumption decreased after 2014, reaching in 2018 a level of 14,160 S-DDD, the lowest level since 2002. The United States accounted for 99.2 per cent of hydrocodone consumption, whereas the consumption of fentanyl was not concentrated in one country. Although the consumption of fentanyl decreased globally in 2017, especially in North America,[21] there were significant increases in various countries in all other regions.

108. Regional analysis confirms the disparity in the consumption of opioid analgesics (see figures 34–37). The reported consumption of countries in North America,[21] Oceania and Western Europe resulted in regional averages of over 7,000 S-DDD (17,436, 7,918 and 12,335 S-DDD,

[20]The list of defined daily doses for statistical purposes (S-DDD) and an explanation of that concept are contained in the notes to tables XIV.1.a-i, XIV.2 and XIV.3.

[21]The consumption figures for Mexico for 2018 were calculated by INCB using available data series. The matter is being followed up with the Government.

respectively). The analysis in figures 34 and 35 of the 20-year trend shows in 2017 and 2018 a sharp decrease in consumption, expressed in defined daily doses for statistical purposes, in North America,[21] the region with highest consumption of opioids for pain management in the world. This decrease was driven mainly by the United States. In Oceania, consumption, which had been declining since 2012, was reported to have increased in 2017, to 9,065 S-DDD. In 2018, however, the declining trend continued, reaching 7,918 S-DDD. The general upward trend in consumption is evident in South-Eastern Europe and Western Europe.

Figure 32. Consumption of codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone, expressed in S-DDD, 1999–2018

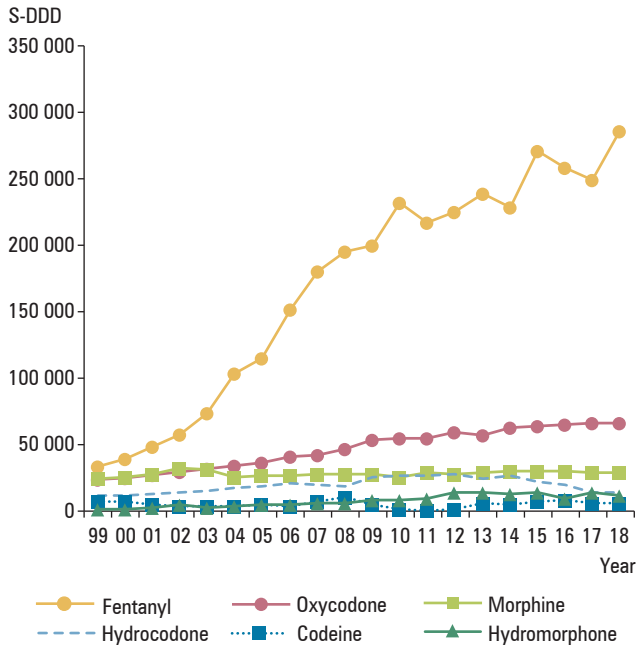


Figure 33. Consumption of codeine, hydrocodone, hydromorphone, morphine and oxycodone, (excluding fentanyl), expressed in S-DDD, 1999–2018

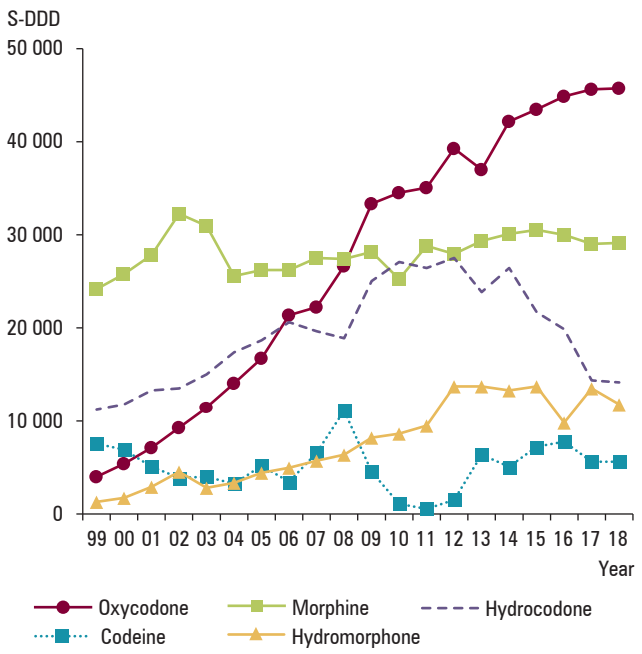


Figure 34. Average consumption of opioids for pain management in regions with the highest consumption, expressed in S-DDD, 1999–2018

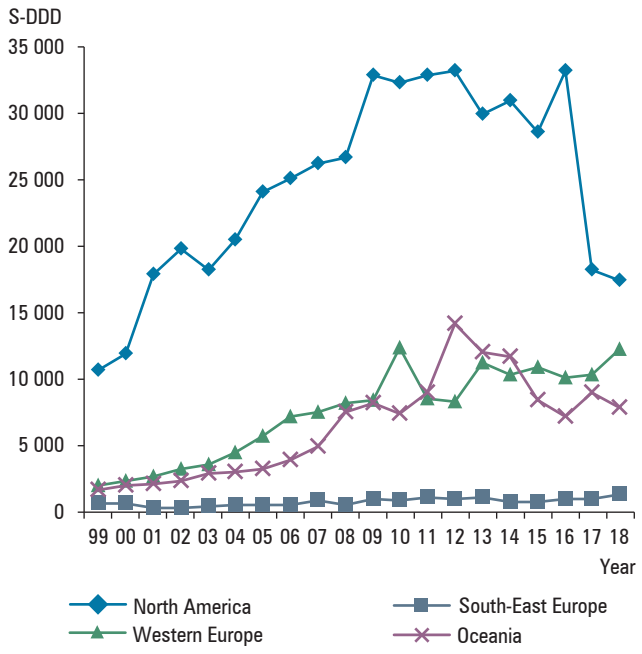
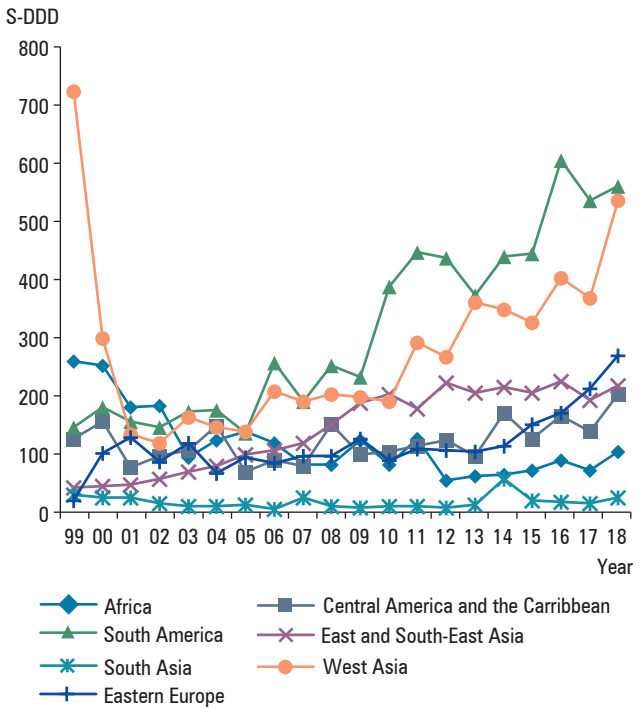


Figure 35. Average consumption of opioids for pain management in the regions with the lowest consumption, expressed in S-DDD, 1999–2018



109. Average consumption well below those values was reported in other regions. A long-term trend of increased consumption was reported in all regions except Africa and South Asia.

110. The two figures below show for 2018 the average consumption of opioid analgesics, expressed in defined daily doses for statistical purposes, in all regions (see figure 36) and in all regions except North America,[21] Western Europe and Oceania (see figure 37), where the average consumption of analgesics is most concentrated. This analysis highlights once again the prominence of fentanyl in various regions of the world. Oxycodone consumption is more concentrated in North America, Western Europe and Oceania, although it is also consumed in other regions, such as West Asia, Central America and the Caribbean, and South-Eastern Europe. The share of morphine is less prominent in most regions, the exceptions being Africa, Central America and the Caribbean, and South America.

Figure 36. Average consumption of codeine, fentanyl, morphine, pethidine and other opioids, by region, expressed in S-DDD, 2018

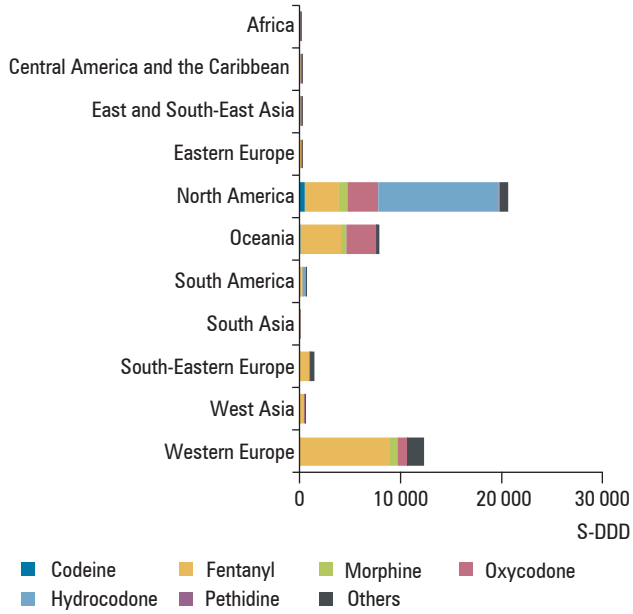


Figure 37. Average consumption in selected regions of codeine, fentanyl, morphine, pethidine and other opioids, expressed in S-DDD, 2018