COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

Summary

After a sharp decrease in global stocks and production of opium in 2016, there was an increase in 2017 in both stocks and manufacture. However, utilization, imports and exports continued to decrease, further signalling a trend towards the eventual elimination of the drug from the international market for opiate raw materials.

Overall utilization of poppy straw and concentrate of poppy straw derived from the morphine-rich variety of poppy straw decreased in 2017 compared with 2016. The global manufacture of morphine followed the same trend, decreasing to 340.9 tons, approximately 88 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. Of the remaining amount, 10.8 per cent was used mainly for palliative care purposes, with the rest being utilized for preparations in Schedule III of the Convention.

The differences in consumption levels between countries continued to be very significant. In 2017, 84.4 per cent of the world's population, mainly in low- and middle-income countries, consumed only 13.6 per cent of the total amount of morphine used for the management of pain and suffering, equivalent to 1.6 per cent of the total amount manufactured. Although that was an improvement from 2014, when 80 per cent of the population consumed only 9.5 per cent, the disparity in the consumption of narcotic drugs for palliative care continues to be a matter of concern.

In 2017, 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 derived from it. The global manufacture of thebaine reached the record level of 156 tons in 2016 but decreased slightly, to 142.4 tons, in 2017. 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 they have caused. Nonetheless, the data continued to indicate a high level of demand.

Of the semi-synthetic opioids, global manufacture of oxycodone and hydrocodone decreased in 2017, while the manufacture of others remained relatively stable.

In the case of synthetic opioids, global manufacture of fentanyl continued to fluctuate, increasing to 2.7 tons in 2017. The manufacture of fentanyl analogues (alfentanil, remifentanil and sufentanil) all decreased. The manufacture of dextropropoxyphene was reported in 2017 after no manufacture of that substance for some years. There was no report of manufacturing of ketobemidone in 2017, while diphenoxylate continued to be manufactured in much smaller quantities than in the past. In 2017, the manufacture of pethidine decreased further, to 3.7 tons, while the manufacture of tilidine and trimeperidine continued to fluctuate. The manufacture of methadone remained stable in 2017 after having increased in the last few years.

The licit use of cannabis 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 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 was 1.4 tons; by

2017, it had increased to 406.1 tons. Since the licit cultivation of cannabis for medical and scientific purposes has increased considerably in recent years and 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. At the time of preparing the present report, Peru had not provided production data for 2017, but had reported an export volume of 147.3 tons, in line with previous years.

The other major licit producer of coca leaf, the Plurinational State of Bolivia, provided information on cultivation (16,643 ha) and preliminary production data (23,417 tons) for 2017 to the Board. The cultivation of coca bush in that country 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 the country in 2013, when it reacceded to the 1961 Convention as amended.

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 143–266 and annexes III and IV, pages 325–473). Unless otherwise indicated, the comments refer to developments during the period 1998–2017.

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 2017. 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 the present report.[3] The most pertinent conclusions and recommendations of INCB based on the analysis of statistical data are included in chapter II of its annual report.[4]

[1]For the purposes of the Single Convention on Narcotic Drugs of 1961, 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]Under 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/2018/1.

Opiate raw materials

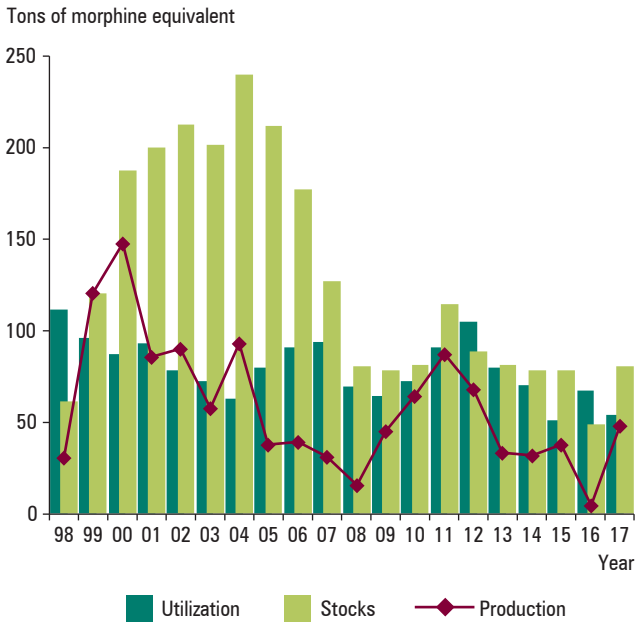
3. Opium and poppy straw are the raw materials obtained from the opium poppy plant (*Papaver somniferum*), from which alkaloids such as morphine, thebaine, codeine and oripavine are extracted. Concentrate of poppy straw is a product obtained in the process of extracting alkaloids from poppy straw. It 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 1998–2017, expressed in morphine equivalent. Included in the data on stocks and use are the amounts of illicitly produced opium that were seized and released for licit purposes.

5. Opium production was over 1,000 tons in 2000, but since then production has followed a downward trend overall. 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 42.2 tons (4.6 tons in morphine equivalent) in 2016. However, production increased again in 2017, to 439.3 tons (48.3 tons in morphine equivalent). In 2017, imports of opium decreased to 37.2 tons (4.1 tons in morphine equivalent), the lowest level in 20 years, from 69.2 tons (7.6 tons in morphine equivalent) in 2016. After decreasing by almost half in 2016, stocks of opium increased in 2017, reaching 730.6 tons (or 80.4 tons in morphine equivalent) (see figure 1).

Figure 1. Opium: global production, stocks[a] and use (consumption and utilization),[b] in morphine equivalent, 1998–2017



[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.

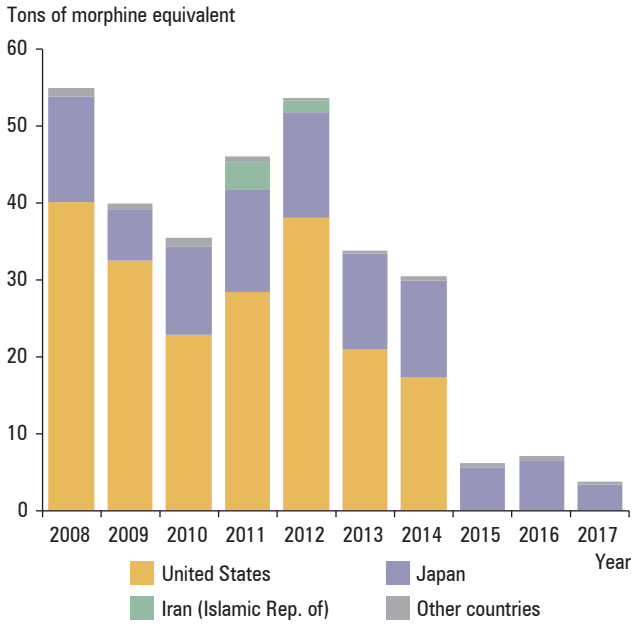
6. India was the main producer and only licit exporter of raw opium in 2017, accounting for 432.5 tons (47.5 tons in morphine equivalent) or 98.4 per cent of total global production. It was followed by China, which produced 6.4 tons (0.7 tons in morphine equivalent) and where poppy straw has replaced opium as the main raw material used in the manufacture of alkaloids since 2000. The Democratic People's Republic of Korea also produced smaller amounts of opium in 2017, but exclusively for domestic consumption and utilization. Japan produces very small amounts for scientific purposes only. India accounted for 91.4 per cent of exports in 2017. The remaining 8.6 per cent was exported by various countries and consisted of re-exports of opium originally imported from India.

7. Opium imports from India fluctuated in the period 2007–2014, decreasing significantly since 2013 and reaching 37.2 tons in 2017 (see figure 2). The main countries importing opium were Japan (30 tons, or 80.4 per cent) followed by France (3.3 tons, or 8.8 per cent), Switzerland (1.4 tons, or 4 per cent) and Spain (0.7 tons, or 2.1 per cent). The United States, which had been the main importer in the past, reported only 0.5 tons of opium imports from India in 2017.

8. As in previous years, the bulk of opium was used for the extraction of alkaloids, with only a small amount (22.5 tons, or 2.4 tons in morphine equivalent) being used for the manufacture of Schedule III preparations. Total utilization of licitly produced opium for the extraction of alkaloids followed a declining trend during the period under consideration. Utilization (including the utilization of seized opium in Iran (Islamic Republic of) and Myanmar) declined from 610.4 tons (67.1 tons in morphine equivalent) in 2016 to 491.5 tons (54.1 tons in morphine equivalent) in 2017.[6] In 2017, the main countries reporting utilization of opium for the extraction of alkaloids were the Islamic Republic of Iran (385.4 tons, or 42.4 tons of morphine equivalent), India (61.1 tons, or 6.7 tons in morphine equivalent) and Japan (41.2 tons, or 4.5 tons in morphine equivalent) (see figure 3). The opium reported as utilized by the Islamic Republic of Iran originated from seized material and is taken into account in the overall opium utilization for the first time in this context. Seized material in Myanmar (3 tons, or 0.3 tons in morphine equivalent) used for the extraction of alkaloids is also included in the global total. The Democratic People's Republic of Korea continued to report limited cultivation of opium poppy; production and utilization of opium totalled 0.3 tons, or 0.04 tons 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.

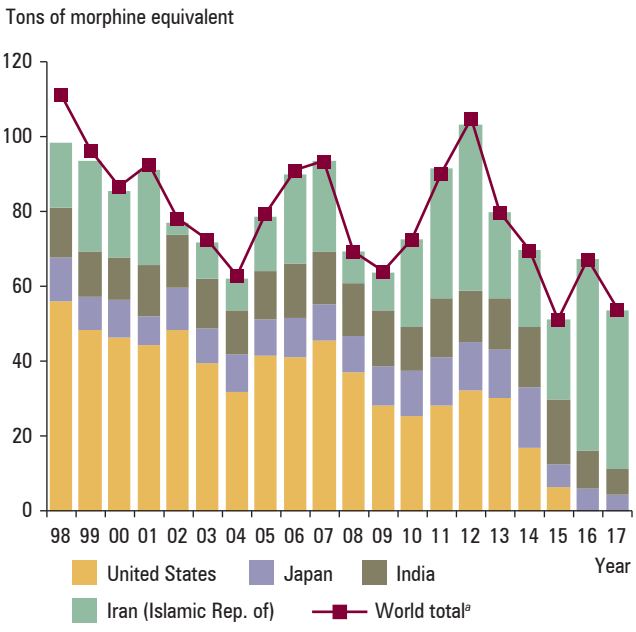
9. While the majority of opium is used for the extraction of alkaloids, opium is also consumed in some countries in the form of preparations, mainly for the treatment of

Figure 2. Opium: imports from India, in morphine equivalent, 2008–2017



Note: The amounts imported by the United States stood at 100 kg in 2015, 56 kg in 2016 and 569 kg in 2017.

Figure 3. Opium: utilization for the extraction of alkaloids, in morphine equivalent, 1998–2017



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

[6]In the Islamic Republic of Iran, in addition to the 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.

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 2017, the consumption and utilization of opium for the manufacture of preparations in Schedule III amounted to 23.3 tons, including 9 tons (almost 1 ton in morphine equivalent) in China, 7 tons (0.8 tons in morphine equivalent) in France and 5.1 tons (0.5 tons 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). They began to decrease thereafter (see figure 1) and stood at 730.6 tons (80.3 tons in morphine equivalent) in 2017. India continued to maintain the largest stocks of opium (600.2 tons, or 66 tons in morphine equivalent, representing 82.1 per cent of the global total), followed by Japan (111.2 tons, or 12.2 tons in morphine equivalent) and China (10.9 tons, or 1.2 tons in morphine equivalent).[8] The United States, which had kept larger stocks in recent years, had only limited stocks in 2017, with 1.1 tons, or 0.1 tons 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 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 opium poppy plant rich in morphine is referred to as "poppy straw (M)", poppy straw produced from varieties of opium poppy plant rich in thebaine is referred to as "poppy straw (T)", poppy straw produced from varieties of opium poppy plant rich in codeine is referred to as "poppy straw (C)" and poppy straw produced from varieties of 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 use of a common denominator, which is the morphine or thebaine equivalent of the quantity of poppy straw produced in each country. Commercial cultivation of the opium poppy plant 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 2017. Global production of poppy straw (M) expressed in morphine equivalent followed an increasing trend in the two decades prior to 2017. Over the years, production fluctuated sharply, mainly because of 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, reaching 234 tons in 2017 (see figure 4). Throughout the two decades prior to 2017, Australia, France, Spain and Turkey had been the main producer countries. In 2017, the leading producer was Australia (67 tons in morphine equivalent), followed by France (63 tons in morphine equivalent), Turkey (55 tons), Spain (23 tons) and Hungary (3 tons). Other producers of poppy straw (M) in 2017 together accounted for the remaining 23 tons of global production. In the case of Australia and France, for accounting purposes, quantities of poppy straw (C) 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 plant, the amounts of poppy straw (M) harvested and the agricultural 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 2017, Hungary was the main exporter of poppy straw (M) for the extraction of alkaloids, followed by Australia, France and Slovakia (see annex IV, table 1).

15. In 2017, the main countries utilizing poppy straw (M) were Turkey (16,097.0 tons in gross weight), France (3,516.4 tons), Australia (3,450.1 tons) and Spain (1,229.6 tons). Hungary, Portugal and China utilized less than 1,000 tons each. Further details on the utilization of poppy straw (M) for the extraction of alkaloids and the industrial yields obtained are contained in part four, table IV.

[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.

Figure 4. Total anhydrous morphine alkaloid contained in all poppy straw varieties: production in the main producing countries, in morphine equivalent, 2008–2017

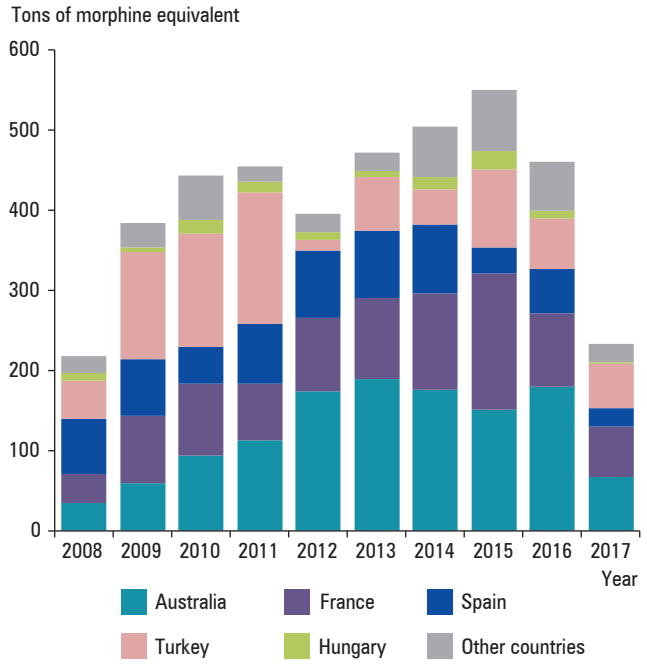
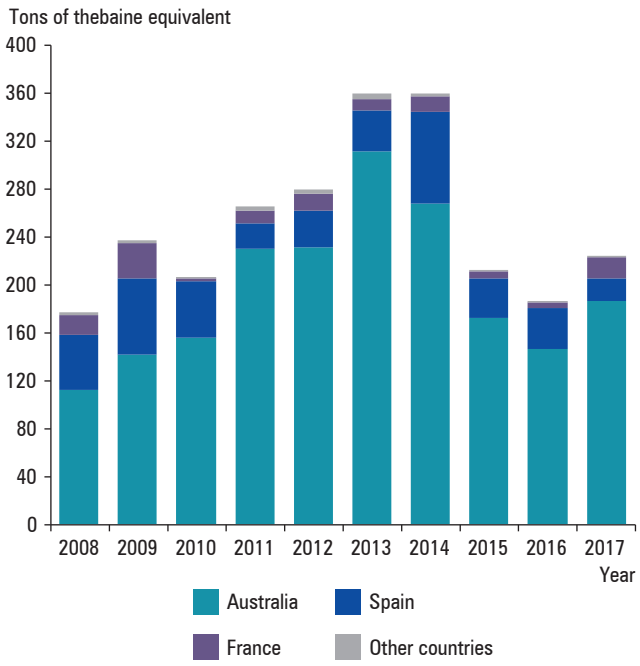


Figure 5. Total anhydrous thebaine alkaloid contained in all poppy straw varieties: production in the main producing countries, in thebaine equivalent, 2008–2017



Poppy straw produced mainly[10] 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 part four, table II.

17. Production of poppy straw (T) in the main producing countries during the period 2008–2017, expressed in thebaine equivalent, is shown in figure 5. Total production increased from 187 tons in 2016 in thebaine equivalent to 224 tons in 2017. In 2017, Australia remained the leading producer, with 187 tons in thebaine equivalent, an increase from 147 tons in 2016. It was followed by Spain and France, both reporting 18 tons for 2017.

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 part four, table V.

[10]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.

Poppy straw produced from opium poppy rich in codeine

19. Australia reported the cultivation of poppy straw (C) for commercial purposes for the first time in 2009 and France in 2013. This new variety was cultivated specifically to meet the high global demand for codeine. Its production increased steadily, from 415 tons (expressed in gross weight) in 2010 to 6,706 tons in 2015, but dropped considerably to 1,313 tons in 2016. In 2017, it increased to 3,105 tons. Spain produced 69.6 per cent of poppy straw (C), while Australia produced the remaining 30.4 per cent. Australia accounted for 79.3 per cent of utilization, followed by France, with 19.1 per cent. Stocks of poppy straw (C) were held mainly by France (35.1 tons), Australia (22.7 tons) and Spain (4 tons).

Poppy straw produced from opium poppy rich in noscapine

20. In recent years, an increase in the cultivation of poppy straw (N) had been reported in some countries. However, in 2017, Hungary was the only country to report its cultivation, with an area of 254 hectares and a total production of 70 tons of poppy straw (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 part four, 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.[11]

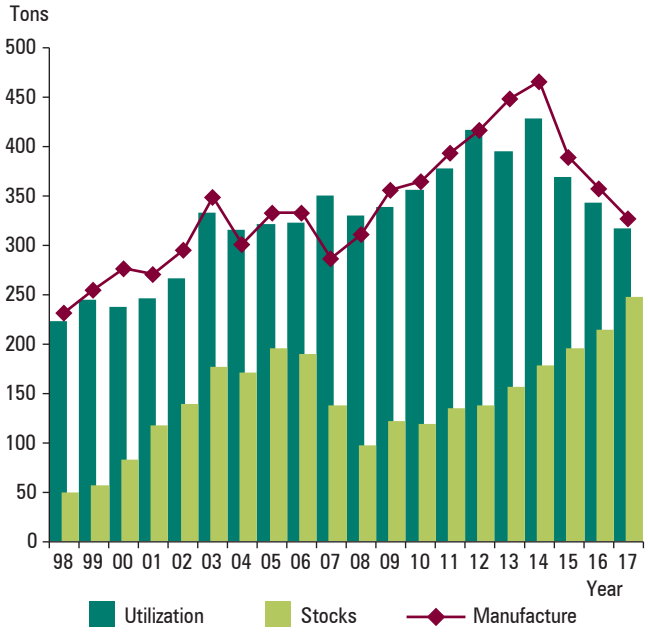
23. Since the actual content of alkaloids in concentrate of poppy straw may vary significantly, for the purposes of comparison and for statistical purposes, all data referring to concentrate of poppy straw are expressed in terms of the quantity of the relevant anhydrous alkaloid contained in the material. 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.

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 1998–2017.

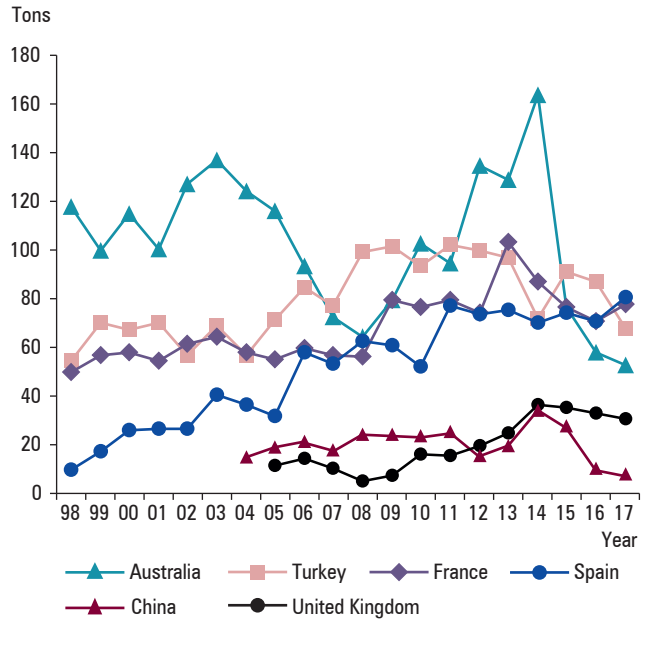
25. With the exception of slight fluctuations between 2003 and 2008, global manufacture of AMA (CPS) increased continuously from the 1990s to 2014, when it reached its highest level ever (466.3 tons). Since then, manufacture of it has decreased gradually, reaching 327.8 tons in 2017. Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 1998–2017 are presented in figure 7.

Figure 6. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: global manufacture, stocks[a] and utilization, 1998–2017



[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, 1998–2017



[11]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.

26. Prior to 2017, Australia and Turkey had been the leading manufacturers of AMA (CPS). In 2017, Spain reported the largest quantity manufactured (80.8 tons, or 24.6 per cent of global manufacture), followed by France (77.3 tons, or 23.5 per cent), Turkey (67.5 tons, or 20.6 per cent) and Australia (52.4 tons, or 16 per cent). Other countries reporting manufacture of AMA (CPS) for 2017 were the United Kingdom of Great Britain and Northern Ireland (30.8 tons), Belgium (10.7 tons) and China (8.1 tons).

27. After reaching a record high of 239 tons in 2012, global exports of AMA (CPS) began to decrease and stood at 131.9 tons in 2017. Spain exported the largest quantity of AMA (CPS) in 2017 (49.7 tons, or 37.6 per cent), followed by Turkey (38.4 tons, or 29.1 per cent), Australia (26.1 tons, or 19.8 per cent), Belgium (12.9 tons, or 9.83 per cent) and France (4.6 tons, or 3.5 per cent). As in recent years, the United Kingdom and the United States were the leading importers of AMA (CPS), together accounting for 68 per cent of the world total in 2017. Other importing countries were, in descending order of the amounts imported, Norway, Australia, Japan, the former Yugoslav Republic of Macedonia, Switzerland and France. 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 for the manufacture of morphine. It is also used in continuous manufacturing processes for the manufacture of codeine. Utilization of AMA (CPS) continued an increasing trend until 2014 but decreased since then (see figure 8). In 2017, total world utilization amounted to 315.9 tons, a notable decrease from 428.7 tons in 2014. The United Kingdom accounted for 78.1 tons, or 24.7 per cent of the global utilization of AMA (CPS), followed closely by France (77.6 tons, or 24.5 per cent), the United States (40.2 tons, or 12.7 per cent) and Australia (36.6 tons, or 11.6 per cent).

29. Global stocks of AMA (CPS) continued to increase in 2017, to 247.8 tons (see figure 9). Turkey held 61.7 tons in stock, or 24.9 per cent, followed by Australia (47.3 tons, or 19 per cent), the United Kingdom (37.2 tons, or 15 per cent), Spain (31.1 tons, or 12.5 per cent), China (26 tons, or 10.5 per cent), the United States (22.7 tons, or 9.1 per cent), Belgium (10.8 tons, or 6.1 per cent), Norway (4.4 tons, or 1.8 per cent), Japan (3.7 tons, or 1.5 per cent) and South Africa (1.5 tons, or 0.6 per cent).

Figure 8. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: utilization for the manufacture of opiates, 1998–2017

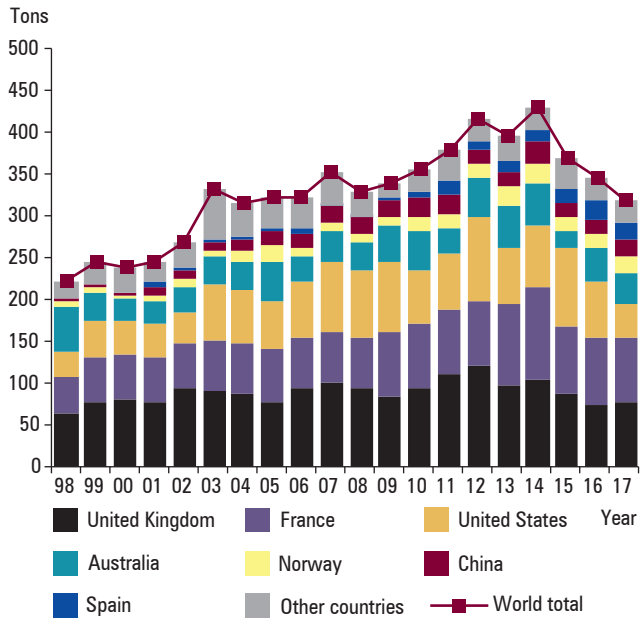
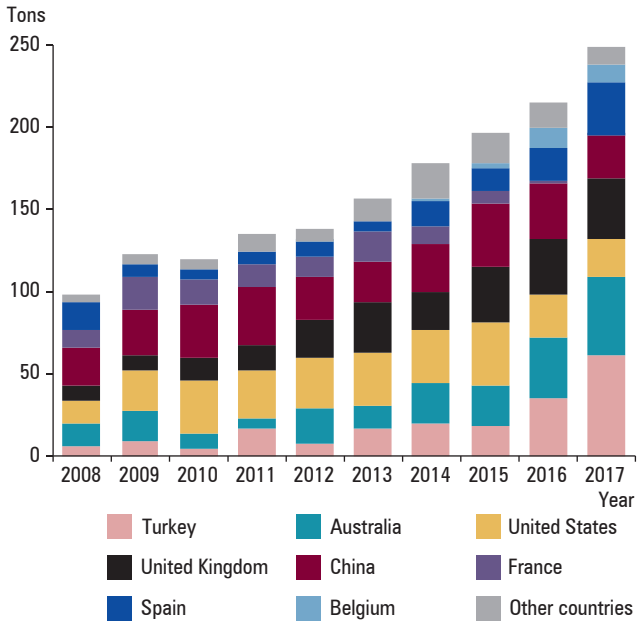


Figure 9. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: stocks,[a] 2008–2017



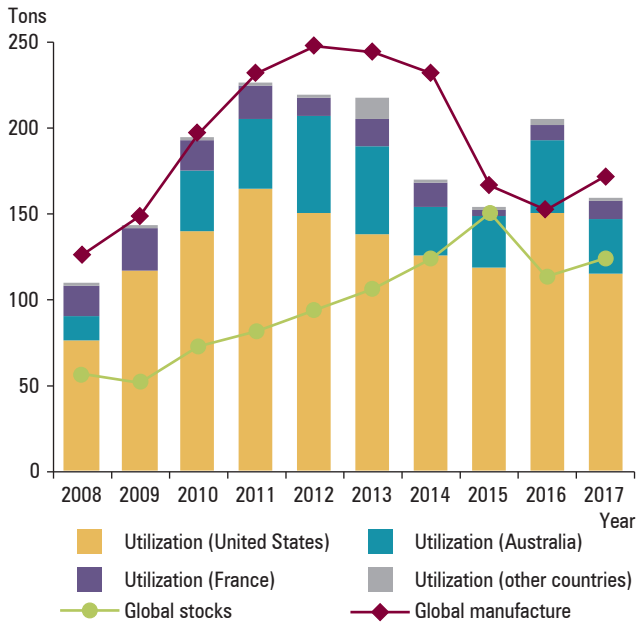
[a]Stocks as at 31 December of each year.

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 2008–2017. Industrial manufacture of ATA (CPS), which started in 1998, increased rapidly before levelling off in 2012 and decreasing considerably to 172 tons in 2017 from 232.1 tons in 2014. The only countries manufacturing ATA (CPS) in 2017 were Australia (131.2 tons, or 76.3 per cent), Spain (22 tons, or 12.8 per cent) and France (18.7 tons, or 10.9 per cent). Australia was also the main exporter, accounting for 85.7 per cent (123.8 tons) of the global total. Spain was the only other exporter, with 14.3 per cent (20.7 tons). The United States has been the leading importer of ATA (CPS) for many years; in 2017, it accounted for 99.2 per cent of total imports.

31. ATA (CPS) is an intermediate product 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 159.2 tons in 2017. This trend reflects the reduction in the demand for thebaine and for narcotic drugs obtained from it, such as hydrocodone and oxycodone, particularly in the North American market (see paras. 66, 67, 70 and 71 below). However, despite this reduction, in 2017, the United States continued to be the main user of thebaine, accounting for 71.9 per cent (114.5 tons) of global utilization. It was followed by Australia (20.7 per cent, or 32.9 tons), France (6.3 per cent, or 10.1 tons) and Hungary (1 per cent, or 1.7 tons). Global stocks of ATA (CPS) stood at 123.4 tons in 2017, held primarily by the United States (80.8 tons, or 65.5 per cent), France (22.9 tons, or 18.6 per cent) and Australia (10.5 tons, or 8.5 per cent), which together accounted for over 92.6 per cent of global stocks.

Figure 10. Total anhydrous thebaine alkaloid contained in all varieties of concentrate of poppy straw: utilization, global manufacture and stocks,[a] 2008–2017



[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 1999. Australia was the main manufacturing country in 2017, with a total of 9.9 tons (98.6 per cent of the global total). Switzerland manufactured just 0.1 tons. Total utilization of AOA (CPS) in 2017 increased considerably, reaching 28.2 tons, compared with 1.3 tons in 2016. Global stocks of AOA (CPS) have been fluctuating since 2001. In 2017, stocks decreased to 43.3 tons, held mainly by Australia (85.6 per cent, or 37 tons) and the United States (9.9 per cent, or 4.3 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 103.7 tons, which was nearly double the amount manufactured (57.6 tons) in 2014. After decreasing to 56.1 tons in 2016, it increased again, reaching 81.6 tons in 2017. ACA (CPS) is used for the extraction of codeine. The only countries that manufactured ACA (CPS) in 2017 were Australia (59.5 per cent of the global total), France (30.7 per cent), Turkey (5.2 per cent) and Spain (4.5 per cent). Global utilization of ACA (CPS) increased from 31.5 tons in 2014 to 79.1 tons in 2015. It then decreased to 40.7 tons in 2016, before increasing slightly to 44.4 tons in 2017. The United States was the main country to utilize ACA (CPS) (50.1 per cent, or 22.2 tons), followed by France (47.1 per cent, or 20.9 tons). Other countries utilized only very small amounts. In 2017, global stocks of ACA (CPS) increased to the highest amount ever recorded (60.7 tons). Those stocks were held in Australia (20.5 tons, or 33.7 per cent), the United States (19 tons, or 31.3 per cent), the United Kingdom (16.1 tons, or 26.5 per cent), Turkey (3.9 tons, or 6.4 per cent) and Spain (1.1 tons, or 1.9 per cent), with other countries holding 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.[12]

35. Opioids are used mostly for their analgesic properties to treat severe pain (fentanyl, hydromorphone, methadone, morphine and pethidine), moderate to severe pain (buprenorphine[13] 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).

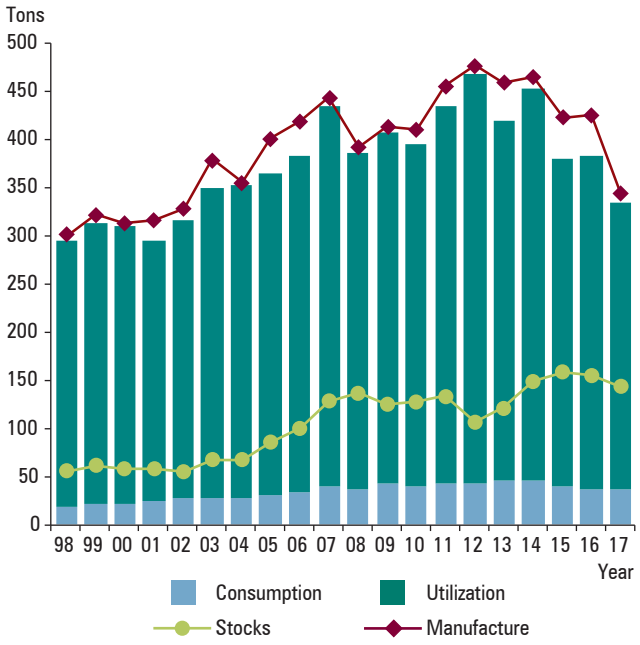
Natural alkaloids

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 1998–2017, the manufacture[14] of morphine increased considerably from the 297.1 tons manufactured in 1998. After stabilizing at about 450 tons between 2011 and 2014, manufacture decreased to 419.2 tons in 2015 and remained at roughly the same level (422.1 tons) in 2016, before decreasing to 340.9 tons in 2017 (see figure 11). About 88 per cent of the morphine manufactured globally is converted into other narcotic drugs or into substances not covered by the 1961 Convention (see paras. 44 and 45 below). The rest is used directly for medical purposes, mainly for palliative care (i.e., for direct consumption and for utilization in the manufacture of preparations listed in Schedule III).

Figure 11. Morphine: global manufacture, stocks,[a] consumption and utilization, 1998–2017



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

38. In 2017, the leading morphine manufacturing country was France (69.6 tons, or 20.4 per cent of global manufacture), followed by the United Kingdom (54.5 tons, or 16 per cent), Australia (38.9 tons, or 11.4 per cent), the Islamic Republic of Iran (35.9 tons, or 10.5 per cent), the United States (31 tons, or 9.1 per cent), China (22.8 tons, or 6.7 per cent), Norway (20.4 tons, or 6 per cent), Spain (18.2 tons, or 5.3 per cent), Slovakia (14 tons, or 4.1 per cent) and Japan (10.4 tons, or 3.1 per cent). Together, these 10 countries accounted for 92.6 per cent of global manufacture.

39. Exports of morphine decreased from 35.4 tons in 2015 to 23.5 tons in 2016, before increasing again, to 29.7 tons in 2017. The main exporting countries in 2017 were Slovakia (31.4 per cent), the United Kingdom (26.7 per cent), Australia and France (9.1 per cent each), Germany (7 per cent) and Switzerland and Italy (4.6 per cent each). Countries that exported less than 2 per cent were, in descending order, Hungary, Poland and Austria (see figure 12). The main

[12]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.

[13]Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971. Comments on its licit movement are contained in para. 98 below.

[14]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, 2008–2017

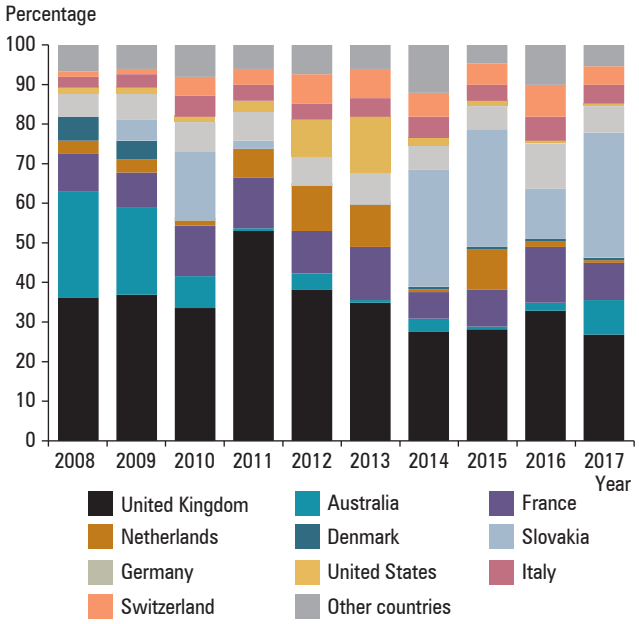
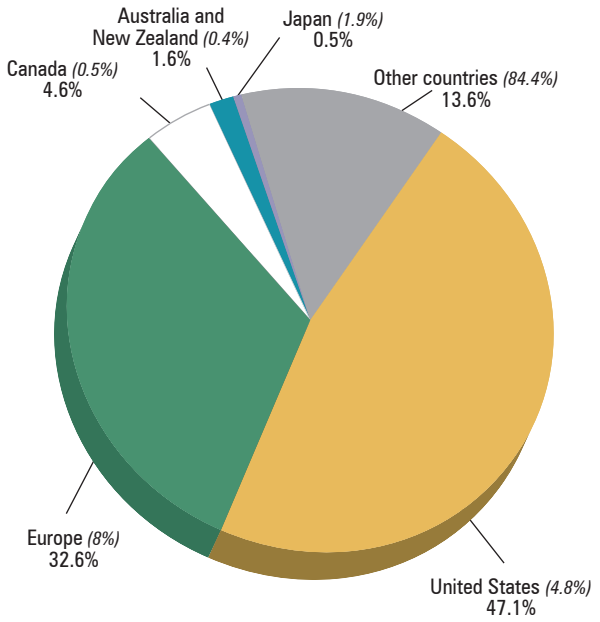


Figure 13. Morphine: distribution of consumption, 2017



Note: percentages in parentheses refer to share of the total population of all countries that submitted data on morphine consumption.

importing countries in 2017 were France (9.5 tons, or 34.8 per cent), Germany (3.6 tons, or 13.4 per cent), Austria (1.9 tons, or 6.9 per cent), Canada (1.8 tons, or 6.8 per cent) and Switzerland (1 ton, or 4 per cent). Other countries imported less than 1 ton. Further details on exports and imports of morphine can be found in annex IV, tables 3 and 4.

40. In 1997, the amount of morphine used for direct consumption stood at 4.2 per cent of total morphine manufactured; it has since more than doubled, reaching 10.8 per cent in 2017. Despite the increase, many countries continue to report having difficulties procuring medications containing morphine.

41. The differences in consumption levels between countries continued to be very significant (see figure 13 and part four, table XII), 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 2017, many people still had limited access to the drug.

42. Since 2000, of the total amount of morphine utilized globally, on average only 9 per cent was reported to have been used for palliative care directly. A smaller amount (4 per cent on average) has been used for the manufacture of Schedule III preparations containing morphine. The majority (87 per cent on average) has been converted into other narcotic drugs (mostly codeine) or into substances not covered by the 1961 Convention. Codeine in turn has mainly been used (89 per cent) for the manufacture of cough medication. Further details on the utilization of morphine can be found in part four, table VI.

43. In 2017, 84.4 per cent of the world population, mainly in low- and middle-income countries, consumed only 13.6 per cent of the total amount of morphine used for the management of pain and suffering. Although the situation has improved in the last 20 years, the disparity in consumption of narcotic drugs for palliative care continues to be a matter of concern. The remaining 86.4 per cent of the total consumption of morphine, excluding Schedule III preparations, continued to be concentrated in a small number of countries located mainly in Europe and North America. In 2017, the United States had the highest share of consumption (47.1 per cent), followed by countries in Europe (32.6 per cent), Canada (4.6 per cent), Australia and New Zealand (1.6 per cent combined) and Japan (0.5 per cent).

44. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention. In 2017, the countries using morphine for that purpose in significant quantities were China (6.9 tons, or 52.9 per cent of the global total), the United Kingdom (4.8 tons, or 36.4 per cent) and Italy (1.3 tons, or 10.1 per cent).

45. The largest share of morphine is used for conversion into other opiates, such as codeine ethylmorphine and pholcodine (see part four, table VI), although it is important to note that codeine is increasingly 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 decreased significantly in 2017, to 294.6 tons. 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 1998–2017 and reached 1.5 tons in 2017, most of which was used by France and the United Kingdom.

46. Global stocks of morphine stood at 143.2 tons in 2017, a slight decrease from 2016 (154.1 tons). The largest stocks were held by the United States (44.1 tons, or 30.8 per cent of global stocks), followed by France (40.7 tons, or 28.4 per cent), Japan (11.5 tons, or 8 per cent), Hungary (10.9 tons, or 7.6 per cent), the United Kingdom (9.4 tons, or 6.6 per cent) and Switzerland (7.1 tons, or 5 per cent). Other countries held stocks in quantities representing less than 4 per cent.

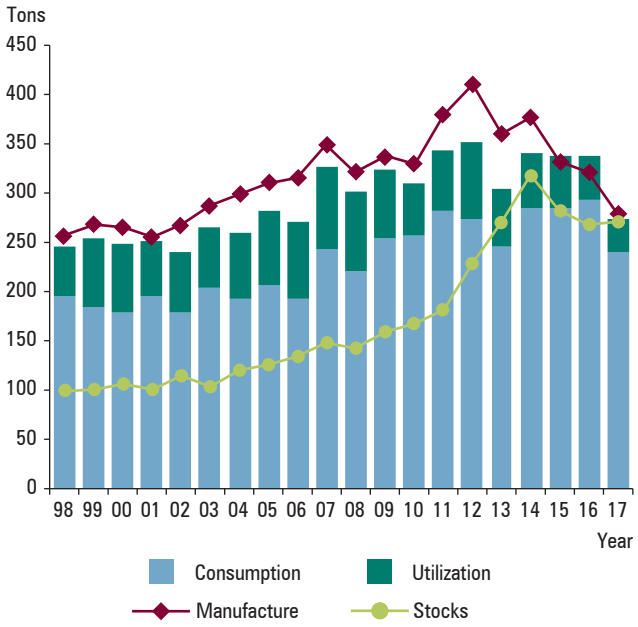
Codeine

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 1998–2017 are shown in figure 14.

48. Global manufacture of codeine increased from 1998 until 2012, when it reached a peak of 411.8 tons. Since then, global manufacture has been decreasing, dropping to 281.5 tons in 2017, almost the same level as 2003. The main manufacturing countries were France (53.3 tons, or 18.9 per cent), the United Kingdom (52.4 tons, or 18.6 per cent), Australia (35.4 tons, or 12.6 per cent) and the United States (33.1 tons, or 11.8 per cent). Smaller, but still considerable, quantities, in descending order, were manufactured in the Islamic Republic of Iran (from seized opium), Spain, Norway, Japan, South Africa, China, Hungary, Slovakia, Turkey and India, amounting to 105 tons, or 37.3 per cent, of the global total (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 responsible for the decrease in manufacture.

49. After decreasing in recent years, global stocks of codeine remained relatively stable in 2017, at 274.2 tons. The countries keeping significant stocks of codeine were the United Kingdom and the United States (40.3 tons, or 14.7 per cent, each), France (38.6 tons, or 14.1 per cent), India (26 tons, or 9.5 per cent), Australia (25.1 tons, or 9.2 per cent), Spain (19.9 tons, or 7.3 per cent) and Canada (11.3 tons, or 4.1 per cent). Stocks of codeine of less than 10 tons, in descending order, were reported by each of the following countries: Japan, Slovakia, Hungary, Italy, Brazil, Germany and Norway. The combined stocks of those seven countries (42 tons) represented 15.3 per cent of total global stocks.

Figure 14. Codeine: global manufacture, stocks,[a] consumption and utilization, 1998–2017



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

Figure 15. Codeine: manufacture, 1998–2017

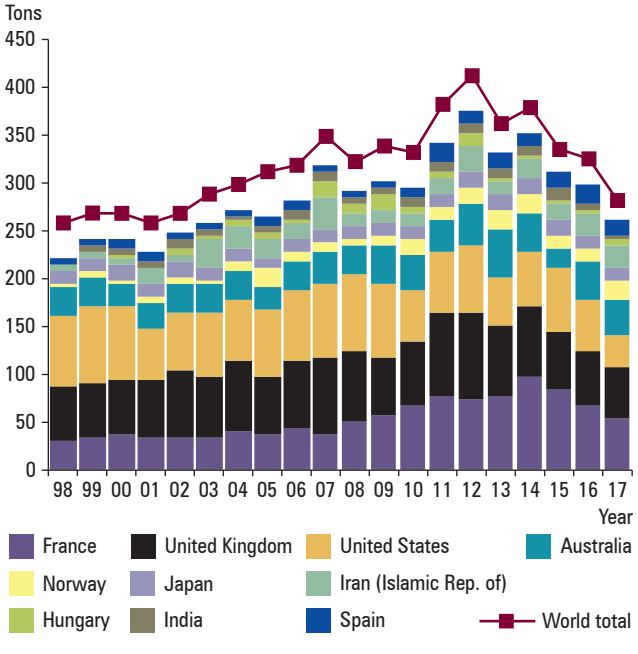


Figure 16. Codeine: exports, 1998–2017

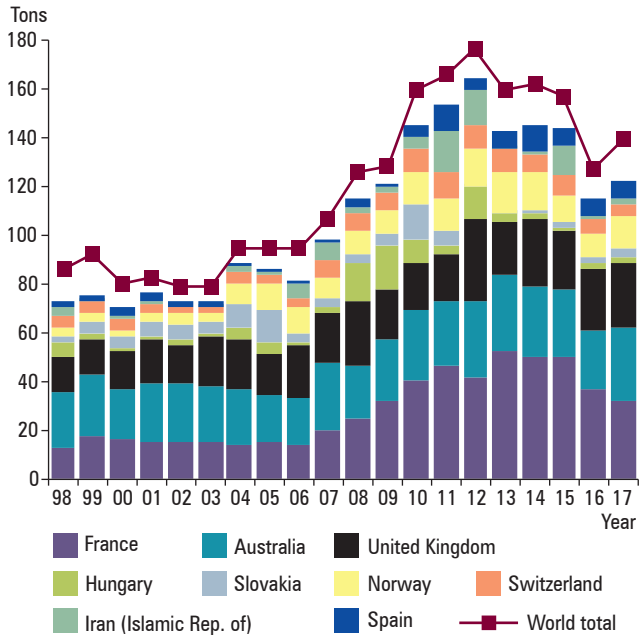
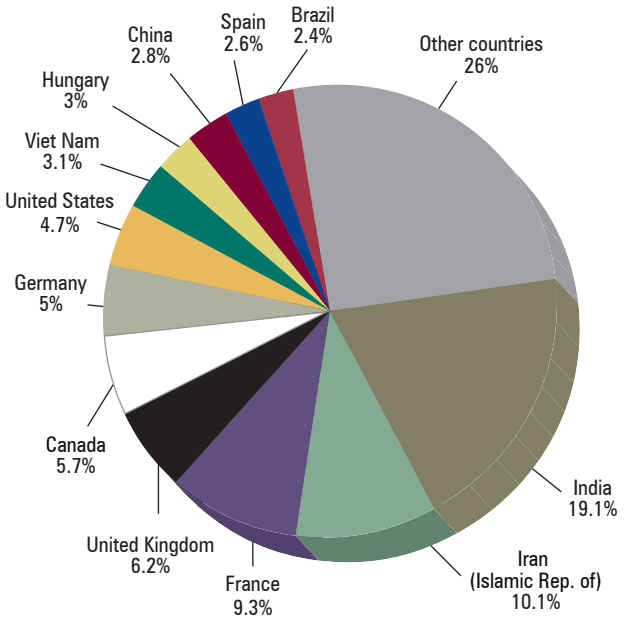


Figure 17. Codeine: utilization for the manufacture of preparations listed in Schedule III of the 1961 Convention, 2017



50. In 2017, world exports of codeine increased to 139.2 tons, compared with 127.6 tons in 2016, but still far from the peak of 176.5 tons recorded in 2012 (see figure 16). France continued to be the leading exporting country for codeine in 2017 (31.8 tons, or 22.9 per cent of the global total), followed by Australia (30.3 tons, or 21.8 per cent), the United Kingdom (26.5 tons, or 19 per cent), Norway (12.8 tons, or 9.2 per cent), Spain (7 tons, or 5 per cent), Italy (6.3 tons, or 4.6 per cent), Switzerland (5.3 tons, or 3.8 per cent), Slovakia (3.7 tons, or 2.7 per cent), Germany (2.9 tons, or 2 per cent) and Hungary (2.5 tons, or 1.8 per cent).

51. The main countries importing codeine in 2017 were India (27.2 tons), Italy (14.2 tons), Germany (14.1 tons), Canada (12.6 tons), Hungary (7.5 tons), Viet Nam (7 tons), Brazil (6.5 tons), Switzerland (4.7 tons), Nigeria (4.1 tons) and Ireland (3.4 tons). More details on the international trade in codeine can be found in annex IV, tables 3 and 4.

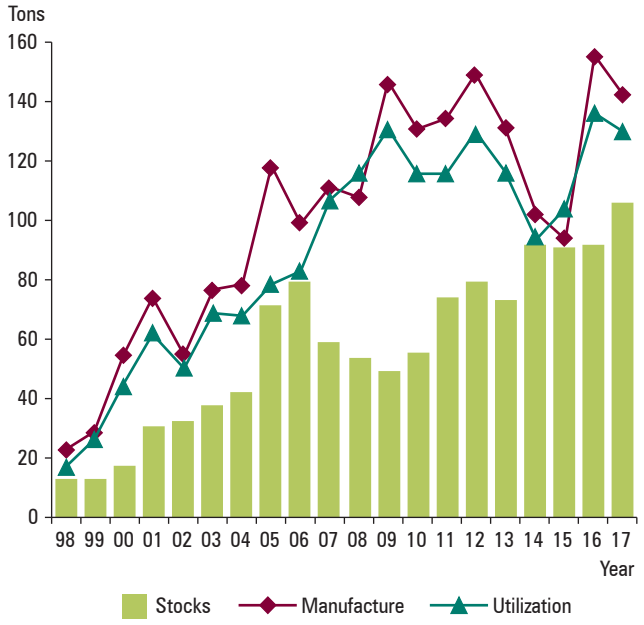
52. In 2017, codeine used for the manufacture of preparations listed in Schedule III accounted for 98.9 per cent of the global consumption[15] of codeine. The use of codeine for that purpose grew from 196.1 tons in 1998 to 240.9 tons in 2017 (see figure 14). Countries reporting the utilization of codeine 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 2017, global consumption (including Schedule III preparations) stood at 242.9 tons (see figure 14). The main countries reporting data in that respect were India (45.9 tons, or 18.9 per cent of the global total), the Islamic Republic of Iran (24.3 tons, or 10 per cent), France (22.3 tons, or 9.2 per cent), Canada (15.2 tons, or 6.3 per cent), the United Kingdom (14.8 tons, or 6.1 per cent), Germany (12 tons, or 5 per cent) and the United States (11.4 tons, or 4.7 per cent). Other countries with a level of codeine consumption of between 2 and 10 tons, in descending order of the amounts consumed, were Viet Nam, Hungary, China, Spain, Brazil, Oman, Australia, Norway, South Africa, Nigeria, Ireland, Turkey, Ukraine and Italy.

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). Utilization has gradually declined and stood at 34 tons in 2017. Of the amount reported for 2017, 12.7 tons (37.5 per cent of the global total) were used in Japan, 8.6 tons (25.6 per cent) in the United States, 6.4 tons (18.9 per cent) in the United Kingdom, 3.9 tons (11.5 per cent) in Italy and 1.6 tons (5 per cent) in Hungary.

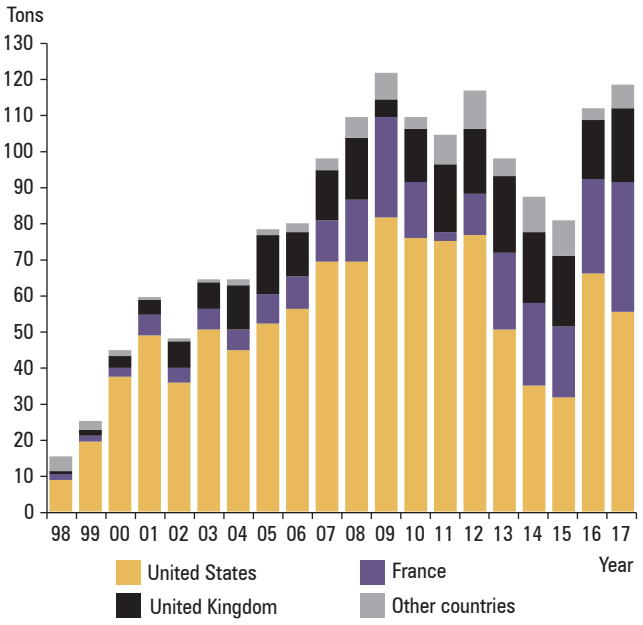
[15] "Global consumption" is a term used by INCB to reflect the total of the amount of a drug that is directly consumed and the amount that is utilized for the manufacture of preparations listed in Schedule III of the 1961 Convention.

Figure 18. Thebaine: global manufacture, utilization and stocks,[a] 1998–2017



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

Figure 19. Thebaine: utilization for the manufacture of opioids, 1998–2017



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 (which is a substance controlled under the Convention on Psychotropic Substances of 1971), as well as of 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 2017, after some fluctuations in the preceding years, global manufacture of thebaine remained high, at 142.4 tons, just below the record level (156 tons), in 2016 (see figure 18). The demand for medicines derived from thebaine, after decreasing in the past years, appears to have increased again, 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 they have caused. The United States (63 tons, or 44.3 per cent of the global total) remained the main manufacturer in 2017. It was followed by Spain (38.3 tons, or 26.9 per cent), Australia (37.7 tons, or 26.5 per cent) and France (2.3 tons, or 1.6 per cent). Japan, India and Slovakia manufactured smaller quantities. After declining to 64.1 tons in 2016, exports increased again in 2017, to 72.3 tons. The only two exporting countries in 2017 were Australia (40.9 tons, or 56.7 per cent of total exports) and Spain (31.3 tons, or 43.4 per cent). The main countries importing thebaine were the United Kingdom (32.5 tons, or 45 per cent), France (22 tons, or 30.4 per cent), Hungary (5.2 tons, or 7.2 per cent), Switzerland (3.9 tons, or 5.4 per cent), Czechia (3.6 tons, or 5 per cent), Germany (2.4 tons, or 3.3 per cent), Denmark (1.4 tons, or 1.9 per cent) and Slovakia (0.8 tons, or 1 per cent).

57. Following the main manufacturing trend, the utilization of thebaine for the manufacture of other narcotic drugs increased to 117.9 tons in 2017 (see figure 19 and part four, table VII). The United States was the main country to use thebaine during the 20-year period 1998–2017. In 2017, the United States accounted for 55.5 tons (47.1 per cent of global use) for that purpose, followed by France (35.6 tons, or 30.2 per cent) and the United Kingdom (20.8 tons, or 17.7 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 2008–2017: in 2017, it decreased to 12.4 tons. The United Kingdom, Czechia, Hungary and India, in that order, accounted for 82.9 per cent of the world total.

58. After an overall fluctuating upward trend in the period since 1996, global stocks of thebaine reached the record level of 106.3 tons in 2017. Major stocks were held in Spain

(28 tons, or 26.4 per cent of global stocks), the United States (25.1 tons, or 23.7 per cent), Australia (17.5 tons, or 16.5 per cent), the United Kingdom (10.1 tons, or 9.5 per cent), France (7.9 tons, or 7.5 per cent), Hungary (3.6 tons, or 3.4 per cent), Switzerland (3 tons, or 2.9 per cent), Germany (2.8 tons, or 2.6 per cent), Denmark (2 tons, or 1.9 per cent) and Japan (1.7 tons, or 1.7 per cent).

Oripavine

59. In 2007, oripavine was included in Schedule I of the 1961 Convention. From 2004 to 2016, the amount of oripavine manufactured globally fluctuated between 6 and 26 tons. In 2017, the combined total of 26.5 tons was manufactured in only two countries: the United States (23.8 tons, or 89.9 per cent of global manufacture) and Spain (2.6 tons, or 10.1 per cent). In 2017, the main users of oripavine for the manufacture of other drugs were the United States (22.9 tons, or 85.6 per cent) and Germany (3.6 tons, or 13.6 per cent). The drugs manufactured were mainly hydromorphone, oxymorphone and buprenorphine. In 2016, global stocks of oripavine amounted to 18.1 tons. In 2017, global stocks of oripavine stood at 16.5 tons, a slight decrease compared with the level of 2016. Of the stocks reported for 2017, Spain held 13.8 tons (83.8 per cent), followed by the United States with 2.6 tons (15.6 per cent); very small quantities were held by Germany, Switzerland, Canada and Sweden.

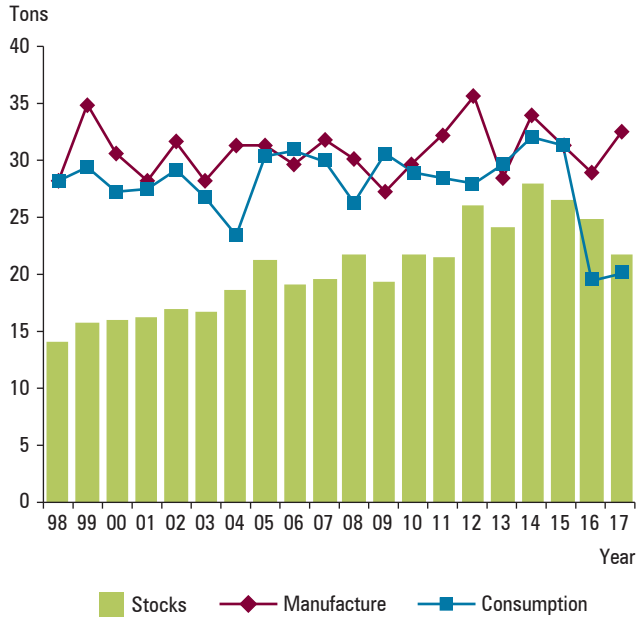
Semi-synthetic opioids

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.[16] 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 27.1 and 35.7 tons in the 20-year period 1998–2017. In 2017, the quantity manufactured worldwide stood at

Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,[a] 1998–2017



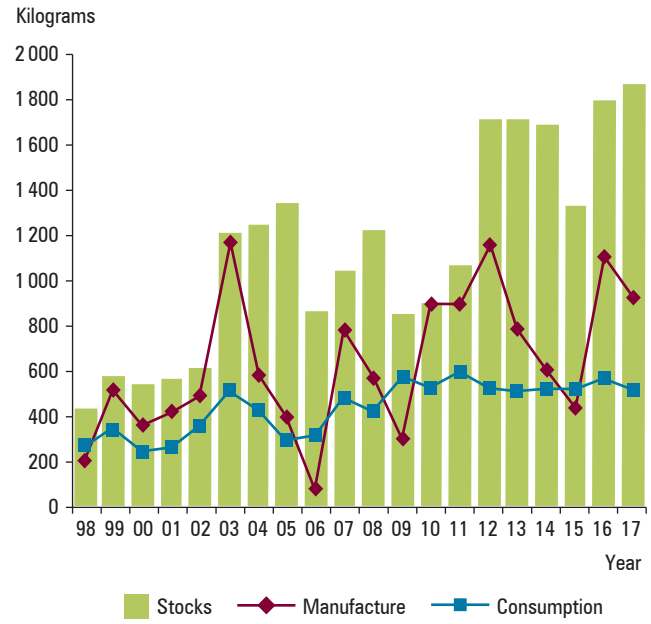
[a]Stocks as at 31 December of each year.

32.5 tons (see figure 20). The main countries manufacturing significant quantities continued to be Japan (12.6 tons, or 38.8 per cent), China and the United Kingdom (6.1 tons, or 18.9 per cent, each) and Italy (4.1 tons, or 12.8 per cent), together accounting for 89.4 per cent of total global manufacture in that year. Global exports of dihydrocodeine amounted to 10.8 tons in 2017. The main exporting country was Italy (4.1 tons, or 38.1 per cent), followed by Slovakia (2 tons, or 18.8 per cent), the United Kingdom (1.7 tons, or 16.2 per cent), Hungary (1.5 tons, or 13.8 per cent), France (1.1 tons, or 10.4 per cent) and Turkey (0.2 tons, or 2.2 per cent). In 2017, the Republic of Korea was the leading importing country for dihydrocodeine (4.6 tons, or 50.6 per cent). Other major importers were the United Kingdom (2.2 tons, or 24.8 per cent), Colombia (0.5 tons, or 5.8 per cent), France and India (0.4 tons, or 4.4 per cent, each) and Italy (0.2 tons, or 2.6 per cent).

62. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention, which accounted for 91 per cent of total consumption in 2017. In 2017, manufacture of dihydrocodeine reached 32.5 tons. The main user countries for dihydrocodeine, in descending order of the amounts used, were Japan, the Republic of Korea and the United Kingdom. Together, those countries used more than 1 ton of that substance, accounting for 87 per cent of the global total. In 2017, global stocks of dihydrocodeine amounted to 21.6 tons; major stocks were held in Japan (12.2 tons, or 56.6 per cent), the United Kingdom (3.9 tons, or 18.1 per cent), Italy (1.2 tons, or 5.6 per cent) and the Republic of Korea (1.1 tons, or 5.2 per cent).

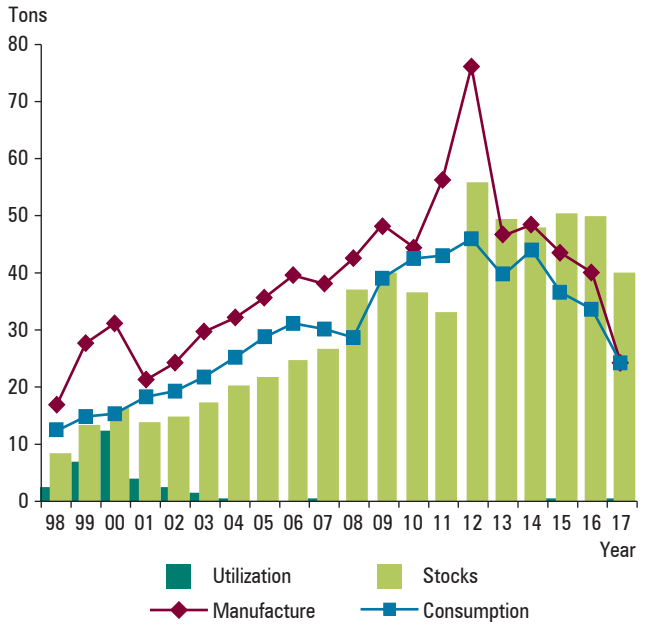
[16]Manufacturing losses are those occurring: *(a)* during the process of refining a drug; *(b)* during the process of transformation of a drug into its salts, isomers, esters and ethers, as applicable according to the Schedules; and *(c)* during the manufacture of preparations other than those included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

Figure 21. Heroin: global manufacture, consumption and stocks,[a] 1998–2017



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

Figure 22. Hydrocodone: global manufacture, consumption, utilization[a] and stocks,[b,c] 1998–2017



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

Ethylmorphine

63. The manufacture of ethylmorphine showed an overall downward trend over the 20-year period 1998–2017 and was stable at about 1 ton for several years. In 2017, the total quantity manufactured was 1.4 tons, much lower than the peak of 4.6 tons reached in 1997. France was the main manufacturing country in 2017 (1.2 tons, or 85 per cent) and was also the leading exporting country (0.5 tons), accounting for over 89 per cent of global exports. The largest importer in 2017 was Sweden, which imported 0.3 tons (50.8 per cent) of the total. Belgium imported 0.2 tons (27.6 per cent), while Poland, Finland and Hong Kong, China, each imported quantities of considerably less than 0.1 tons (8 per cent each). About 95 per cent of total consumption of ethylmorphine is in the form of preparations listed in Schedule III of the 1961 Convention. Global consumption (consumption and utilization for manufacture of preparations in Schedule III) reached 775.5 kg in 2017. The main consuming countries in 2017 were Sweden (241.1 kg, or 31 per cent of global consumption), France (205 kg, or 26 per cent) and Belgium (155.2 kg, or 20 per cent). In addition, consumption of less than 50 kg each was reported by China, Hong Kong, Hungary, India, Poland and Tunisia, whose combined consumption accounted for 156.2 kg (20.1 per cent) of the global total. In 2017, global stocks of ethylmorphine totalled 1.8 tons; the largest holders of stocks were France, India, Hungary and Sweden, each holding more than 0.1 tons and together accounting for 1.5 tons (83 per cent) of global stocks.

Heroin

64. Over the past 20 years, the licit manufacture of heroin averaged 600 kg, with peaks of over 1,000 kg in 2003, 2012 and 2016. In 2017, a total of 929 kg was manufactured, mostly by Switzerland (531.8 kg, or 57.2 per cent) and the United Kingdom (397.5 kg, or 42.7 per cent) (see figure 21). The two main countries exporting heroin continued to be the United Kingdom (466.6 kg, or 66.2 per cent, of global exports) and Switzerland (229.2 kg, or 32.5 per cent). In 2017, the main importing country was Switzerland (435.5 kg, or 56.2 per cent), followed by Germany (178.5 kg, or 23.1 per cent), the Netherlands (70.5 kg, or 9 per cent), Denmark (45.1 kg, or 6 per cent), the United Kingdom (20.3 kg, or 2.6 per cent), Canada (14.1 kg, or 1.8 per cent) and Hungary (8.7 kg, or 1.1 per cent).

65. Global consumption of heroin remained relatively stable at 532.7 kg in 2017. Switzerland, where heroin is prescribed for individuals with long-term opiate dependency, reported heroin consumption of 256.9 kg for 2017 (48.2 per cent of global consumption). Other countries with significant heroin consumption in 2017 were the Netherlands (114.5 kg, or 21.5 per cent), Germany (90.2 kg, or 16.9 per cent) and the United Kingdom (32.4 kg, or 6 per cent). Global stocks of heroin increased in 2017 to over 1,865 kg, the highest level ever. The countries holding significant stocks in 2017 were Switzerland (1,142 kg, or 61.2 per cent of global stocks), Spain (199.9 kg, or 10.7 per cent), the Netherlands (192 kg, or 10.3 per cent), the United Kingdom

(175.9 kg, or 9.4 per cent), Germany (107.9 kg, or 5.8 per cent) and Denmark (36.3 kg, or 2 per cent).

Hydrocodone

66. In 2017, global manufacture of hydrocodone decreased to 24.1 tons, from 39.7 tons in the previous year, continuing the declining trend that started after the peak of 75.9 tons reached in 2012 (see figure 22). The United States accounted for almost all (99.9 per cent) of global manufacture.

67. Global consumption of hydrocodone continued to decline in 2017, reaching 24.1 tons, down from 33.8 tons in 2016. 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 2017, the country with the highest consumption of hydrocodone continued to be the United States, with 24 tons, equivalent to 99.2 per cent of total global consumption. In the past, hydrocodone had been 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 since the late 1990s. While most consumption took place in the United States, some quantities of hydrocodone were exported. Such exports were almost exclusively accounted for by shipments from the United States to Colombia (201 kg) and Canada (66.2 kg). In 2017, global stocks of hydrocodone stood at 40.2 tons, more than 99.3 per cent of which were held by the United States.

Hydromorphone

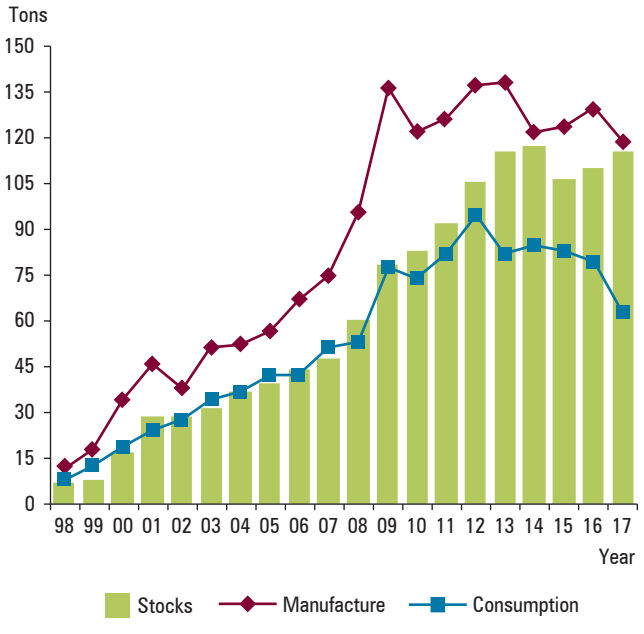
68. Global manufacture of hydromorphone has increased sharply over recent years, reaching 6.8 tons in 2013, the highest level ever registered; it dropped to 5 tons in 2015 and increased again in 2016, to 6.3 tons, before decreasing in 2017 to 5.8 tons. The leading manufacturing countries in 2017 were the United States (3.5 tons, or 60.6 per cent of the global total), the United Kingdom (1.1 tons, or 19.8 per cent), Slovakia (0.4 tons, or 7.7 per cent) and Belgium (0.3 tons, or 5 per cent). Total exports of hydromorphone decreased to 2.9 tons in 2017. The leading exporting countries were the United Kingdom (1.2 tons, or 39.4 per cent of world exports), the United States (0.8 tons, or 27.3 per cent) and Switzerland (0.5 tons, or 15.2 per cent). In 2017, Canada continued to be the main importing country (1.1 ton, or 35.8 per cent); it was followed by Germany (0.9 tons, or 31 per cent), Switzerland (0.3 tons, or 11.4 per cent), Italy (0.2 tons, or 7.5 per cent) and Austria (0.1 tons, or 4 per cent).

69. In 2017, consumption of hydromorphone decreased to 3.3 tons. The United States continued to be the main consumer country in 2017 (1.4 tons, or 42.6 per cent of global consumption); it was followed by Canada (almost 1 ton, or 29 per cent) and Germany (0.6 tons, or 17 per cent). Global stocks of hydromorphone increased to 7.8 tons in 2017, of which 4.3 tons (55.7 per cent) were held in the United States, followed by Canada with 1.1 tons (14.3 per cent) and Germany with 0.5 tons (6.8 per cent).

Oxycodone

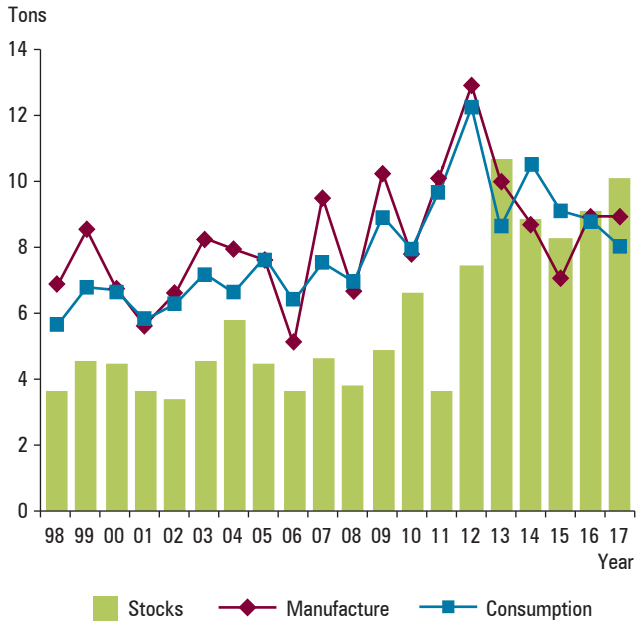
70. Oxycodone is one of the drugs commonly associated with overdose deaths in relation to prescription drug abuse, in particular in North America. Global manufacture of oxycodone has increased sharply over recent years, reaching a record high of 138 tons in 2013. After a considerable decrease in 2014 and 2015, manufacture of oxycodone increased again in 2016, to 130.1 tons, but dropped again to 118.7 tons in 2017 (see figure 23). The fluctuations in manufacture 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 2017, the United States accounted for 71.2 tons (60 per cent) of total global manufacture, followed by France (28.3 tons, or 23.9 per cent), the United Kingdom (12.4 tons, or 10.5 per cent), Switzerland (3.5 tons, or 3 per cent) and Hungary (1.4 tons, or 1.2 per cent).

Figure 23. Oxycodone: global manufacture, consumption and stocks,[a,b] 1998–2017



[a]Stocks as at 31 December of each year.
[b]Considerable losses occur in the manufacturing process of this substance. This explains some gaps between manufacture and consumption/stocks.

Figure 24. Pholcodine: global manufacture, consumption and stocks,[a] 1998–2017



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

In 2017, exports increased to a record high level of 37.5 tons. That increase was attributable mainly to a total export amount of 8.3 tons from the United States to the United Kingdom. The United Kingdom continued to be the main exporting country in 2017 (15.7 tons, or 42 per cent of world exports), followed by the United States (9.5 tons, or 25.5 per cent), Switzerland (3.1 tons, or 8.3 per cent), France (2.8 tons, or 7.4 per cent), Germany (1.6 tons, or 4.3 per cent) and the Netherlands (1.3 tons, or 3.5 per cent). The main importing countries were the United Kingdom (9.3 tons, or 25.4 per cent), Germany (5.6 tons, or 15.4 per cent), Canada (3.5 tons, or 9.5 per cent) and Switzerland and France (with almost 2.4 tons, or 6.5 per cent, each). Further details on exports and imports of oxycodone are contained in annex IV, tables 3 and 4.

71. In line with the decrease in manufacture in 2017, global consumption of oxycodone also decreased, from 79.7 tons in 2016 to 62.6 tons in 2017. Consumption of oxycodone was concentrated in the United States, which accounted for 42.4 tons (67.7 per cent) of the world total. Other main consumer countries in 2017, in descending order of the amounts consumed, were Canada (3.5 tons, or 5.6 per cent), Germany (3.3 tons, or 5.3 per cent), Australia (2.7 tons, or 4.3 per cent), France (1.6 tons, or 2.5 per cent), the United Kingdom (1.3 tons, or 2 per cent) and Italy (1.1 tons, or 1.8 per cent). Global stocks of oxycodone reached 115.4 tons, with the United States holding 74.4 tons (64.3 per cent) of the world total.

Pholcodine

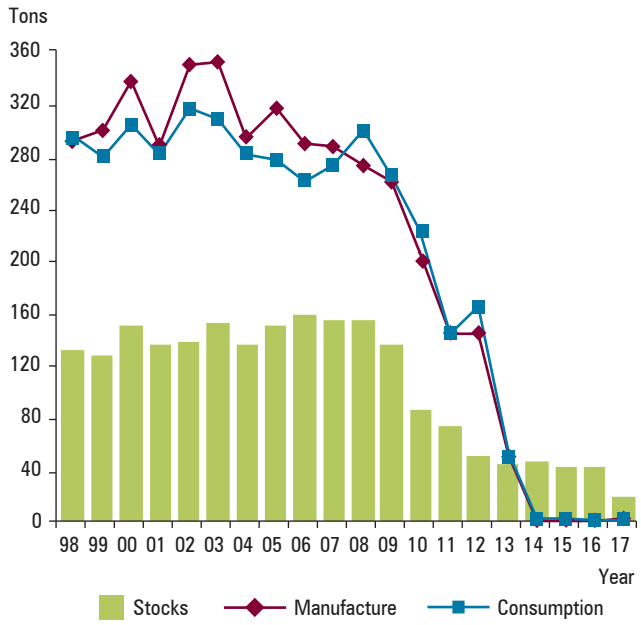
72. During the 15-year period 2003–2017, pholcodine manufacture and consumption was characterized by a volatile trend. Manufacture dropped from 12.9 tons in 2012 to 7 tons in 2015; it then increased to 8.9 tons in 2016, and to 9 tons in 2017 (see figure 24). The fluctuations may be related to concerns 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 2017 were France (5.2 tons, or 58.1 per cent), Norway (1.9 tons, or 21.6 per cent) and Hungary (1.5 tons, or 16.5 per cent). Total exports of pholcodine decreased from 9 tons in 2016 to 8 tons in 2017. Exports originated mostly in France (3.9 tons, or 49.2 per cent of the global total), Norway (2.1 tons, or 26 per cent) and Italy (1.1 tons, or 14.1 per cent). The main destinations were Hong Kong, China (1.9 tons, or 31 per cent), Italy (1.1 tons, or 17.8 per cent), the United Kingdom (0.7 tons, or 11.8 per cent), Australia (0.5 tons, or 9 per cent) and Norway (0.4 tons, or 7 per cent). Further details on exports and imports of pholcodine are provided in annex IV, tables 3 and 4.

73. Most pholcodine (98.4 per cent) is used in the manufacture of preparations listed in Schedule III of the 1961 Convention. In 2017, global consumption of pholcodine stood at 8 tons. In 2017, the main consumers were Hong Kong, China (2.6 tons, or 32.5 per cent), Australia (1.3 tons, or 15.6 per cent) and Italy (1.1 tons, or 14.3 per cent). In 2017, global stocks of pholcodine stood at 10.1 tons. Major stocks were held by Hungary (2 tons, or 19.8 per cent), Hong Kong, China (1.7 tons, or 16.3 per cent), France (1.3 tons, or 12.5 per cent), the United Kingdom (1.2 tons, or 12.3 per cent) and Norway (1 ton, or 9.9 per cent).

Synthetic opioids

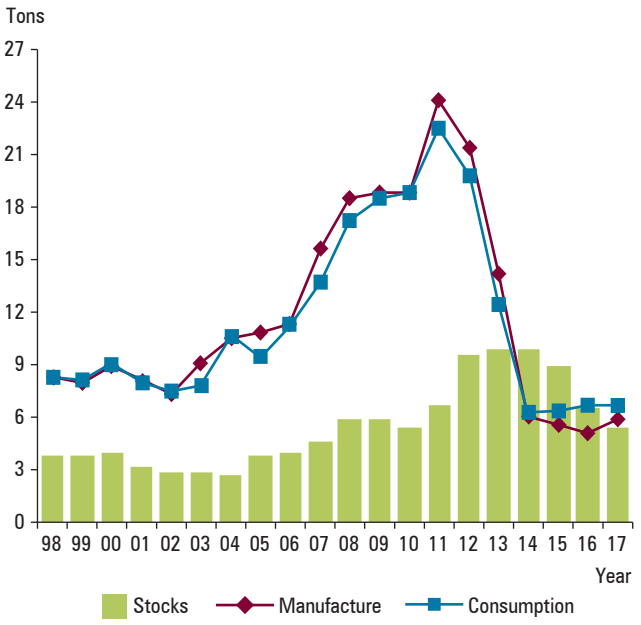
74. Synthetic opioids are used in the treatment of chronic, moderate and severe pain. They are also used for the induction of general anaesthesia and in the treatment of specific conditions such as gastrointestinal disorders. In addition, methadone is used in treatment related to drug dependency.

Figure 25. Dextropropoxyphene: global manufacture, consumption and stocks,[a] 1998–2017



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

Figure 26. Diphenoxylate: global manufacture, consumption and stocks,[a] 1998–2017



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

Dextropropoxyphene

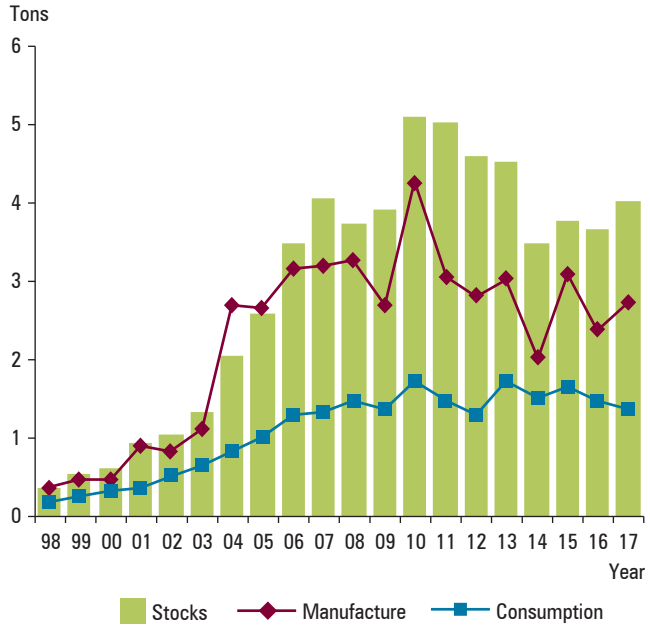
75. Global manufacture of dextropropoxyphene followed a downward trend from 2003, when 349.6 tons were manufactured, to 2014, when its manufacture fell to zero. It remained at that level in 2015 and 2016, but increased again in 2017, with 0.9 tons manufactured. The decline is attributed to the fact that the substance has been banned in several countries owing to concerns over serious side effects. In May 2013, the Ministry of Health and Family Welfare of India issued a gazette notification suspending the manufacture, sale and distribution of dextropropoxyphene and formulations containing dextropropoxyphene in the country. Manufacturing, nearly all of which was concentrated in India, therefore decreased, to 49.1 tons in 2013. In 2017, the only manufacturers of dextropropoxyphene were Germany (0.5 tons) and Malta (0.4 tons). The only country to report consumption was the United Kingdom (0.4 tons). Global stocks amounted to 17.4 tons, which were held by India (14.7 tons, or 84.4 per cent), followed by the United Kingdom and Turkey (0.5 tons, or 3 per cent, each) and Malta (0.4 tons, or 2.6 per cent) (see figure 25).

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 24.1 tons in 2011, but dropped afterwards, reaching a low of 5 tons in 2016 (see figure 26). Most of the drop in manufacture over the period 2011–2016 may be attributable to regulatory measures introduced in India following concerns related to potential abuse. In 2017, manufacture increased to 5.9 tons, accounted for by India (2.6 tons, or 44.3 per cent), China (2.4 tons, or 39.8 per cent) and the United States (0.9 tons, or 15.8 per cent). India was also the leading exporter of diphenoxylate (0.6 tons, or 94.2 per cent of the global total). The main importing country in 2017 was the Islamic Republic of Iran (0.3 tons, or 50.2 per cent of the global total), followed by Iraq (0.1 tons, or 14.6 per cent) and Pakistan (almost 0.1 tons, or 14.3 per cent).

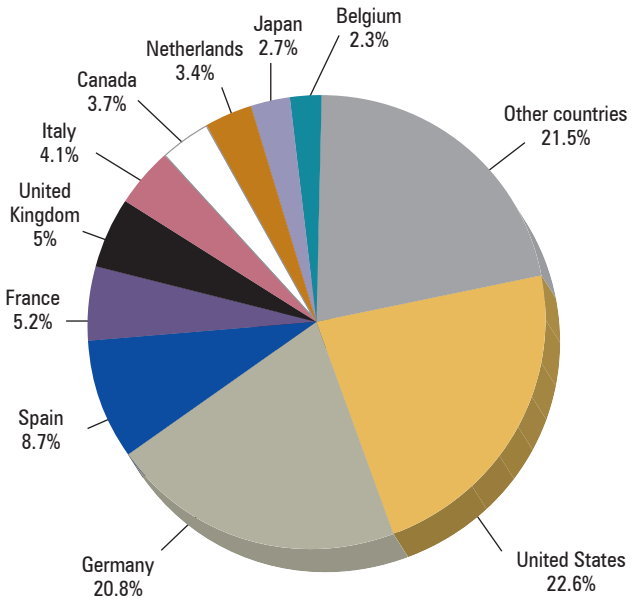
77. Diphenoxylate was consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (more than 99 per cent of total consumption in 2017). Global use in 2017 reached 6.7 tons. The countries reporting the highest global consumption (consumption and the amounts used to manufacture preparations in Schedule III) in 2017 were India (3.7 tons, or 55.7 per cent of the global total), China (1.8 tons, or 26.5 per cent) and the United States (0.6 tons, or 9.2 per cent). In 2017, global stocks of diphenoxylate decreased to 5.5 tons, the majority of which were held by India (4 tons, or 75 per cent) and China (0.8 tons, or 16.1 per cent).

Figure 27. Fentanyl: global manufacture, consumption and stocks,[a] 1998–2017



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

Figure 28. Fentanyl: distribution of consumption, 2017



Fentanyl

78. Fentanyl, when used as an analgesic, is about 100 times as potent as morphine and is 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 2000–2010, reaching a record level of 4.2 tons in 2010. It then decreased to 2.0 tons in 2014 and has since fluctuated, increasing to 2.7 tons in 2017 (see figure 27). The United States was the main manufacturing country for fentanyl in 2017 (981.4 kg, or 35.9 per cent of the global total), followed by Germany (559.6 kg, or 20.4 per cent), South Africa (547.9 kg, or 20.1 per cent) and Belgium (525.4 kg, or 19.2 per cent). The principal exporting countries were Germany (403.2 kg, or 39.5 per cent), Belgium (263 kg, or 25.8 per cent), the United States (200.3 kg, or 19.6 per cent) and the United Kingdom (51.8 kg, or 5.1 per cent). Germany was also the principal importing country for fentanyl in 2017 (591.6 kg of the global total, or 40.9 per cent), followed by Spain (122 kg, or 8.4 per cent), the United Kingdom (115.9 kg, or 8 per cent), France (72.8 kg, or 5 per cent), Italy (69.3 kg, or 4.8 per cent) and Canada (59.4 kg, or 4.1 per cent). Further details on exports and imports of fentanyl are contained in annex IV, tables 3 and 4.

80. Since 2006, global consumption of fentanyl has fluctuated between 1.2 and 1.8 tons. In 2017, 1,359 kg were consumed, down from 1,469 kg in 2016. The decrease in both manufacture and consumption 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 2017, most of the global consumption of fentanyl (87 per cent) was concentrated in 16 countries, all of which were high-income countries. The two largest consumers were the United States (307.7 kg, or 22.6 per cent) and Germany (283.3 kg, or 20.8 per cent) (see figure 28). Other major consumers of fentanyl were, in descending order of the amounts consumed, Spain, France, the United Kingdom, Italy, Canada, the Netherlands, Japan and Belgium.

81. In 2017, global stocks of fentanyl stood at 4 tons, an increase from the level of 2016 (3.6 tons), but still lower than that of 2010 (5 tons). The largest stocks were held by the United States (1.3 tons, or 33.2 per cent of global stocks), Germany (1.2 tons, or 29.5 per cent) and Belgium (0.6 tons, or 14.9 per cent).

Fentanyl analogues

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

Alfentanil

83. The manufacture of alfentanil has fluctuated significantly since 2002. In 2012, global manufacture peaked at 78.3 kg; in 2009, only 5.5 kg were manufactured. Global manufacture of alfentanil more than tripled in 2015 compared with 2014, to 51.1 kg from 15.2 kg; dropped to 17.2 kg in 2016, stabilizing at 16.7 kg in 2017. The only manufacturers in 2017 were Slovakia (12.3 kg, or 73.8 per cent of global manufacture) and the United States (4.4 kg, or 26.2 per cent).

84. In 2017, global consumption of alfentanil (19.4 kg) decreased slightly from the level of the previous year. The United Kingdom was the main consumer country (9.5 kg, or 48.9 per cent of global consumption), followed by Germany (1.8 kg, or 9.3 per cent), Brazil (1.7 kg, or 8.7 per cent), Italy[17] (1.4 kg, or 7.2 per cent) and France (1.1 kg, or 5.8 per cent). Detailed information on the consumption of fentanyl analogues is provided in part four, table XIII.1. In the period 2015–2017, global stocks of alfentanil decreased by more than 60 per cent, from 183.2 kg in 2015 to 67.4 kg in 2017. Belgium was the main holder of alfentanil stocks, with 41.1 kg (61 per cent of global stocks), followed by Germany (10.2 kg, or 15.1 per cent), the United States (5.8 kg, or 8.6 per cent) and the United Kingdom (3.9 kg, or 5.8 per cent). Much smaller quantities, in descending order of amounts, were held by Italy, Sweden, Slovakia and Switzerland, together accounting for 3.9 kg (5.8 per cent) of the total.

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 to 200 times as potent as morphine. In 2002, 27 kg of remifentanil were manufactured. Since then, manufacture has been fluctuating considerably. It peaked at 111.8 kg in 2016 but decreased to 84.1 kg in 2017, owing primarily to a considerable reduction in the manufacture of remifentanil in Belgium, which had been the biggest manufacturer and exporter of that substance in recent years. In 2017, Spain was the main manufacturing country, with 19.1 kg (22.7 per cent) of global manufacture; it was followed by the United Kingdom (18.9 kg, or 22.4 per cent), China (15.8 kg, or 18.8 per cent), Argentina (10.8 kg, or 12.8 per cent) and South Africa (8.6 kg, or 10.2 per cent). Belgium, Italy, Spain and the United Kingdom were the main exporting countries, totalling 85.6 kg and accounting for 80.4 per cent of global exports. Italy was the main importing country, with 54.3 kg (46.4 per cent) of global imports; it was followed by Germany (15 kg, or 12.8 per cent), Japan (8.4 kg, or 7.2 per cent), Serbia (6.3 kg, or 5.4 per cent) and the Republic of Korea (4.7 kg, or 4 per cent). Despite the decrease in manufacture, consumption increased from 69.6 kg in 2016 to 90.4 kg in 2017. The main consumer countries were China (14.9 kg, or 19.7 per cent of global consumption), Italy[18] (14.2 kg, or 15.7 per cent), Germany (12.8 kg, or 14.2 per cent), Spain (8.6 kg, or 9.5 per cent), Japan (8.4 kg, or 7.2 per cent) and Brazil (4.8 kg, or 5.3 per cent). In 2017, global stocks of remifentanil decreased to 136.3 kg, compared with 141.1 kg in 2016. The largest amounts of global stocks were held by Italy[18] (52.5 kg, or 38.5 per cent), China (21.4 kg, or 15.7 per cent), the United Kingdom (10.9 kg, or 8 per cent), Germany (9.2 kg, or 6.7 per cent), Japan (6.3 kg, or 4.7 per cent) and the United States (4.8 kg, or 3.5 per cent).

Sufentanil

86. In 2017, global manufacture of sufentanil decreased by almost half, to 4 kg from 7.8 kg in 2016. The main countries manufacturing sufentanil were Slovakia (1.3 kg, or 33.1 per cent), China (1.2 kg, or 29.3 per cent), the United States (0.95 kg, or 23.9 per cent) and Belgium (0.5 kg, or 13.7 per cent). The main exporting countries were Slovakia (1.6 kg, or 36.9 per cent), Belgium (0.67 kg, or 15.7 per cent) and the United Kingdom (0.6 kg, or 14.1 per cent). In 2017, global consumption of sufentanil increased to 4.9 kg, the highest level ever recorded. The largest consumers of sufentanil were, in descending order of amounts consumed, China, Germany, France, the United States and Canada, which together accounted for 4 kg, or 88.8 per cent, of the global total. In 2017, global stocks of sufentanil totalled 19.9 kg, most of which were held by the United States (6.4 kg, or 32.3 per cent), China (6.3 kg, or 31.6 per cent), Belgium (2 kg, or 9.8 per cent), Germany (1.8 kg, or 9 per cent) and Slovakia (1.6 kg, or 8 per cent).

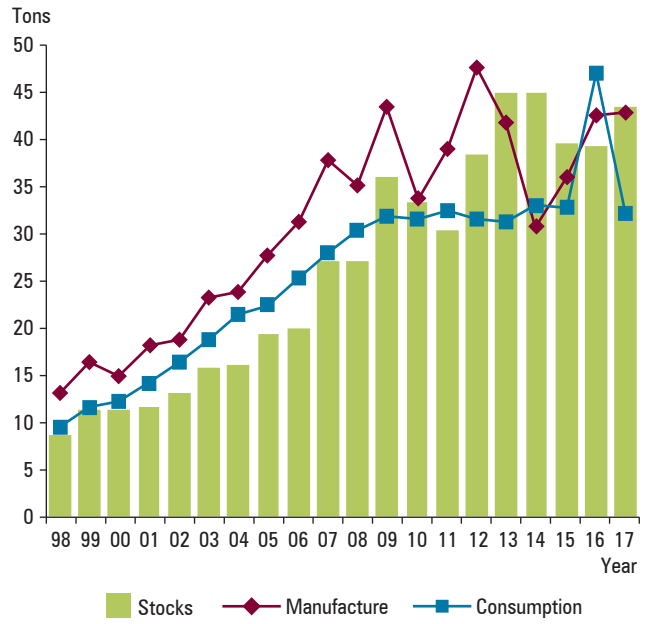
Ketobemidone

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 consumption has been decreasing from year to year; the last reported manufacture figure of 365.8 kg was submitted in 2015. Stocks have been fluctuating, from 142 kg in 2013 to 88 kg in 2014, 196 kg in 2015,

[17] This figure is being clarified with the respective Government.

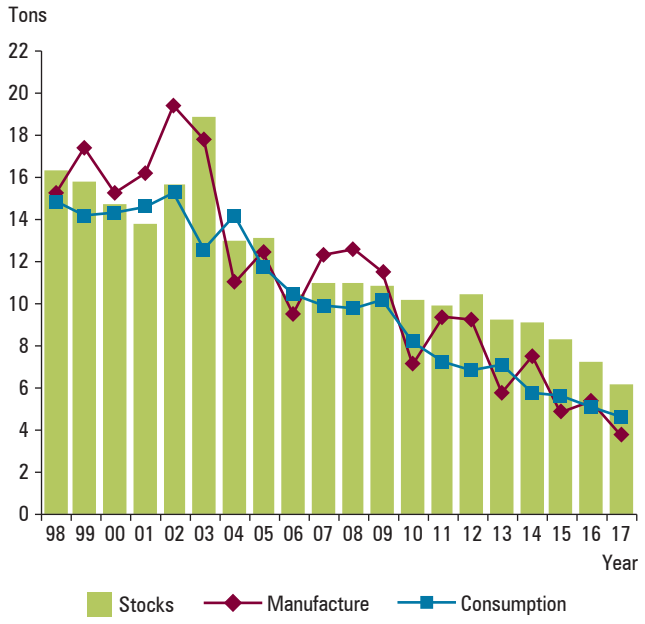
[18] This figure is being clarified with the respective Government.

Figure 29. Methadone: global manufacture, consumption and stocks,[a] 1998–2017



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

Figure 30. Pethidine: global manufacture, consumption and stocks,[a] 1998–2017



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

151.9 kg in 2016 and 97.6 kg in 2017. The level in 2017 constitutes the second-lowest level, after 2014, in the past 20 years. In 2017, only 49 kg of ketobemidone were exported, mainly by Germany (38.4 kg, or 78.5 per cent) and France (9.4 kg, or 19.2 per cent). Germany held 67.7 per cent of global stocks of ketobemidone (66.1 kg), followed by Sweden (10.6 kg, or 10.8 per cent), Norway (9.9 kg, or 10.1 per cent) and Denmark (5.5 kg, or 5.6 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 29, the trends related to its consumption, manufacture and stocks show a steady increase over the 20-year period 1998–2017, albeit with some fluctuations. The manufacture of methadone remained relatively stable at 42.8 tons in 2017. The main manufacturing countries were the United States (21.8 tons, or 50.9 per cent) and Switzerland (14.7 tons, or 34.3 per cent), followed by Germany (2.6 tons, or 6.1 per cent) and India (1.6 tons, or 3.7 per cent). Smaller quantities were manufactured by China, Slovakia and the United Kingdom. In 2017, Switzerland continued to be the main exporter of methadone (10.5 tons, or 55.8 per cent); it was followed by the United States (2.1 tons, or 11.2 per cent), India (1.4 tons, or 7.6 per cent) and the Netherlands (1.2 tons, or 6.3 per cent). The main importing countries were Canada (2.2 tons, or 11.6 per cent of the global total), the United Kingdom (2 tons, or 10.6 per cent), Viet Nam (1.6 tons, or 8.5 per cent), France (1.5 tons, or 7.9 per cent), Germany and Italy (1.4 tons, or 7.5 per cent, each) and the Netherlands (1.1 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 32.1 tons in 2017, a considerable decrease from the level of 47.1 tons in 2016, which can be accounted for by sharp drops in consumption in the United States (44 per cent) and the United Kingdom (82 per cent). The largest consuming countries were the United States (14.6 tons, or 45.6 per cent of global consumption), Canada (almost 2 tons, or 6.2 per cent), Viet Nam[19] (1.7 tons, or 5.3 per cent), Germany (1.7 tons, or 5.2 per cent), Italy and China (1.3 tons, or 4 per cent, each), and France and Australia (1.1 tons, or 3.5 per cent, each). In most cases, the different levels of consumption were related to the presence or absence of people who inject drugs. In other cases, even though there was a certain number of such people, little or no methadone (and buprenorphine) seemed to be consumed, and few, if any, opiate substitution treatment services seemed to be available.

90. Stocks of methadone amounted to 43.5 tons, which were mainly held by the United States (15.9 tons, or 36.6 per cent), Switzerland (12.6 tons, or 28.9 per cent) and Germany (4.5 tons, or 10.3 per cent). Other countries holding stocks of more than one ton, in descending order

[19]This figure was calculated by INCB using available data series. It is being followed up with the Government.

of the amounts held, were France, Canada and Italy, together accounting for 10.2 per cent of global stocks.

Pethidine

91. The manufacture of pethidine has continued to fluctuate since 1995. Manufacture increased slightly in 2014 to 7.5 tons, only to drop again in 2015 to 5.1 tons. In 2017, it decreased further, to 3.8 tons (see figure 30). Consumption of pethidine, which stood at 15.3 tons in 2002, has been decreasing steadily since then, reaching 4.7 tons in 2017. Pethidine is used mostly for pain relief in childbirth. The 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), as 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 2017, manufacture of pethidine was concentrated in Spain (1,420 kg, or 37.9 per cent), Slovakia (1,096 kg, or 29.2 per cent), China (801 kg, or 21.4 per cent), the United States (342.7 kg, or 9.1 per cent) and India (91.1 kg, or 2.4 per cent). The main exporting countries were Slovakia and Spain (almost 1,400 kg, or 34.7 per cent, each), followed by the United Kingdom (371 kg, or 9.4 per cent), Germany (277 kg, or 7 per cent) and Austria (189 kg, or 4.8 per cent). The main countries importing pethidine were the United Kingdom (565 kg, or 16.7 per cent), Austria (311 kg, or 9.2 per cent), the Republic of Korea (226 kg, or 6.7 per cent), Brazil (193 kg, or 5.7 per cent) and Turkey (189 kg, or 5.6 per cent). Quantities of pethidine that exceeded 100 kg — but that represented less than 5 per cent of total imports — were imported, in descending order of the amounts imported, by the Islamic Republic of Iran, Thailand, Canada, Ghana, Germany, Switzerland and the Netherlands. Further details on exports and imports of pethidine are contained in annex IV, tables 3 and 4.

93. Pethidine consumption amounted to 4.7 tons in 2017. The main consumer countries were the United States (604 kg, or 12.7 per cent) and China (572 kg, or 12 per cent). Other countries consumed smaller quantities; in descending order of the amounts consumed, those countries included South Africa, Brazil, Canada, Turkey, Myanmar, the Republic of Korea, the Islamic Republic of Iran and Spain. As a consequence of the overall decline in manufacture and consumption, global stocks of pethidine also continued to decline, reaching 6.1 tons in 2017. The largest stocks were held by the United States (1,807 kg, or 29.4 per cent of global stocks), Germany (916 kg, or 15 per cent), China (802 kg, or 13 per cent) and Slovakia (394 kg, or 6.4 per cent).

Tilidine

94. In 2017, as in previous years, Germany was the only manufacturer of tilidine. Manufacture continued to fluctuate, amounting to 50.4 tons in 2017. Exports of tilidine decreased to 52.6 tons in 2017. As the sole manufacturer, Germany also continued to be the principal exporting country in 2017, accounting for 52.3 per cent of global exports. That was a considerable reduction from the level of 2012, when Germany accounted for 98 per cent of exports. Serbia was the second exporting country in 2017, accounting for 46.2 per cent of reported exports.

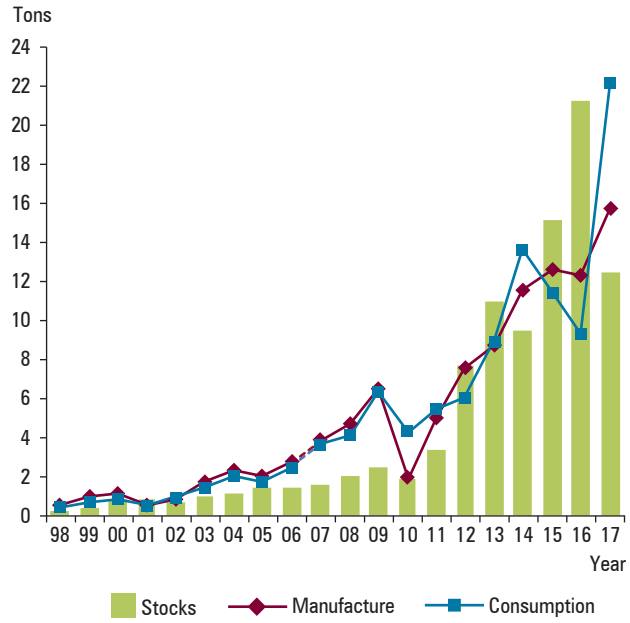
95. After reaching a record level of 59.1 tons in 2012, consumption of tilidine dropped to 20 tons in 2013, but rose gradually, to 30.2 tons in 2017. Most tilidine is consumed in Germany (28 tons, or 92.9 per cent), followed by Belgium (2 tons, or 6.8 per cent). In 2017, nearly all global stocks of tilidine (54.6 tons, or 90 per cent of the global total) were held by Germany.

Trimeperidine

96. Before 2012, the quantity of trimeperidine manufactured fluctuated considerably for a number of years; from 2012 to 2017, it was more or less stable at about 200 kg. Manufacture in 2017 stood at 211.2 kg. The only manufacturers of trimeperidine were the Russian Federation (184.7 kg, or 87.5 per cent of the global total) and Ukraine (26.5 kg, or 12.5 per cent). Trimeperidine was discovered around 1945 in the former Union of Soviet Socialist Republics (USSR) and, historically, consumption was concentrated there. After the collapse of the USSR, the post-Soviet States continued to be the main consumers and importers of the substance.

97. In 2016, the main exporter of trimeperidine was the Russian Federation (46.6 kg, or 33.2 per cent of global exports), followed by Ukraine (31.9 kg, or 22.7 per cent), Latvia (28.9 kg, or 20.6 per cent), India (20.7 kg, or 14.7 per cent) and Slovakia (12.3 kg, or 10.7 per cent). The main importing countries in 2017 were Latvia (56.9 per cent of global imports), Slovakia (15.2 per cent), Belarus (13 per cent) and Uzbekistan (5.5 per cent). In 2017, stocks stood at 307.5 kg; they were mainly held by the Russian Federation (169.4 kg, or 55.1 per cent), Latvia (49.4 kg, or 16.1 per cent), Kazakhstan (54 kg, or 17.5 per cent), Belarus (20.2 kg, or 6.6 per cent) and Ukraine (19.5 kg, or 6.4 per cent). Slovakia and Uzbekistan each held quantities of less than 5 per cent.

Figure 31. Buprenorphine: global calculated consumption,[a] reported manufacture and stocks,[b] 1998–2017



[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.

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.[20]

[20]E/INCB/2018/3.

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. Since the late 1990s, global manufacture of buprenorphine has 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 12.3 tons, before increasing to 15.8 tons in 2017 (see figure 31). The main manufacturing countries in 2017 were the United Kingdom (9.7 tons, or 62 per cent of global manufacture), the United States (1.9 tons, or 12.3 per cent), Czechia (1.4 tons, or 9.4 per cent), Belgium (1.1 tons, or 7.3 per cent) and India (0.6 tons, or 4 per cent). In 2017, the main exporters were, in descending order of the amounts exported, the United Kingdom, Czechia, Germany, Belgium, the United States, France, Switzerland and Australia. The main countries importing buprenorphine in 2017 were, in descending order of the amounts imported, Germany, the United Kingdom, the United States, France, Czechia, Australia, Spain and Canada.

Pentazocine

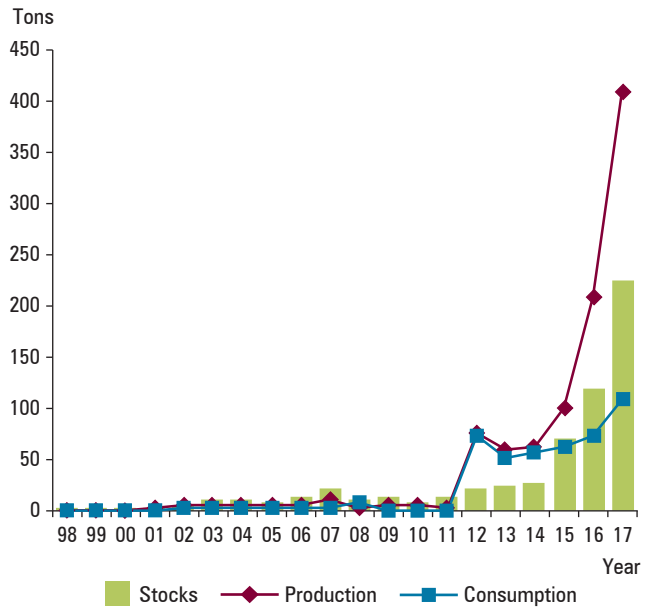
100. Pentazocine is an opioid analgesic with properties and uses similar to those of morphine. In 2017, global manufacture of pentazocine decreased to 1.8 tons, most of which took place in India (1.2 tons, or 67.1 per cent of global manufacture), followed by China (350 kg, 18.9 per cent) and Italy (257 kg, or 13.9 per cent). India was also the world's leading exporter of pentazocine in 2017, with 565 kg (70 per cent) of total exports, followed by Italy, with 158 kg (20 per cent). The main importers were Nigeria (402 kg, or 63 per cent of total imports), Japan (107 kg, or 16.9 per cent), Canada (52 kg, or 8.2 per cent) and Portugal (28 kg, or 4.4 per cent).

Cannabis

101. The licit use of cannabis 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 and more countries have started to use cannabis and cannabis extracts[21] for medical purposes, as well as for scientific research. In 2000, total production was 1.4 tons; by 2017, it had increased to 406.1 tons (see figure 32). Since the licit cultivation of cannabis for medical and scientific purposes has increased considerably in recent years, and the processes for manufacturing and measuring yields are not standardized, some data are being clarified with the relevant Governments in order to ensure consistency. In 2017, the United Kingdom was the main producer, reporting the production of 258.4 tons (63.6 per cent of the global total) of pharmaceutical preparations containing cannabis extracts, followed by Canada (131.4 tons, or 32.4 per cent) and Israel (10.4 tons, or 2.6 per cent). A total of 10 other countries

[21]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").

Figure 32. Cannabis: global production,[a] consumption and stocks,[b] 1998–2017



[a]Production figures for the United Kingdom for 2016 and 2017 reflected in the total are being followed up with the Government.
[b]Stocks as at 31 December of each year.

manufactured quantities of less than 5 tons. Those countries, in descending order of the amounts manufactured, were the Netherlands, Spain, Chile, Austria, Switzerland, Australia, Czechia, the United States, Italy and Lesotho (see table 1 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.

Table 1. Cultivation of cannabis plant and production of cannabis, 2015–2017

Country[a]	Year	Area harvested (hectares)	Quantity produced (kilograms)
Australia	2015	n/a	n/a
	2016	n/a	n/a
	2017	. .[b]	224
Austria	2015	0.04	59
	2016	0.09	116
	2017	. .	259
Canada	2015	. .	48 491
	2016	10.74	80 816
	2017	20.20	131 437
Chile	2015	. .	36
	2016	1.00	1 416
	2017	1.00	444
Colombia	2015	n/a	n/a
	2016	n/a	n/a
	2017	0.36[c]	. .
Czechia[d]	2015	n/a	n/a
	2016	. .	46
	2017	. .	95
Israel	2015	7.45	7 758
	2016	8.45	9 263
	2017	9.03	10 424
Italy	2015	. .	. .
	2016	. .	315
	2017	. .	60
Japan	2015	0.57	. .
	2016	0.58	. .
	2017	0.05	. .
Lesotho	2015	n/a	n/a
	2016	n/a	n/a
	2017	9.00	16
Netherlands	2015	0.50	1 100
	2016	0.50	1 460
	2017	. .	2 385
Portugal	2015	15.00	169
	2016	7.00	21 000
	2017	. .	. .
Spain	2015	n/a	n/a
	2016	n/a	n/a
	2017	0.66	2 079[e]
Switzerland	2015	. .	315
	2016	. .	453
	2017	. .	230
United Kingdom	2015	. .	41 706
	2016	117.00	95 000[f]
	2017	37.90	258 378
United States	2015	. .	566[g]
	2016	. .	. .
	2017	. .	74[g]
Uruguay	2015	n/a	n/a
	2016	—	—
	2017	—	—
Total	**2015**	**23.56**	**100 201**
	2016	**145.36**	**209 884**
	2017	**78.20**	**406 104**

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. N/a indicates that there was no reported licit cultivation of cannabis in that year in question.

[a]In addition to the 17 countries listed in this table, Malta and South Africa furnished estimates for 2018 and/or 2019 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 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]The manufactured quantity is being used solely and exclusively for research purposes.

[f]Reported figures for 2016 and 2017 are being followed up with the Government.

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

102. The United Kingdom continued to be the main exporter of cannabis (4.9 tons, or 69.1 per cent of the global total), mainly in the form of cannabis extracts or pharmaceutical preparations containing cannabis extracts; it was followed by the Netherlands (1.3 tons, or 18.1 per cent), Canada (393 kg, or 5.5 per cent) and Austria (263 kg, or 3.6 per cent). Countries exporting less than 100 kg each were, in descending order, Germany, Denmark, Portugal, the United States, Belgium and Israel. In 2017, the United States imported almost 14 tons (66.9 per cent of the global total), followed by Germany (4.5 tons, or 21.8 per cent) and Italy (0.7 tons, or 3.5 per cent). Smaller quantities in excess of 100 kg were imported by the Netherlands, Spain and Switzerland. Most of the stocks were held by the United Kingdom (213.2 tons, or 94.6 per cent), followed by Canada (8.2 tons, or 3.6 per cent), Israel (almost 1.5 tons, or 0.7 per cent) and the Netherlands (1.4 tons, or 0.6 per cent).

Coca leaf and cocaine

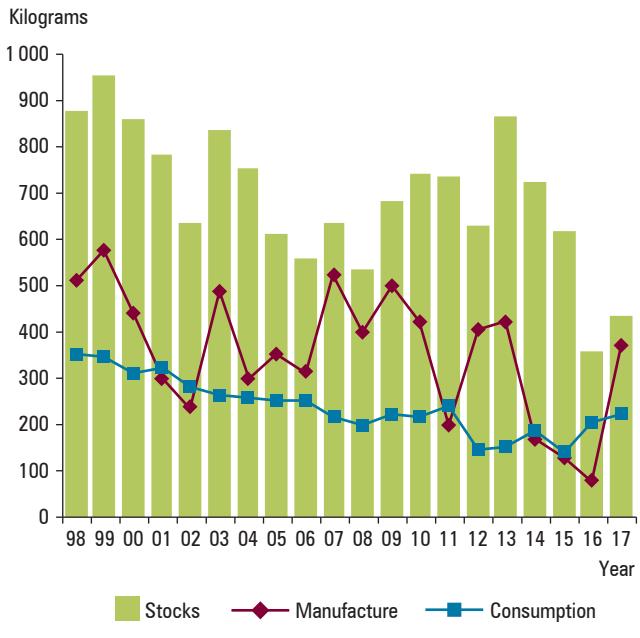
Coca leaf

103. Peru has been the only country exporting coca leaf for the global market since 2000. At the time of preparing this report, Peru had not provided production data for 2017, but had reported an export volume of 147.3 tons, in line with previous years. The United States was the only importing country and accounted for the largest amount utilized (611.4 tons, or 82.9 per cent). Peru utilized 125.3 tons, or 17 per cent. The United States utilizes coca leaf for the extraction of flavouring agents and the manufacture of cocaine as a by-product. Imports by the United States decreased to 90.9 tons in 2017. Stocks of coca leaf are almost exclusively maintained by the United States (82.9 per cent) and Peru (17 per cent). The other major licit producer of coca leaf, the Plurinational State of Bolivia, provided information on estimated cultivation (16,643 ha) and preliminary production data (23,417 tons) for 2017 to the Board. The cultivation of coca bush in that country 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 the country in 2013, when it reacceded to the 1961 Convention as amended by the 1972 Protocol.

Cocaine

104. The global licit manufacture of cocaine continued to fluctuate, as it has for more than 20 years, reaching 370.9 kg in 2017 (see figure 33). The main manufacturing country was the United States (259 kg, or 69.8 per cent), followed by Peru (111.8 kg, or 30.1 per cent). The main exporting country in 2017 was the United Kingdom (90.3 kg, or 82.1 per cent of global exports), followed by the Netherlands (12.9 kg, or 11.9 per cent). Switzerland, Germany and Peru exported smaller quantities in excess of 1 kg. The Netherlands was the main importing country (32 kg), accounting for 30.1 per cent of the total imports of cocaine in 2017, followed by Australia (15.2 kg, or 14.3 per cent), Canada (12.4 kg, or 11.7 per cent), Switzerland (7.8 kg, or 7.4 per cent) and Belgium (5.5 kg, or 5.1 per cent). The licit consumption of cocaine, which had been declining for a number of years, in particular since 2011, decreased to 138 kg in 2015 and began increasing again in 2016, reaching 222 kg in 2017. The main consumer country was the United Kingdom (125.2 kg, or 56.4 per cent), followed by the United States (25.2 kg, or 11.4 per cent), the Netherlands (12.1 kg, or 5.4 per cent), Belgium (7.2 kg, or 3.3 per cent), Australia (7.1 kg, or 3.2 per cent) and Canada (7 kg, or 3.1 per cent). The largest stocks were held by Peru (176.7 kg, or 40.7 per cent), the United States (91 kg, or 21 per cent), the Russian Federation (46.3 kg, or 10.7 per cent), the United Kingdom (32.1 kg, or 7.4 per cent), Canada (14.8 kg, or 3.4 per cent) and Japan (14.1 kg, or 3.2 per cent).

Figure 33. Cocaine: global manufacture, consumption and stocks,[a] 1998–2017



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

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).[22]

106. Countries reporting the highest average consumption of opioids for pain management in the period 2015–2017 were the United States (32,394 S-DDD), Germany (26,237 S-DDD), Austria (20,284 S-DDD), Canada (19,925 S-DDD) and Belgium (17,307 S-DDD).

107. When comparing the trends in the consumption of individual substances (figures 34 and 35), it is evident that there has been an exponential increase in the consumption of fentanyl over the past 20 years. Compared with fentanyl, the consumption of oxycodone is at a lower level; however, it has been increasing and, since 2009, has replaced morphine as the second most-consumed opioid, reaching an all-time high of 45,661 S-DDD in 2017. The trend for the use of morphine, on the other hand, has remained relatively stable since the late 1990s. In 2017, consumption of morphine decreased slightly compared with 2016, from 30,009 to 29,061 S-DDD. Hydrocodone consumption increased for some years but has started to decline recently. Hydromorphone consumption, after having decreased in 2016, increased again in 2017, reaching 13,527 S-DDD. 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, there were significant increases in various countries in all other regions..

Figure 34. Consumption of codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone, expressed in S-DDD, 1998–2017

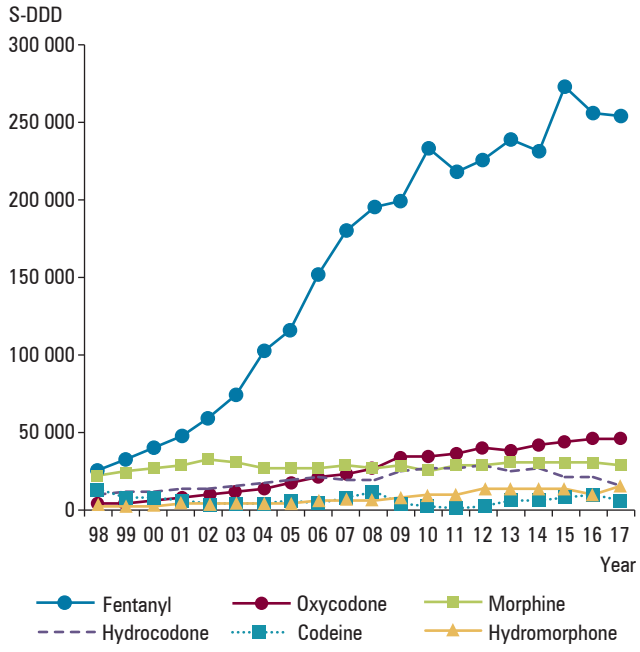
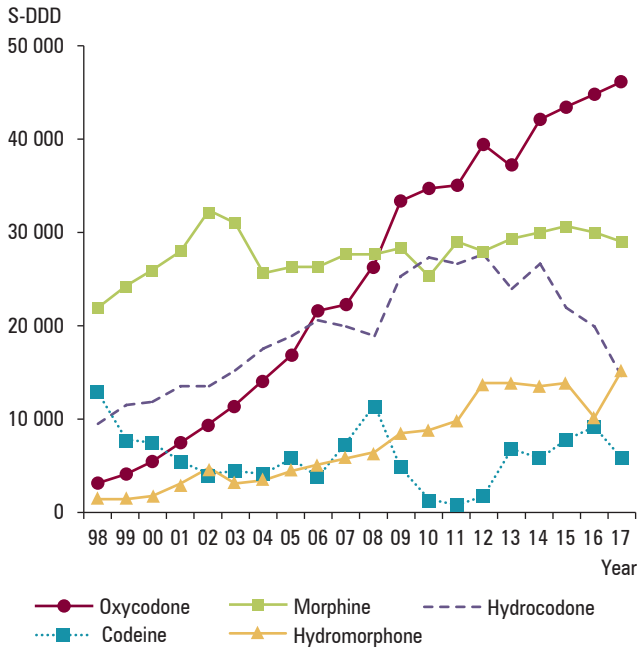


Figure 35. Consumption of codeine, hydrocodone, hydromorphone, morphine and oxycodone, expressed in S-DDD (excluding fentanyl), 1998–2017



[22]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 in part four.

108. Regional analysis confirms the disparity in the consumption of opioid analgesics (figures 36–39). The reported consumption of countries in North America, Oceania and Western Europe resulted in regional averages of over 10,000 S-DDD (22,874, 14,241 and 12,230 S-DDD, respectively). The analysis in figures 36 and 37 of the 20-year trend shows a sharp decrease in S-DDD in North America, the region with highest consumption of opioids for pain management in the world. This decrease was driven mainly by the United States, which reported consumption of 24,929 S-DDD in 2017, 27.1 per cent lower than the 34,204 S-DDD reported in 2016. Declining consumption had been reported in Oceania since 2012, but, in 2017, an increase in consumption was reported, to 14,241 S-DDD, compared with 10,743 S-DDD in 2016. The general upward trend in consumption in the region as a whole is evident in South-Eastern Europe; a slight decrease was reported in Western and Central Europe, although the general stable trend was maintained.

109. Consumption well below those values was reported in other regions in 2017. A general trend of increased consumption was reported in South America (561 S-DDD), East and South-East Asia (429 S-DDD) and Eastern Europe (470 S-DDD) in the past 20 years, while West Asia (493 S-DDD) has seen a sharp decrease since 2008. Africa (88 S-DDD), Central America and the Caribbean (157 S-DDD) and South Asia (58 S-DDD) continued to be the regions with the lowest consumption in the world. In 2017, the three regions remained below the 200 S-DDD threshold, below which consumption is considered inadequate, and Africa and South Asia remained below the 100 S-DDD threshold, with consumption considered as very inadequate.

110. Figures 38 and 39 show the sum of S-DDD by substance and region. This analysis highlights once again the prominence of fentanyl in various regions of the world. Oxycodone consumption is more concentrated in North America, Western and Central 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, with the exception of Africa, Central America and the Caribbean, and South America.

Figure 36. Average consumption of opioids for pain management in the regions with the highest consumption, expressed in S-DDD, 1998–2017

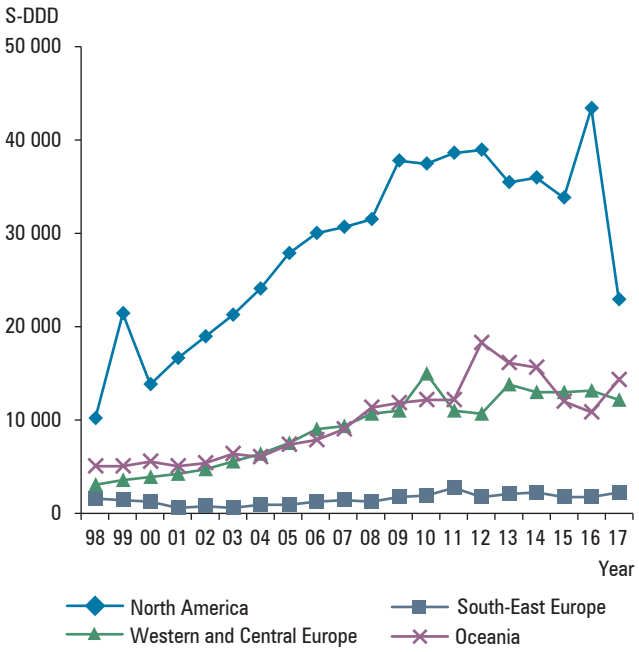


Figure 37. Average consumption of opioids for pain management in the regions with the lowest consumption, expressed in S-DDD, 1998–2017

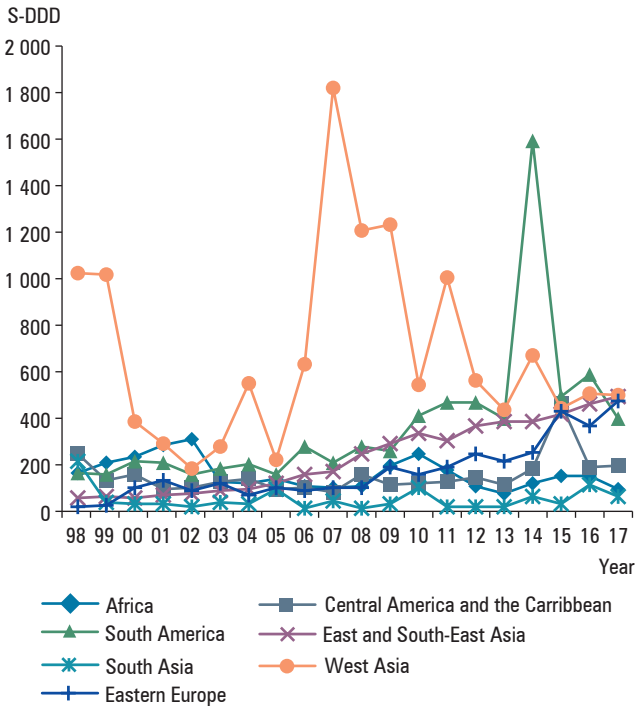


Figure 38. Average consumption of codeine, fentanyl, morphine, pethidine and other opioids, by region, expressed in S-DDD, 2017

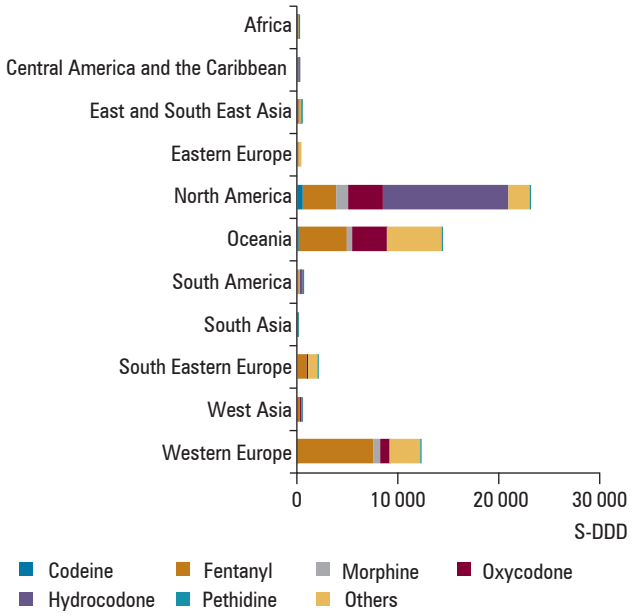


Figure 39. Average consumption in selected regions of codeine, fentanyl, morphine, pethidine and other opioids, expressed in S-DDD, 2017