COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

Summary

The further overall reduction in global stocks and in the production of opium confirm the continuing trend towards the eventual elimination of the drug from the international market for opiate raw material.

Poppy straw and concentrate of poppy straw derived from the two main varieties of poppy straw (the morphine-rich and thebaine-rich varieties) decreased slightly in 2016 compared with 2015, and the manufacture of morphine remained stable at 422.1 tons, of which around 87 per cent of global manufacture was converted into other narcotic drugs or into substances not covered by the 1961 Convention. Of the remaining 13 per cent, only 8.6 per cent was directly consumed for palliative purposes.

The differences in consumption levels between countries continued to be very significant. In 2016, 80 per cent of the world population consumed only 14 per cent of the total amount of morphine used for the management of pain and suffering. Although that represented an improvement on 2014, when 80 per cent of the world population consumed 9.5 per cent, the disparity in consumption of narcotic drugs for palliative care continues to be a matter of concern.

After some fluctuations in the preceding years, global manufacture of thebaine reached the record level of 156 tons in 2016, signalling that the demand for medicines derived from thebaine, after having decreased in the past several years, appears to have resumed, despite restrictions on prescription drugs recently imposed in the main market (the United States of America) in response to their abuse and the high number of overdose deaths they have caused.

This was reflected in the fact that the global manufacture of oxycodone and hydrocodone increased in 2016, while the other semi-synthetic opioids (with the exception of heroin) all decreased.

In the case of synthetic opioids, global manufacture of fentanyl continued to fluctuate, decreasing to 2.3 tons in 2016. The manufacture of fentanyl analogues, remifentanil and sufentanil, also decreased, while the manufacture of alfentanil increased. The manufacture of dextropropoxyphene and ketobemidone ceased in 2016, and diphenoxylate continued to be manufactured in much smaller quantities than in the past. The manufacture of pethidine remained at a low level, while the manufacture of tilidine and trimeperidine continued to fluctuate. The manufacture of methadone continued to increase, as more and more countries used it in the treatment of opioid dependence.

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 2016 it had increased to 211.3 tons.

Peru has been the only country to export coca leaf for the global market since 2000. At the time of preparing this report, Peru had not provided production data for 2016, but had reported an export volume of 136 tons, in line with previous years.

The other major licit producer of coca leaf, the Plurinational State of Bolivia, provided information to the Board on the estimated cultivation (14,705 ha) and preliminary production data (23,217 tons) for 2016. 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 expressed in 2013, when the country reacceded to the 1961 Convention, as amended by the 1972 Protocol.

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 135-256 and annexes III and IV, pages 313-448). Unless otherwise indicated, the comments refer to developments during the period 1997–2016.

[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]The parties shall 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 1961 Convention and of substances not covered by the Convention and on the utilization of poppy straw for the manufacture of drugs.

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 2016. 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 below.[3] The most pertinent conclusions and recommendations of INCB based on the analysis of statistical returns are included in chapter II of its annual report.[4]

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

[4]E/INCB/2017/1.

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.

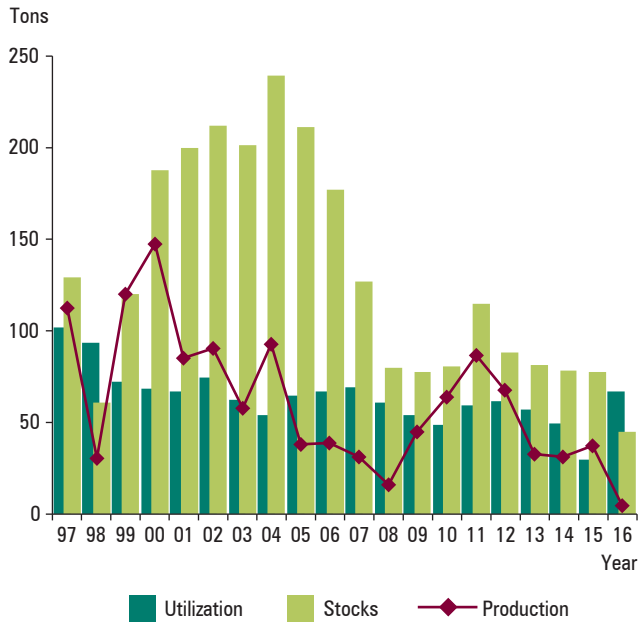
Opium

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 1997–2016, expressed in morphine equivalent. Not 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. 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. Though imports increased marginally, from 67.7 tons (7.4 tons in morphine equivalent) in 2015 to 69.2 tons (7.6 tons in morphine equivalent) in 2016, the level was much lower than that of 2014 (283.1 tons, or 31.1 tons in morphine equivalent). At the same time, stocks of opium also continued to be depleted, decreasing from 709.5 tons in 2015 to 411 tons (or 45.2 tons in morphine equivalent) in 2016 (see figure 1).

[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.

Figure 1. Opium: global production, stocks[a] and use (consumption and utilization),[b] in tons of morphine equivalent, 1997-2016



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

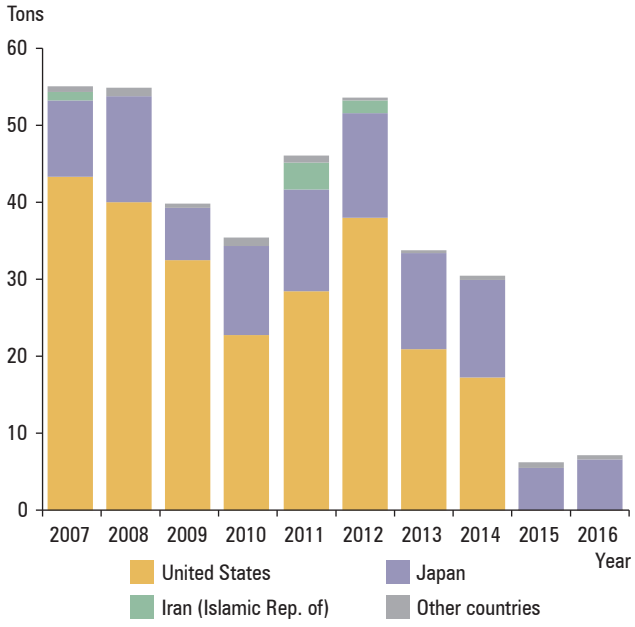
[b]Excluding the utilization of seized opium in Iran (Islamic Republic of) and Myanmar.

6. India was the main producer and only licit exporter of raw opium in 2016, accounting for 23.3 tons (2.5 tons in morphine equivalent) or 55.2 per cent of total global production, followed by China, with 18.9 tons (2 tons in morphine equivalent), where poppy straw has replaced opium as the main raw material used in the manufacture of alkaloids since 2000. Together with China, other countries produced smaller amounts of opium in 2016, but exclusively for domestic consumption and utilization. Japan produced 1.2 kg for research purposes. India accounted for 94.5 per cent of exports in 2016.

7. Opium exported by India contains morphine in a concentration of 9.5 to 12.0 per cent, codeine in a concentration of about 2.5 per cent and thebaine in a concentration of 1.0 to 1.5 per cent. Opium imports from India fluctuated in the period 2007–2016, decreasing significantly between 2013 and 2015 and reaching 69.2 tons in 2016 (see figure 2). The main countries importing opium were Japan (60 tons, or 86.7 per cent) followed by France (6.5 per cent), Switzerland (2.3 per cent), Thailand (1.8 per cent) and Spain (1.1 per cent). The United States, which had been the major importer in the past, reported imports of marginal quantities of opium from India in 2015 and 2016, amounting to 100 kg and 56 kg, respectively.

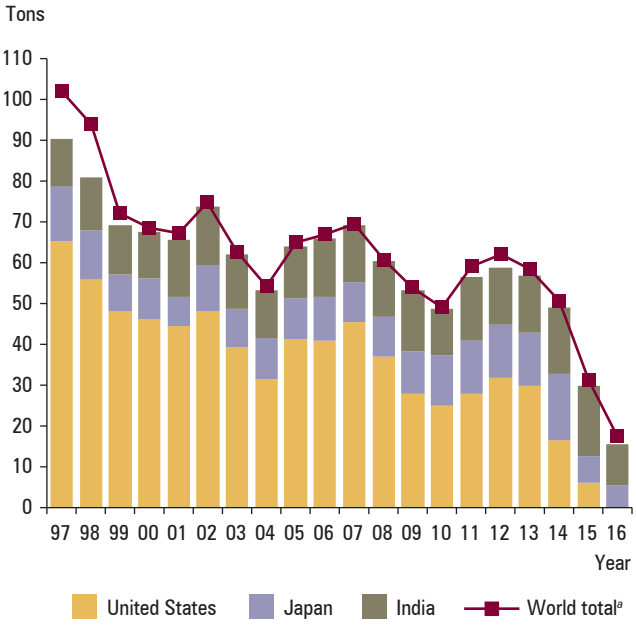
8. As in previous years, the bulk of opium was used for the extraction of alkaloids, with only a small amount (23.1 tons, or 2.5 tons in morphine equivalent) being used for Schedule III preparations. Total utilization of licitly produced opium for the extraction of alkaloids followed a declining trend during the period under consideration. Utilization declined further, from 271.7 tons (29.8 tons in morphine equivalent) in 2015 to 145.3 tons (15.9 tons in morphine equivalent) in 2016 (excluding the utilization of seized opium in the Democratic People's Republic of Korea and the Islamic Republic of Iran[6]). In 2016, the main users of opium for the extraction of alkaloids were India (91.2 tons) and Japan (54.1 tons), together accounting for almost 100 per cent of the global total (see figure 3). In addition, the Islamic Republic of Iran reported the manufacture of more than 464.8 tons (51.1 tons in morphine equivalent), but that quantity is not included in the global total because it originated from seizures. The Democratic People's Republic of Korea continued to report limited cultivation of opium poppy characterized by a very low yield, which the competent national authority attributed to unfavourable climate conditions and a lack of fertile soil. Details on the utilization of opium for the extraction of alkaloids and the alkaloids obtained are provided in table III.

Figure 2. Opium: imports from India, in tons of morphine equivalent, 2007-2016



Note: Amounts imported by the United States decreased significantly, to 100 kg, in 2015 and decreased further, to 56 kg, in 2016.

Figure 3. Opium: utilization for the extraction of alkaloids, in tons of morphine equivalent, 1997-2016



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

9. While the majority of opium is used for the extraction of alkaloids, opium is also consumed in some countries in the form of preparations, mainly for the treatment of diarrhoea and coughs. Most of those preparations are

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

included in Schedule III of the 1961 Convention.[7] Global consumption of opium for those purposes has fluctuated since 2001. In 2016, total consumption increased to 24.8 tons. The consumption and utilization of opium for the manufacture of preparations in Schedule III amounted to a total of 23.1 tons, including 9.5 tons (1 ton in morphine equivalent) in China, 7.3 tons (0.8 tons in morphine equivalent) in France and 5.4 tons (0.5 tons in morphine equivalent) in India. Thailand and Spain reported lower levels of utilization (720 kg and 20 kg, respectively).

10. Global stocks of opium reached a peak in 2004 (2,176.2 tons, or 239.3 tons in morphine equivalent) and then began to decrease thereafter (see figure 1), reaching 490.8 tons (53.9 tons in morphine equivalent) in 2016. India continued to maintain the largest stocks of opium (280.2 tons, or 30.8 tons in morphine equivalent, representing 68.1 per cent of the global total), followed by Japan (92 tons, or 10.1 tons in morphine equivalent) and China (22.7 tons, or 2.4 tons in morphine equivalent).[8] The United States almost totally eliminated its stock, from 137.2 tons in 2012 to 1.2 tons in 2016 (from 15 to 0.1 tons in morphine equivalent). The further overall reductions in global stocks and the production of opium confirm the continuing trend towards the eventual elimination of the drug.

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 2010 and in France in 2013. For statistical purposes, the quantities of poppy straw produced from that variety of opium poppy are recorded under "poppy straw (M)".

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

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 information in 2016. Global production of poppy straw (M) expressed in morphine equivalent followed an increasing trend in the two decades prior to 2016. 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 586 tons in 2015, decreasing again, to 463 tons, in 2016 (see figure 4). Throughout the two decades prior to 2016, Australia, France, Spain and Turkey were the main producer countries. In 2016, the leading producer was Australia (180 tons in morphine equivalent, accounting for 38.9 per cent of global production), followed by France (91 tons in morphine equivalent, or 19.7 per cent), Turkey (63 tons, or 13.6 per cent), Spain (56 tons, or 12.1 per cent) and Hungary (9 tons, or 1.9 per cent). Other main producers of poppy straw (M) in 2016 together accounted for the remaining 13.2 per cent 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.

14. In 2016, the production of opiate raw material (calculated in morphine equivalent) mostly from poppy straw (M) increased from 2015 levels in Australia (from 152 to 180 tons) and in Spain (from 33 to 56 tons), but decreased in France (from 168 to 91 tons) and Turkey (from 98 to 63 tons) (see figure 4). Changes in the area cultivated with opium poppy plant, the amounts of poppy straw (M) harvested and the yields obtained in producing countries are shown in table II.

[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 production of, stocks of and demand for opium, see also part three of the present publication, entitled "Supply of opiate raw materials and demand for opiates for medical and scientific purposes".

[9] The quantities in morphine equivalent of the morphine and codeine alkaloids 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 section, where applicable.

Figure 4. Total anhydrous morphine alkaloid contained in all poppy straw varieties: production in main producing countries, in tons of morphine equivalent, 2007-2016

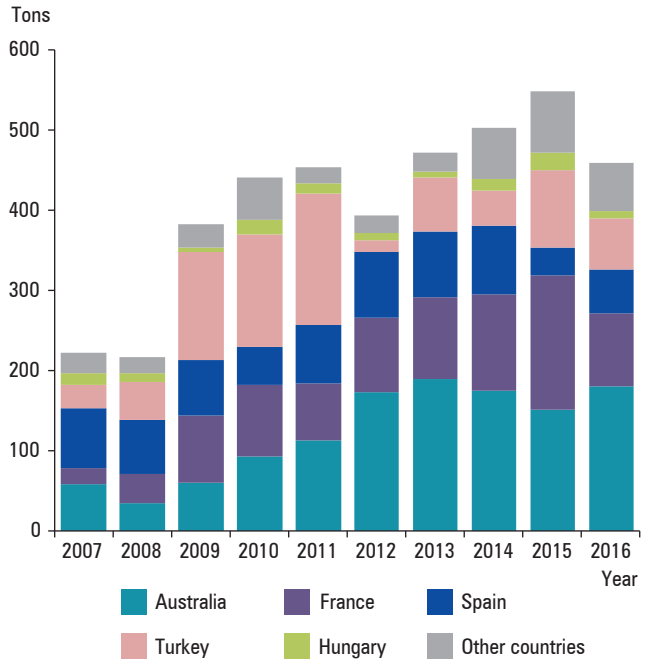
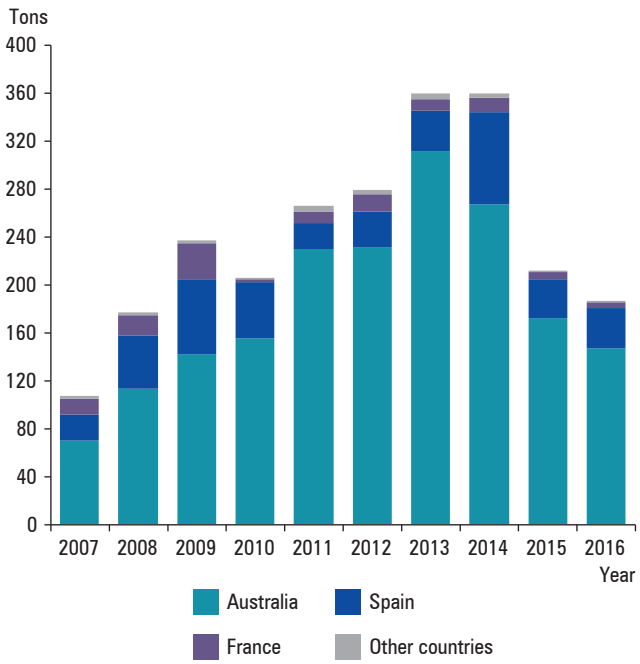


Figure 5. Total anhydrous thebaine alkaloid contained in all poppy straw varieties: production in main producing countries, in tons of thebaine equivalent, 2007-2016



15. International trade in poppy straw (M) as a raw material continues to be limited. In 2016, Czechia was the main exporter of poppy straw (M) for the extraction of alkaloids, followed by Australia, Slovakia and Hungary (see annex IV, table 1). Czechia, which cultivates opium poppy plants primarily for the production of seeds for culinary purposes, produces poppy straw as a by-product and exports it to Slovakia, where it is used for the extraction of alkaloids. Such poppy straw has a significantly lower morphine content than poppy straw obtained from opium poppy plants cultivated for the production of alkaloids. In 2016, Slovakia imported a total of 2,067.7 tons (expressed in gross weight) of poppy straw (M).

16. In 2016, the main countries utilizing poppy straw (M) were Turkey (16,550 tons in gross weight), Australia (6,596.8 tons) and France (4,050 tons). The United Kingdom of Great Britain and Northern Ireland, Portugal, Slovakia, Hungary and China utilized less than 1,000 tons. Further details on the utilization of poppy straw (M) for the extraction of alkaloids and the yields obtained are contained in table IV.

Poppy straw produced mainly[10] from opium poppy rich in thebaine (poppy straw (T))

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

18. Production of poppy straw (T) in the main producing countries during the period 2007–2016, expressed in thebaine equivalent, is shown in figure 5. Total production decreased from 216 tons in 2015 in thebaine equivalent to 187 tons in 2016. In 2016, Australia remained the leading producer, with 147 tons in thebaine equivalent, a decrease from 172 tons in 2015. It was followed by Spain, which reported 34 tons in 2016, approximately the same level as 2015. France reported only 5 tons, approximately the same level as 2015 (6 tons).

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

Poppy straw produced from opium poppy rich in codeine (poppy straw (C))

20. 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 has been increasing steadily, from 415 tons (expressed in gross weight) in 2010 to 6,706 tons in 2015, and dropped

[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 section, where applicable.

considerably in 2016 to 1,313 tons. Australia produced 59.6 per cent of poppy straw (C) and France the remaining 40 per cent. Similar proportions were reported for utilizations and stocks for both countries.

Poppy straw produced from opium poppy rich in noscapine (poppy straw (N))

21. In recent years, an increase in the cultivation of opium poppy rich in noscapine (poppy straw (N)) in some producing countries was reported. In 2016, Hungary was the main country to report its cultivation, with a total production of 655 tons (expressed in gross weight). France, the only other country that cultivated this variety of poppy straw, produced 230 tons.

Poppy straw used for decorative purposes

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

Concentrate of poppy straw

23. Most countries using poppy straw for the extraction of alkaloids first manufacture an intermediate product called "concentrate of poppy straw", although in some countries morphine or thebaine is manufactured directly from poppy straw in a continuous process, which may involve a number of other intermediate products (for details, see tables IV and V). Until the second half of the 1990s, only concentrate of poppy straw containing morphine as the main alkaloid was manufactured. Since then, concentrate of poppy straw containing mainly thebaine, oripavine or codeine has started to be manufactured. Concentrate of poppy straw may contain a mixture of alkaloids, and more alkaloids than just the principal alkaloid may be extracted in industrial processes. The different types of concentrate of poppy straw are referred to by the main alkaloid contained in them.[11]

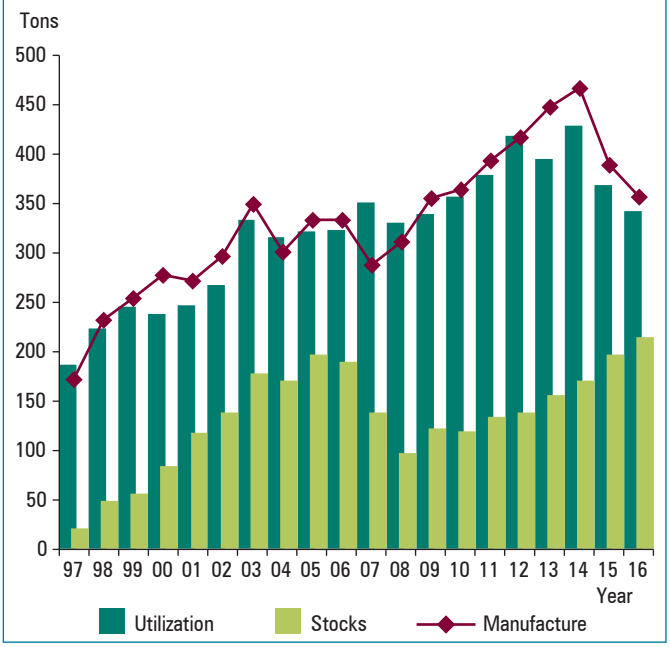
24. Since the actual content of alkaloids in concentrate of poppy straw may vary significantly, for purposes of comparison and for statistical purposes, all data referring to concentrate of poppy straw are expressed in terms of the quantity of the relevant anhydrous alkaloid contained in the material. The quantities of anhydrous morphine alkaloid contained in concentrate of poppy straw are referred to as AMA (CPS), those of anhydrous thebaine alkaloid as ATA (CPS), those of anhydrous oripavine alkaloid as AOA (CPS) and those of anhydrous codeine alkaloid as ACA (CPS). The totals of all the individual alkaloids contained in concentrate of poppy straw are examined below, expressed in terms of 100 per cent of anhydrous alkaloid content.[12]

Anhydrous morphine alkaloid contained in concentrate of poppy straw (AMA (CPS))

25. 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 1997–2016.

26. Global manufacture of AMA (CPS) has continuously increased since the 1990s, albeit with some fluctuations between 2003 and 2008, reaching its highest level ever in 2014 (466.3 tons). Its manufacture decreased in 2016 to 357.1 tons. Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 1997–2016 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, 1997-2016



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

[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.

[12]The comments on concentrate of poppy straw in the present publication are not directly comparable with comments on concentrate of poppy straw contained in editions of the present publication prior to 2005, since at that time, concentrate of poppy straw was expressed in terms of 50 per cent of the main alkaloid contained therein.

Figure 7. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: manufacture in the main manufacturing countries, 1997-2016

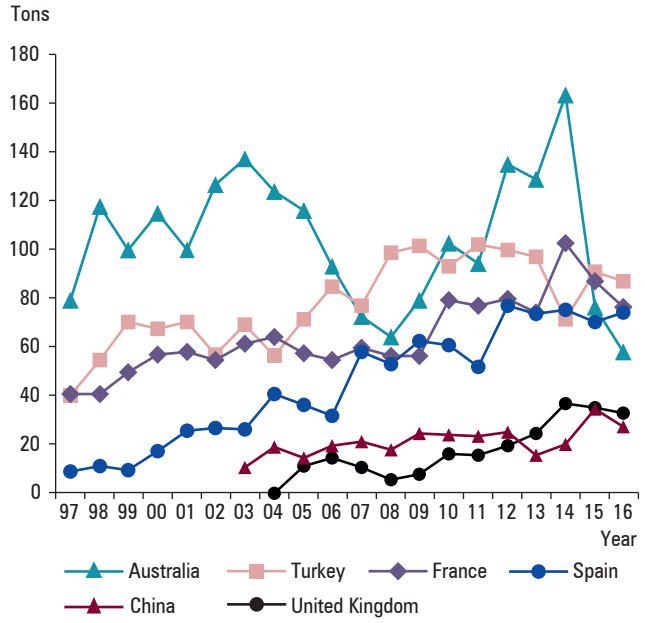
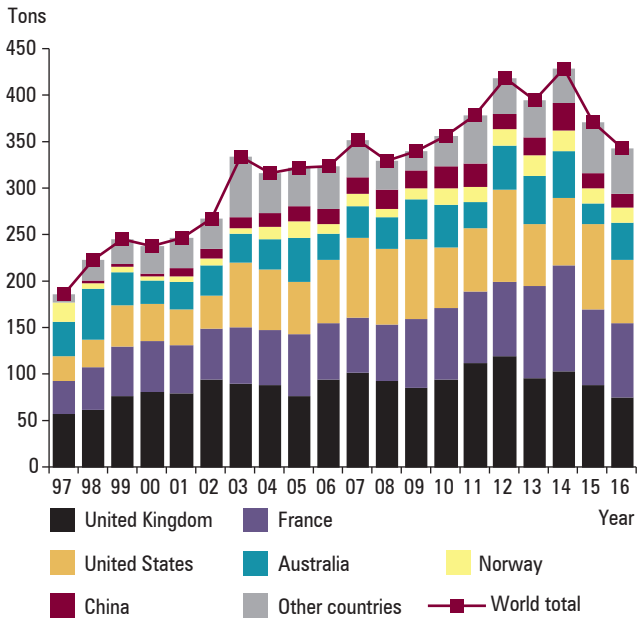


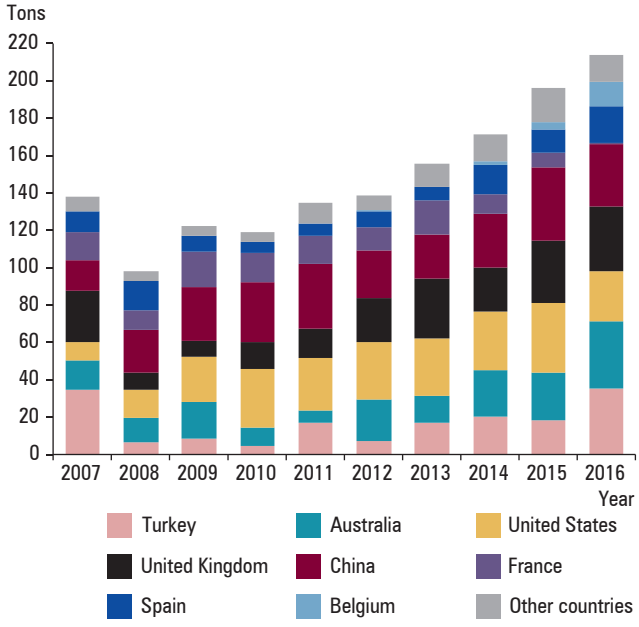
Figure 8. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: utilization for the manufacture of opiates, 1997-2016



27. Over the previous decade, Australia and Turkey were the leading manufacturers of AMA (CPS). In 2016, Turkey reported the largest quantity manufactured (87 tons, or 24.3 per cent of global manufacture), followed by Spain and France (both at 70.9 tons, or 19.8 per cent) and Australia (57.8 tons, or 16.2 per cent). Other countries reporting manufacture of AMA (CPS) for 2016 were the United Kingdom (32.6 tons), Belgium (27.2 tons) and China (10.4 tons).

28. After reaching a record high of 196.6 tons in 2015, global exports of AMA (CPS) increased further to reach 214.1 in 2016. Turkey exported the largest quantity of AMA (CPS) in 2016 (66.8 tons, or 40.2 per cent), followed by Spain (49.9 tons, or 30 per cent), Australia—the top exporter in previous years—(31.6 tons or 19 per cent), Belgium (17.4 tons, or 10.6 per cent) and Norway (12.3 tons, or 7.5 per cent). The United States and the United Kingdom have been the leading importers of AMA (CPS), and together they accounted for 74.9 per cent of the world total in 2016. Other importing countries were, in descending order, Australia, Norway, Japan, Switzerland, the former Yugoslav Republic of Macedonia, Italy and Belgium. Further details on international trade in AMA (CPS) can be found in annex IV, tables 1 and 2.

Figure 9. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: stocks,[a] 2007-2016



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

29. 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 in 2015 and 2016 (see figure 8). In 2016, total world utilization amounted to 343.4 tons, a notable decrease from 428.7 tons in 2014. France, at 79.9 tons, accounted for 23.2 per cent of the global

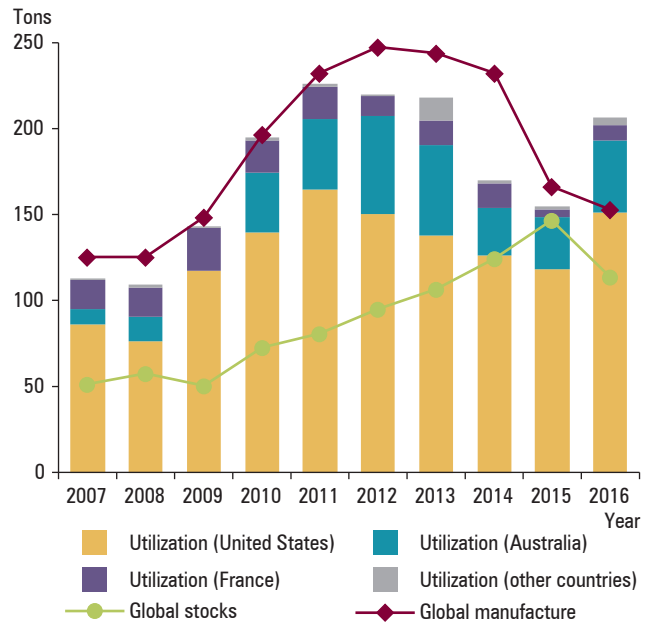
utilization of AMA (CPS), followed by the United Kingdom (74.6 tons, or 21.7 per cent), the United States (68.3 tons, or 19.8 per cent) and Australia (40.3 tons, or 11.7 per cent).

30. Global stocks of AMA (CPS) continued to increase in 2016, to 214.1 tons (see figure 9). Australia, Turkey and the United Kingdom each held stocks accounting for around 16 per cent in 2016, followed by China (15.6 per cent), the United States (12.3 per cent), Spain (9.28 per cent), Belgium (6.1 per cent), Japan (2.2 per cent), South Africa (1.9 per cent) and Norway (1.2 per cent).

Anhydrous thebaine alkaloid contained in concentrate of poppy straw (ATA (CPS))

31. Figure 10 provides an overview of the manufacture, stocks and utilization of ATA (CPS) during the period 2007–2016. Industrial manufacture of ATA (CPS), which started in 1998, increased rapidly before levelling off in 2012 and decreasing considerably to 153.1 tons in 2016, from 232.1 tons in 2014. The only countries manufacturing ATA (CPS) in 2016 were Australia, which accounted for 84.9 per cent of the global total, Spain (10.5 per cent) and France (4.4 per cent). Australia was also the main exporter, accounting for 110.1 tons, or 87.9 per cent, of global exports in 2016. The United States has been the leading importer of ATA (CPS) for many years; in 2016, it accounted for 99.2 per cent of total imports.

Figure 10. Total anhydrous thebaine alkaloid contained in all varieties of concentrate of poppy straw: utilization, global manufacture and stocks,[a] 2007-2016



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

32. 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, to 154.9 tons in 2015, then increased again in 2016 to 205.2 tons. This trend reflects the temporary reduction in the demand for thebaine and of narcotic drugs obtained from it, such as oxycodone and hydrocodone (see paras. 53 to 56 below). In 2016, the United States continued to be the main user of thebaine (accounting for 73.6 per cent of global utilization); it was followed by Australia (20.5 per cent) and France (4.1 per cent). Global stocks of ATA (CPS) stood at 113.4 tons in 2016. The United States (58.4 tons) and Australia (48.4 tons) together accounted for over 94.3 per cent of global stocks.

Anhydrous oripavine alkaloid contained in concentrate of poppy straw (AOA (CPS))

33. Manufacture of AOA (CPS) in commercially usable quantities started in 1999. Australia was the only manufacturing country in 2016, with a total of 31.4 tons. Total utilization of AOA (CPS) in 2016 was low (1.3 tons), representing a small fraction of the 21.8 tons in 2015. AOA (CPS) was manufactured exclusively in Australia (99.9 per cent). In 2016, 1.3 tons were used for the manufacture of other drugs, mostly by Switzerland and Australia. Global stocks of AOA (CPS) had been fluctuating since 2001. In 2016, they increased slightly to 66.8 tons, held exclusively by Australia (75 per cent) and the United States (24 per cent).

Anhydrous codeine alkaloid contained in concentrate of poppy straw (ACA (CPS))

34. Manufacture of ACA (CPS) increased from 2001 until 2015, when it reached a record 103.7 tons, which was nearly double the 57.6 tons manufactured in 2014, but then decreased to 56.1 tons in 2016. ACA (CPS) is used for the extraction of codeine. The only countries that manufactured ACA (CPS) in 2016 were France (49.3 per cent of the global total), Australia (30.9 per cent), Spain (10.4 per cent) and Turkey (9.2 per cent). Global utilization of ACA (CPS) increased from 31.5 tons in 2014 to 79.1 tons in 2015, then decreased to 40.7 tons in 2016. France was the main country to utilize ACA (CPS) (52.4 per cent), followed by the United States (35.7 per cent) and the United Kingdom (9.6 per cent). Global stocks of ACA (CPS) stood at 19.4 tons in 2016, most of which was held in the United States (14.5 tons), Australia (2.1 tons), Turkey (1.8 tons), Spain (0.6 tons) and France (0.1 tons).

Opiates and opioids

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

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

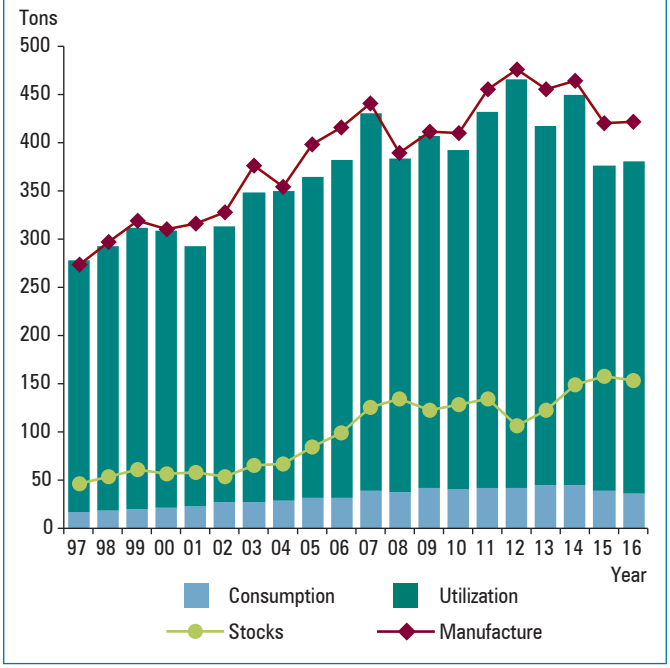
Natural alkaloids

37. 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 of their convertibility 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

38. In the 20-year period 1997–2016, the manufacture[15] of morphine increased considerably from 273.9 tons in 1997.

Figure 11. Morphine: global manufacture, stocks,[a] consumption and utilization, 1997-2016



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

After stabilizing at around 450 tons between 2011 and 2014, it decreased to 419.2 tons in 2015 and remained at roughly the same level (422.1 tons) in 2016 (see figure 11). Around 87 per cent of the morphine manufactured globally is converted into other narcotic drugs or into substances not covered by the 1961 Convention (see paras. 42 and 43 below). The rest is used directly for medical purposes (for direct consumption and in preparations listed in schedule III), mainly for palliative care.

39. In 2016, the leading morphine manufacturing country was the United Kingdom (76.5 tons, or 18.1 per cent of global manufacture), followed by France (74.2 tons, or 17.5 per cent), the United States (60.4 tons, or 14.3 per cent), Iran (Islamic Republic of) (57.5 tons, or 13.6 per cent), Australia (45.5 tons, or 10.7 per cent), Spain (22 tons, or 5.2 per cent) and China (17.3 tons, or 4.1 per cent). Together, these seven countries accounted for 83.8 per cent of global manufacture. Three other countries reported the manufacture of morphine for 2016 in quantities of more than 10 tons (listed in descending order): Norway, Japan and Slovakia.

40. Exports of morphine decreased from 35.4 tons in 2015 to 23.5 tons in 2016. The main exporting countries in 2016 were the United Kingdom (32.6 per cent), France (14.3 per cent), Slovakia (12.3 per cent), Germany (11.7 per cent), Switzerland (8 per cent) and Italy (5.6 per cent). Countries that exported less than 1 ton, or less than 3 per

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

[14]Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971. Comments on its licit movement are contained in para. 96 below.

[15]In Australia, Brazil, China, Iran (Islamic Republic of), Italy, Norway, Portugal, 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 export, by country, 2007-2016

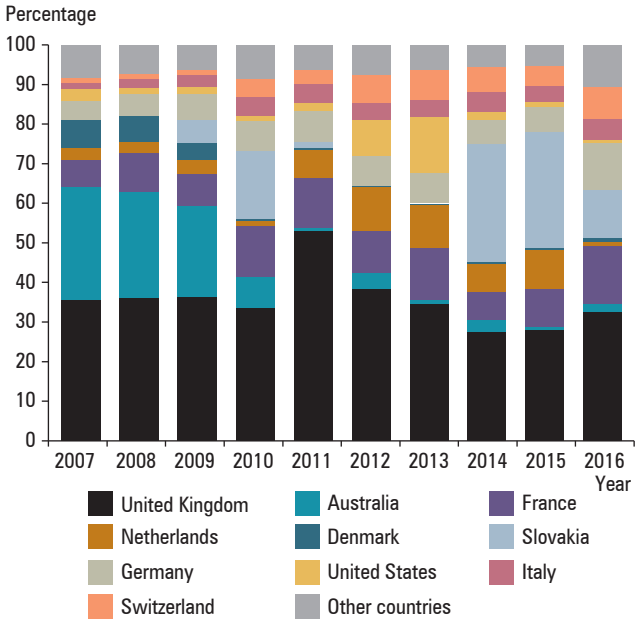
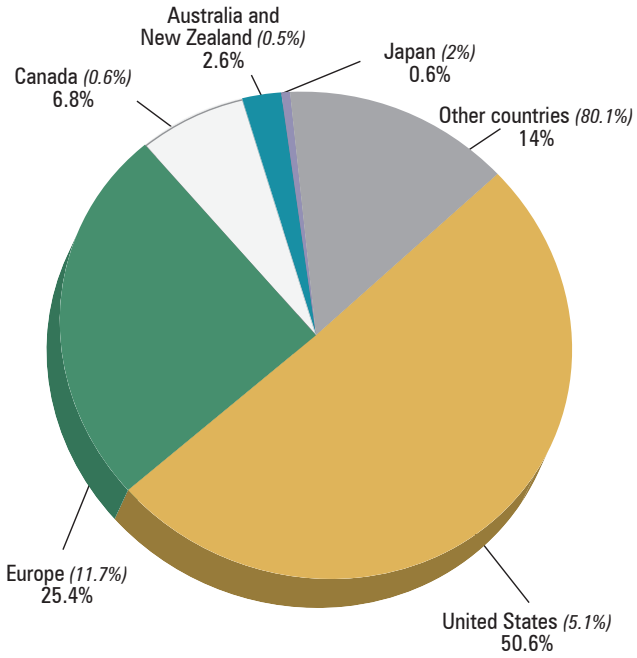


Figure 13. Morphine: distribution of consumption, 2016



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

cent, were, in descending order, Hungary, Poland, Australia, Spain, Austria, Iran (Islamic Republic of) and Denmark (see figure 12). The main importing countries in 2016 were Germany (4.5 tons, or 20.3 per cent), Austria and France (both at 3 tons, or 13.9 per cent), the United Kingdom (2.1 tons, or 9.6 per cent), Canada (1.4 tons, or 6.4 per cent), and Switzerland (1.1 ton, or 5.1 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.

41. The amount of morphine used for direct consumption stood at 4.2 per cent in 1997 but since then has doubled, reaching 8.6 per cent in 2016. Despite the increase, many countries continued to report having difficulties procuring morphine medications.

42. The differences in consumption levels between countries continued to be very significant (see figure 13 and table XIV), owing to various economic, knowledge, regulatory and other factors influencing the use of morphine for the treatment of pain. Although most countries and territories reported morphine consumption in 2016, many people still had limited access to the drug. In 2016, 80 per cent of the world population consumed only 14 per cent of the total amount of morphine used for the management of pain and suffering. Although that represented an improvement over 2014, when 80 per cent of the world population consumed 9.5 per cent, the disparity in consumption of narcotic drugs for palliative care continues to be a matter of concern. The remaining 86 per cent of the total consumption of morphine, excluding preparations included in Schedule III of the 1961 Convention, continued to be concentrated in a small number of countries located mainly in Western Europe and North America. Among them, in 2016 the United States had the highest consumption (18.3 tons), followed by Canada (2.4 tons), Austria, China and France (all three at 1.8 tons), Germany (1.6 tons) and the United Kingdom (1 ton).

43. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention. In 2016, the countries using morphine for that purpose in significant quantities were China (7.6 tons), the United Kingdom (6 tons) and Italy (1.2 tons).

44. The largest share of morphine is used for conversion into other opiates, such as codeine ethylmorphine and pholcodine (see table VI), although it is important to note that codeine is increasingly 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 2015 and remained relatively stable in 2016, at 342 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 1997–2016 and reached 2.1 tons in 2016, most of which was used by France and the United Kingdom.

45. Global stocks of morphine stood at 154.1 tons in 2016, a slight decrease from 2015 (157.3 tons). The largest stocks were held by the United States (54.3 tons, or 35.2 per cent of global stocks), followed by France (33.7 tons, or 21.8 per cent), Hungary (16.5 tons, or 10.7 per cent), Japan (14.6 tons, or 9.1 per cent), Switzerland (9.1 tons, or 5.9 per cent) and the United Kingdom (6.3 tons, or 4.1 per cent).

Codeine

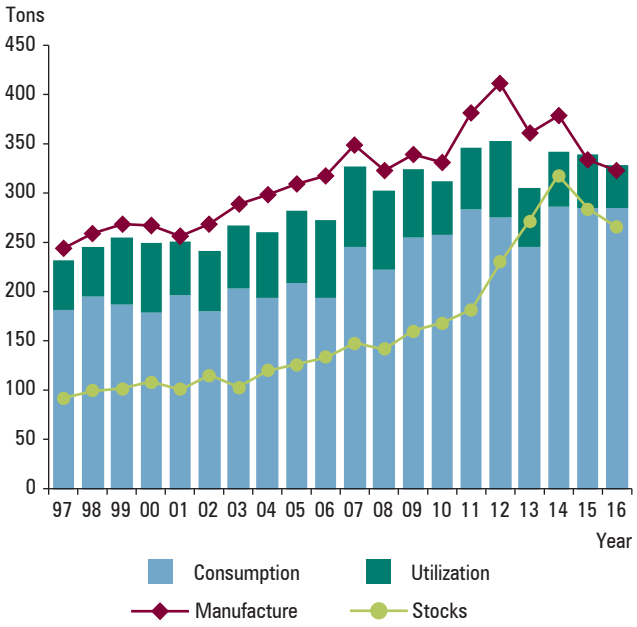
46. Codeine is a natural alkaloid of the opium poppy plant, but most of the codeine currently being manufactured is obtained from morphine through a semi-synthetic process. As reported above, there has been an increase in the cultivation of the opium poppy variety that is rich in codeine, and in the 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 1997–2016 are shown in figure 14.

47. Global manufacture of codeine increased since 1997 and reached a peak of 411.8 tons in 2012. Since then, global manufacture has been decreasing, dropping to 323.2 tons in 2016, almost the same level as 2008. The main manufacturing countries were France (66.8 tons, or 20.6 per cent), the United Kingdom (56.8 tons, or 17.5 per cent), the United States (55.1 tons, or 17 per cent), and Australia (37.9 tons, or 11.7 per cent). The Islamic Republic of Iran (from seized opium), Spain, Norway, Japan, India, China, South Africa and Slovakia, in descending order, manufactured smaller quantities (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.

48. Stocks available globally continued to drop in 2016. At 318.2 tons in 2014, they decreased to 284.4 tons in 2015, then further to 266 tons in 2016. The countries keeping significant quantities of codeine in stock were India (44.1 tons, or 16.6 per cent), France (41.5 tons, or 15.6 per cent), the United States (40.3 tons, or 15.1 per cent), the United Kingdom (38.1 tons, or 14.3 per cent), Australia (15.5 tons, or 5.8 per cent), Canada (12.7 tons, or 4.7 per cent) and Japan (11.5 tons, or 4.3 per cent). A number of countries reported stocks of codeine below 10 tons.

49. In 2016, world exports of codeine mirrored the decreasing trend in manufacturing, falling to 127.9 tons from 157 tons in 2015, far from the peak at 176.4 tons recorded in 2012 (see figure 16). France continued to be the leading exporting country for codeine in 2016, exporting 37.2 tons, or 29.1 per cent of the global total, followed by the United Kingdom (25 tons, or 19.6 per cent), Australia (23.6 tons, or 18.4 per cent), Norway (10.1 tons, or 7.9 per cent), Spain (6.6 tons, or 5.2 per cent) the United States (5.7 tons or 4.5 per cent) and Switzerland (5.4 tons, or 4.2 per cent).

Figure 14. Codeine: global manufacture, stocks,[a] consumption and utilization, 1997-2016



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

Figure 15. Codeine: manufacture, 1997-2016

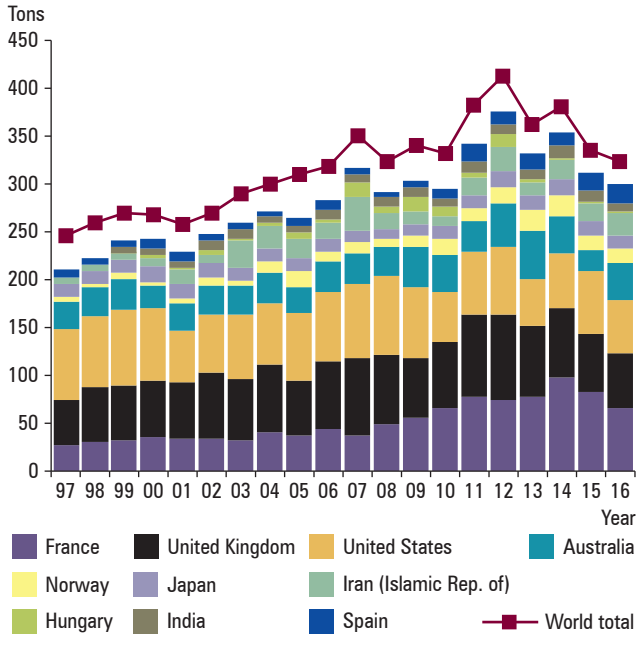


Figure 16. Codeine: exports, 1997-2016

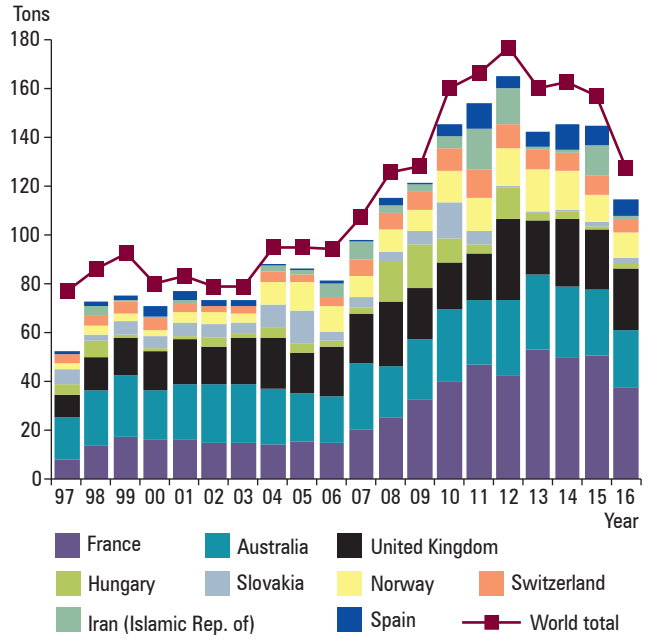
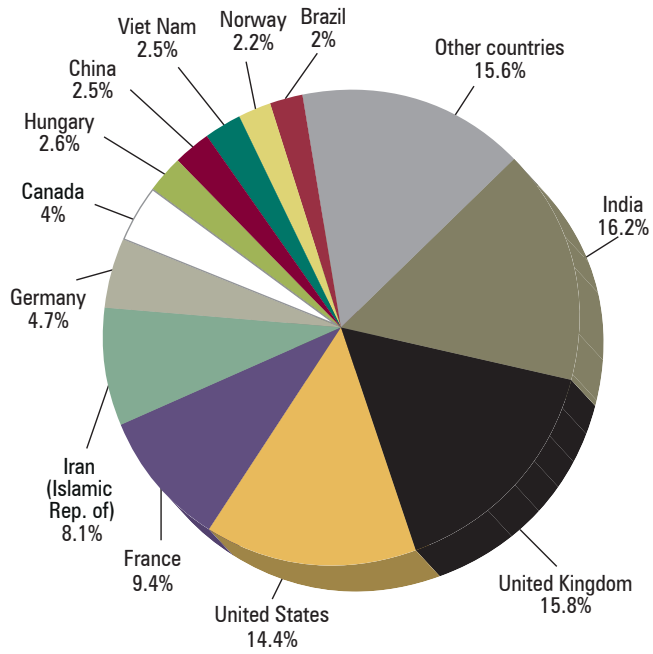


Figure 17. Codeine: utilization for the manufacture of preparations listed in Schedule III of the 1961 Convention, 2016



50. The main countries importing codeine in 2016 were India (25.9 tons), Germany (17.5 tons), Canada (14.6 tons), Italy (7 tons), Viet Nam (6.1 tons) and Hungary (5.7 tons). More details on the international trade in codeine can be found in annex IV, tables 3 and 4.

51. In 2016, codeine used for the manufacture of preparations listed in Schedule III accounted for 96.1 per cent of the global consumption[16] of codeine. The use of codeine for that purpose grew from 162.9 tons in 1996 to 278.9 tons in 2016 (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.

52. In 2016, global consumption (including Schedule III preparations) stood at 290 tons (see figure 14). The main countries reporting data in that respect were India (45.5 tons), the United Kingdom (44.2 tons), the United States (40.5 tons), France (26.5 tons), Iran (Islamic Republic of) (22.8 tons), Germany (13.2 tons) and Canada (13 tons). Other countries with a level of codeine consumption below 10 tons were Hungary, China, Viet Nam, Norway, Brazil, South Africa, Australia and Italy. Other countries reported consumption below 4 tons.

53. 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 44 tons in 2016. Of the amount reported for 2016, 15 tons were used in the United States, 12 tons in Japan, 11.6 tons in the United Kingdom, 3.5 tons in Italy and 1.5 tons in Slovakia.

Thebaine

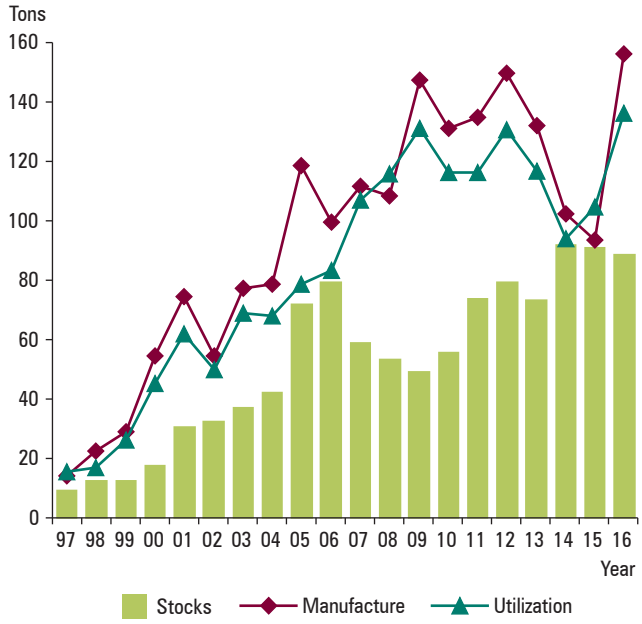
54. Until the 1990s, thebaine was manufactured mainly from opium; since 1999, it has been obtained primarily from poppy straw. Thebaine may also be obtained through the conversion of oripavine or from semi-synthetic opioids, such as hydrocodone. Thebaine itself is not used in therapy, but it is an important 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),[17] as well as of substances not under international control, such as the derivatives naloxone, naltrexone, nalorphine and nalbuphine.

55. Global manufacture of thebaine has increased sharply since the late 1990s, as a consequence of the growing

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

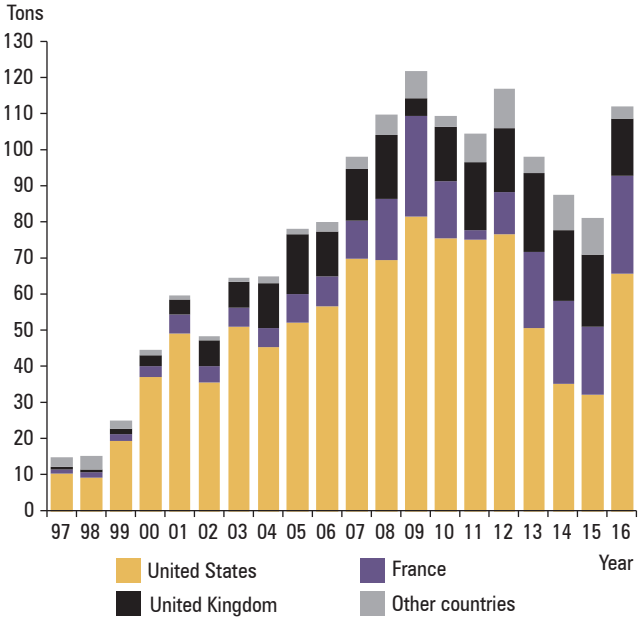
[17] United Nations, *Treaty Series*, vol. 1019, No. 14956.

Figure 18. Thebaine: global manufacture, utilization and stocks,[a] 1997-2016



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

Figure 19. Thebaine: utilization for the manufacture of opioids, 1997-2016



demand for oxycodone and other drugs and substances that may be derived from it. In 2016, after some fluctuations in the preceding years, global manufacture of thebaine reached a record level of 156 tons (see figure 18). The demand for medicines derived from thebaine, after decreasing in the past years, appears to have resumed, 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. With 72.5 tons, or 46.4 per cent, in 2016, the United States resumed its position as the main manufacturer, having lost that position in 2015. It was followed by Australia (39.8 tons, or 25.5 per cent) and Spain (37.5 tons, or 24 per cent). Minor manufacturing countries were, in descending order, France, Japan, China, Slovakia, Hungary and India. Exports declined from 77.7 tons in 2015 to 64.1 tons in 2016. The main exporting countries in 2016 were Australia (36.2 tons) and Spain (26.6 tons). Switzerland, Denmark and the United Kingdom exported quantities below 1 ton. The main countries importing thebaine were France (46.7 per cent), the United Kingdom (42.3 per cent), Czechia (4.4 per cent) and Denmark (2.6 per cent).

56. Following the main manufacturing trend, the utilization of thebaine for the manufacture of other narcotic drugs increased to 111.5 tons in 2016 (see figure 19 and table VII). The United States was the main country to use thebaine during the 20-year period 1997–2016. In 2016, the United States accounted for 58.8 per cent of global use for that purpose, followed by France (24 per cent) and the United Kingdom (14.2 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 2007–2016: in 2016, it reached 24.8 tons, the highest amount ever reported. Switzerland, the United Kingdom and Czechia, in descending order, accounted for 84.6 per cent of the world total.

57. After an overall fluctuating upward trend in the period since 1996, global stocks of thebaine remained stable in 2016 at 89 tons. Major stocks were held in the United States (26.52 tons), Spain (21.1 tons), France (14.2 tons), the United Kingdom (12.2 tons), Australia (5.5 tons), Switzerland (3.2 tons) and Japan (2.4 tons).

Oripavine

58. In 2007, oripavine was included in Schedule I of the 1961 Convention. Since 2004, the amount of oripavine manufactured has fluctuated between 6 and 25 tons. In 2016, a combined total of 21.3 tons were manufactured in only three countries: the United States (14 tons), Spain (6.3 tons) and Switzerland (1 ton). The use of oripavine in significant quantities for the manufacture of other drugs was reported in 2016 by the United States (16 tons) and Switzerland (1.1 tons). The drugs manufactured were mainly hydromorphone, oxymorphone and buprenorphine. In 2016, global stocks of oripavine amounted to 18.1 tons, of which 76.3 per cent was held in Spain, 14.9 per cent in the United States and 8.5 per cent in Switzerland.

Semi-synthetic opioids

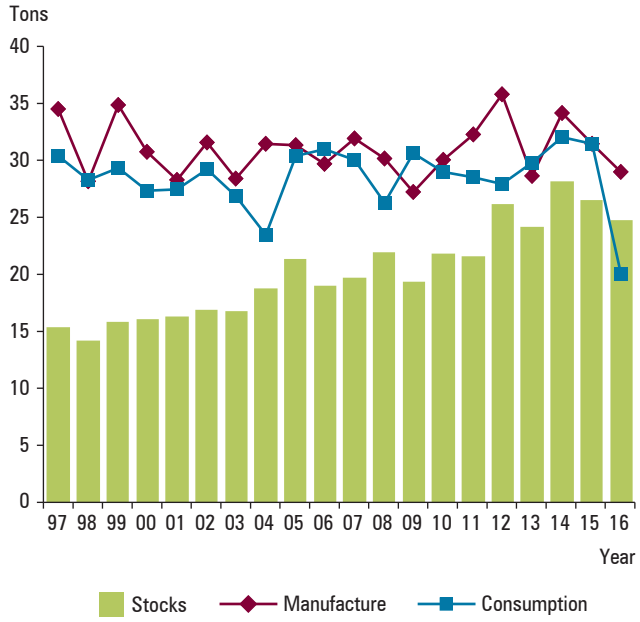
59. Semi-synthetic opioids are made by means of relatively simple chemical modifications of natural opiates such as morphine, codeine and thebaine. Some examples of such derivatives are dihydrocodeine, ethylmorphine, heroin, hydrocodone, oxycodone and pholcodine. Some of the main manufacturers have reported that large losses occur during the processing of some semi-synthetic opioids.[18] 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

60. Global manufacture of dihydrocodeine fluctuated between 27.1 and 35.7 tons in the 20-year period 1997–2016. In 2016, the quantity manufactured worldwide stood at 28.9 tons (see figure 20). The main countries manufacturing significant quantities continued to be Japan (12 tons), the United Kingdom (11.1 tons) and Italy (3.4 tons), together accounting for 91 per cent of total manufacture in 2016. Global exports of dihydrocodeine amounted to 7.8 tons in 2016. The main exporting country was Italy (42.7 per cent), followed, in descending order, by the United Kingdom (21.6 per cent), France (15.9 per cent), Slovakia (11.6 per cent) and Hungary (4.4 per cent). In 2016, the Republic of Korea was the leading importing country for dihydrocodeine (3.1 tons). Other major importers were the United Kingdom (2 tons), Colombia (0.6 ton), Hong Kong, China (0.3 ton) and Italy (0.2 ton).

61. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention, which accounted for 81.7 per cent of total consumption in 2016, a decrease from 92 per cent in 2015. In 2016, manufacture of dihydrocodeine reached 28.9 tons. The main user countries for dihydrocodeine, in descending order, were Japan, the United Kingdom and the Republic of Korea, together accounting for 88.5 per cent of total global utilization (consumption and utilization for the manufacture of preparations in Schedule III). In 2016, global stocks of dihydrocodeine amounted to 24.7 tons; major stocks were held in Japan (11.1 tons) and the United Kingdom (6.2 tons).

Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,[a] 1997-2016



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

Ethylmorphine

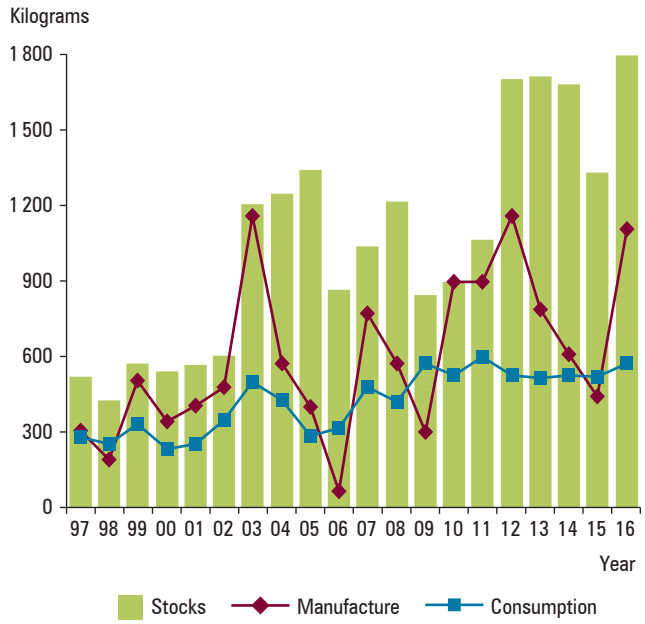
62. The manufacture of ethylmorphine showed an overall downward trend over the 20-year period 1997–2016 and was stable at around 1 ton for several years. In 2016, the total quantity manufactured was 1 ton, down from 1.4 tons in the previous year and much lower than the peak of 4.6 tons reached in 1997. France was the only manufacturing country in 2016 and was also the leading exporting country (415 kg), accounting for over 86 per cent of global exports. The largest importer in 2016 was Sweden, which imported 50.6 per cent of total production. Belgium imported 25.2 per cent, while Finland, Poland and Hong Kong, China imported quantities smaller than 10 per cent. Ethylmorphine is consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (about 92.5 per cent of total consumption). Global utilization (consumption and manufacture of preparations in Schedule III) reached 984 kg in 2016. The main consuming countries in 2016 were Sweden (30.3 per cent of the world total), France (26.8 per cent), India (14.9 per cent) and Belgium (12.7 per cent). In 2016, global stocks of ethylmorphine totalled 2.2 tons; the largest holders of stocks were France, India and Belgium, all three with 29 per cent of global stocks.

Heroin

63. Over the past 20 years, the licit manufacture of heroin averaged 600 kg, with peaks of over 1 ton in 2003, 2012 and 2016. In 2016, a total of 1.1 tons was manufactured,

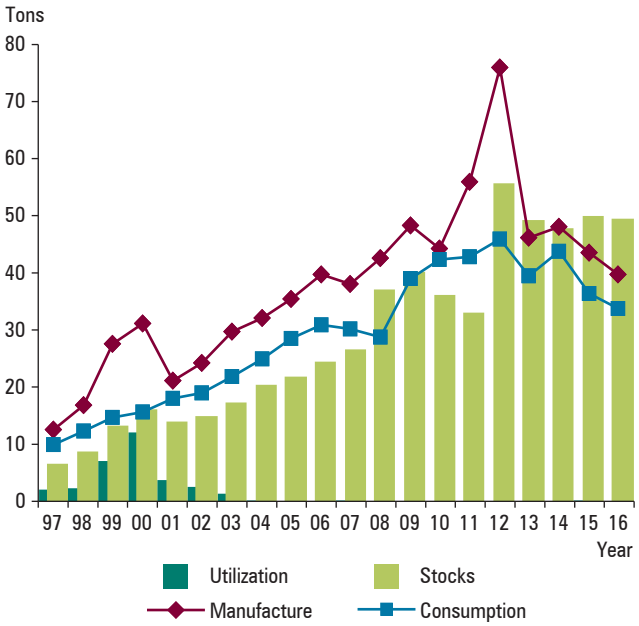
[18]Manufacturing losses are those occurring: *(a)* during the process of refining a drug; *(b)* during the process of transformation of a drug into its salts, isomers, esters and ethers, as applicable according to the Schedules; and *(c)* during the manufacture of preparations other than those included 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] 1997-2016



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

Figure 22. Hydrocodone: global manufacture,consumption, utilization[a] and stocks,[b,c] 1997-2016



[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.

mostly by the United Kingdom (56.8 per cent) and Switzerland (38.3 per cent) (see figure 21). The main country exporting heroin continued to be the United Kingdom (534.5 kg of global exports, or 84.9 per cent), followed by Switzerland (77.2 kg, or 12.2 per cent). Germany, Spain and Hungary exported quantities smaller than 10 kg. In 2016, the main importing country was Switzerland (400.2 kg), followed by the Netherlands (187.5 kg), the United Kingdom (51.8 kg), Denmark (25.8 kg) and Germany (21.7 kg).

64. Global consumption of heroin remained relatively stable, at 571.5 kg in 2016. Switzerland, where heroin is prescribed for individuals with long-term opiate dependency, reported heroin consumption of 255.7 kg for 2016 (or 44.7 per cent of global consumption). Other countries with significant heroin consumption were the Netherlands (27.9 per cent) and Germany (10.6 per cent). Global stocks of heroin increased in 2016 to 1.7 tons, the highest level ever. The countries holding significant stocks in 2016 were Switzerland (796.1 kg), the United Kingdom (356.3 kg), the Netherlands (240.2 kg), Spain (201.3 kg) and Denmark (120.1 kg).

Hydrocodone

65. In 2016, global manufacture of hydrocodone decreased to 39.7 tons from 43.5 tons the previous year, continuing the declining trend started after the peak of 75.9 tons reached in 2012 (see figure 22). The United States accounted for almost 100 per cent of global manufacture.

66. Global consumption of hydrocodone stood at 33.7 tons in 2016, down from 36.3 tons in 2015. This continued decrease is related to the rescheduling of hydrocodone combination products in 2014 in the United States, where prescriptions for liquid and tablet formulations declined. In 2016, the country with the highest consumption of hydrocodone continued to be the United States, with 33.4 tons, equivalent to 99.1 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 had 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 from the United States to Colombia (163 kg) and Canada (50.1 kg). In 2016, global stocks of hydrocodone stood at 49.6 tons, more than 99 per cent of which was held by the United States.

Hydromorphone

67. 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 but increased again in 2016, to 6.3 tons. The leading manufacturing countries in 2016 were the United States (67.4 per cent of the global total), the United Kingdom (26.3 per cent) and Belgium (3.2 per cent). Total exports of hydromorphone decreased to 3 tons in 2016. The leading exporting countries were the United Kingdom (45 per cent of world exports) and the United States (15.7 per cent). In 2016, Canada continued to be the main importing country (1.3 tons); it was followed by Germany (0.7 tons), Switzerland (0.6 tons), Italy (0.2 tons) and Austria (0.1 tons).

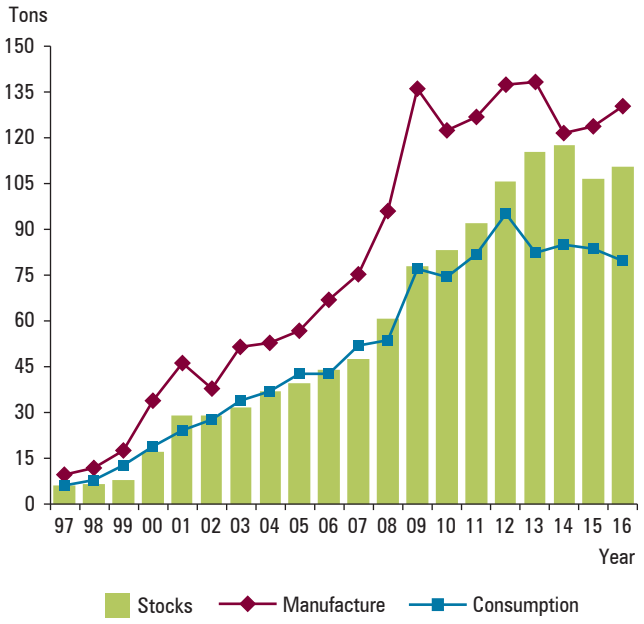
68. In 2016, consumption of hydromorphone decreased to 4 tons. The United States continued to be the main consumer country in 2016 (49.3 per cent of global consumption); it was followed by Canada (27.8 per cent) and Germany (13.2 per cent). Global stocks of hydromorphone increased to 7.4 tons in 2016, of which 57.4 per cent were held in the United States, 14.3 per cent in Canada and 6.1 per cent in Germany.

Oxycodone

69. 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. However, after a considerable decrease in 2014 and 2015, manufacture of oxycodone increased again in 2016, to 130.1 tons (see figure 23). The decrease in manufacture in 2014 and 2015 may be attributable to stricter control measures introduced in some countries where the risk of overdose deaths and abuse of oxycodone is significant. In 2016, the United States accounted for 69.2 per cent of total world manufacture, followed by France (17.7 per cent), the United Kingdom (9.3 per cent) and Hungary (2 per cent). In 2016, exports decreased to below 30 tons (29.9 tons) for the first time since 2014. The United Kingdom continued to be the main exporting country in 2016 (56.1 per cent of world exports), followed by Switzerland (9.3 per cent), France (8.7 per cent), Germany (5.9 per cent) and the Netherlands (5 per cent). Major countries of destination were the United Kingdom (18.9 per cent), Germany (14.8 per cent), Canada (11.7 per cent) and France (8.2 per cent). Further details on exports and imports of oxycodone are contained in annex IV, tables 3 and 4.

70. Along with the increase in manufacture in 2016, global consumption of oxycodone decreased slightly, from 83.2 tons in 2015 to 79.6 tons in 2016. Consumption of oxycodone was concentrated in the United States (72.9 per cent of the world total). Other major consumer countries in 2016, in descending order, were Canada, Germany,

Figure 23. Oxycodone: global manufacture,consumption and stocks,[a,b] 1997-2016



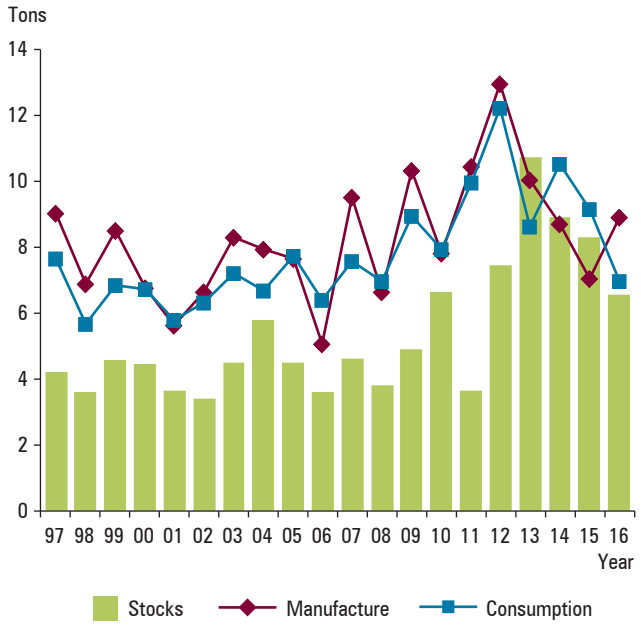
[a]Stocks as at 31 December of each year.
[b]Considerable losses occur in the manufacturing process of this substance. This explains some gaps between manufacture and consumption/stocks.

Australia, France, China, the United Kingdom and Italy. Global stocks of oxycodone reached 110.2 tons, with the United States accounting for 70.7 per cent of the world total.

Pholcodine

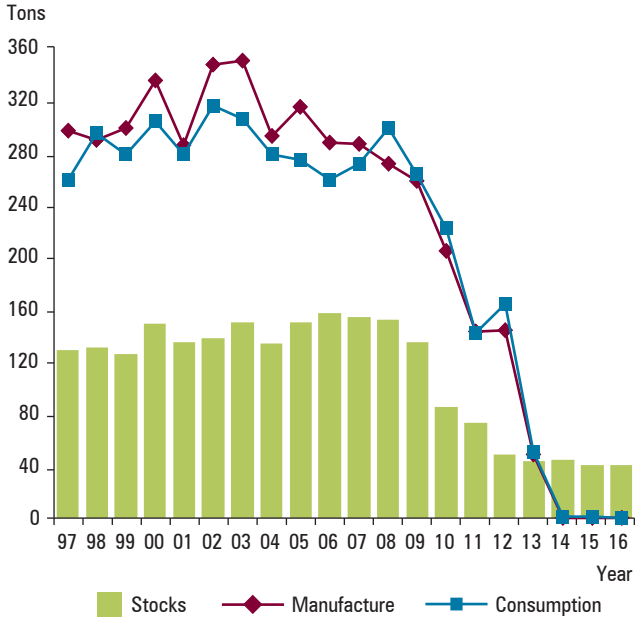
71. During the 15-year period 2002–2016, pholcodine manufacture and consumption was characterized by a volatile trend. Manufacture of pholcodine dropped from 12.9 tons in 2012 to 7 tons in 2015, then increased to 8.9 tons in 2016 (see figure 24). The fluctuations may be related to concerns that the use 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 2016 were France (4.4 tons), the United Kingdom (1.6 tons), Hungary

Figure 24. Pholcodine: global manufacture, consumption and stocks,[a] 1997-2016



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

Figure 25. Dextropropoxyphene: global manufacture, consumption and stocks,[a] 1997-2016



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

(1.2 tons) and Norway (1 ton). Total exports of pholcodine increased from 6.5 tons in 2015 to 9 tons in 2016. Exports originated mostly in France (46.3 per cent of the global total), Hungary (15.9 per cent), Norway (13.7 per cent), the United Kingdom (11.6 per cent) and Italy (9.7 per cent). The main destinations were Australia (1.8 tons), Hong Kong, China (1.4 tons), Pakistan (1.3 tons) and Italy (0.6 tons). Further details on exports and imports of pholcodine are provided in annex IV, tables 3 and 4.

72. Almost all pholcodine (86 per cent) is consumed in the form of preparations listed in Schedule III of the 1961 Convention. In 2016, global consumption of pholcodine decreased to 6.9 tons. In 2016, the main consumer countries were Italy (26.7 per cent of global consumption), Pakistan (16.5 per cent), Australia (14.9 per cent), France (9.1 per cent) and China (8.3 per cent). In 2016, global stocks of pholcodine continued to decrease, to 6.5 tons. Major stocks were held by the United Kingdom (16.3 per cent), Australia (13.7 per cent), Slovakia (12.6 per cent), Norway and Hungary (10 per cent each).

Synthetic opioids

73. Synthetic opioids are used in the treatment of chronic, moderate or 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.

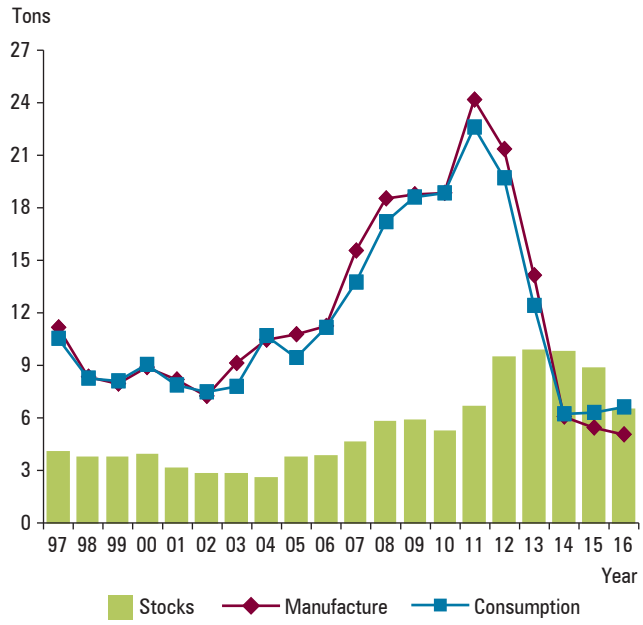
Dextropropoxyphene

74. Global manufacture of dextropropoxyphene has followed a downward trend since 2003, when 349.6 tons were manufactured; by 2014 it had fallen to zero and remained at that level in 2015 and 2016. This 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. According to the reports received by INCB, in 2014, 2015 and 2016, no dextropropoxyphene was manufactured (see figure 25). Consumption was limited to 469 kg. Global stocks amounted to 40.3 tons, of which 96.3 per cent were held by India. Dextropropoxyphene was consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (92 per cent of total consumption in 2016).

Diphenoxylate

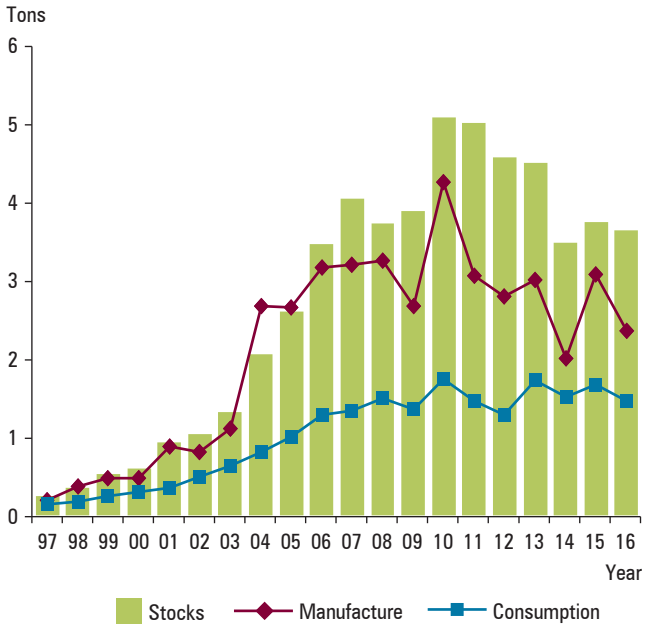
75. Diphenoxylate is used mostly as an antidiarrhoeal agent. It works by decreasing bowel activity. Global manufacture of diphenoxylate increased after 2003, reaching a peak of 24.1 tons in 2011, but dropped afterwards, reaching a low of 5 tons in 2016 (see figure 26). Most of that drop was accounted for by India, where over 47.5 per cent of

Figure 26. Diphenoxylate: global manufacture, consumption and stocks,[a] 1997-2016



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

Figure 27. Fentanyl: global manufacture, consumption and stocks,[a] 1997-2016



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

diphenoxylate was manufactured; it may be attributable to regulatory measures introduced in India following concerns related to potential abuse. In 2016, India manufactured 2.3 tons, followed by China (2.1 tons) and the United States (0.5 tons). India also exported the largest amount of diphenoxylate (0.7 tons, or 91.6 per cent of the global total). The main importing country in 2016 was the Islamic Republic of Iran (0.3 tons, or 52 per cent of the global total), followed by Pakistan (0.1 tons, or 18.6 per cent).

76. 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 2016). Global use in 2016 reached 6.5 tons. The countries reporting the highest utilization (consumption and manufacture of preparations in Schedule III) in 2016 were India (52.2 per cent of the global total), China (30.8 per cent) and the United States (9.8 per cent). In 2016, stocks of diphenoxylate decreased to 6.5 tons, the majority of which (89.3 per cent) was held by India.

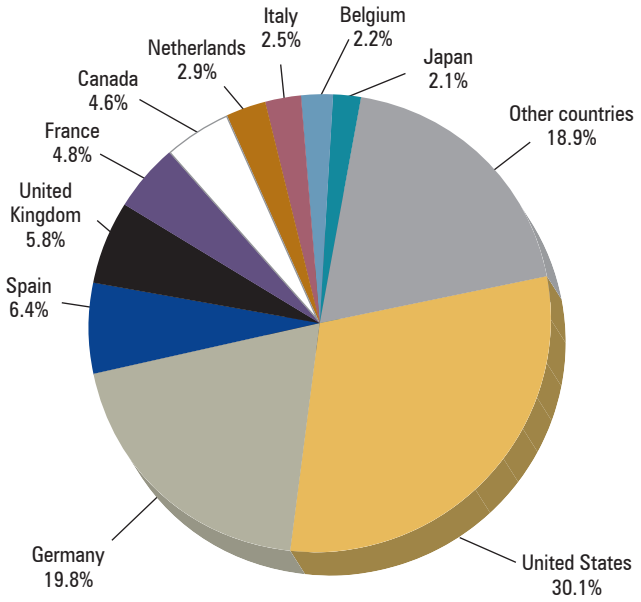
Fentanyl

77. 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.

78. 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 (see figure 27), increased again in 2015, to 3.1 tons, then decreased again in 2016, to 2.3 tons. The United States was the main manufacturing country for fentanyl in 2016 (34.8 per cent of global manufacture); it was followed by Belgium (24.5 per cent), Germany (19.5 per cent) and South Africa (15.2 per cent). The principal exporting countries were Germany (34.2 per cent), the United States (23.7 per cent), Belgium (22.6 per cent) and the United Kingdom (9.2 per cent). Germany was also the principal importing country for fentanyl in 2016 (505.2 kg of the global total, or 38 per cent), followed by the United Kingdom and Spain (both at 100 kg, or 7.6 per cent), France (79 kg, or 6 per cent), Italy (63.6 kg, or 4.7 per cent) and Canada (60.8 kg, or 4.5 per cent). Further details on exports and imports of fentanyl are contained in annex IV, tables 3 and 4.

79. Since 2006, global consumption of fentanyl has fluctuated between 1.2 and 1.8 tons. In 2016, 1.4 tons were consumed, down from 1.6 tons in 2015. 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

Figure 28. Fentanyl: distribution of consumption, 2016



that caused the overdose deaths were illicitly manufactured and trafficked, and not necessarily diverted from licitly prescribed medications, national authorities placed further restrictions on the prescription of fentanyl. In 2016, most of the global consumption of fentanyl (1.3 tons, or 91.8 per cent) was concentrated in 20 countries; all but one were high-income countries. The two largest consumers were the United States (29.9 per cent) and Germany (19.7 per cent) (see figure 28). Other major consumers of fentanyl were, in descending order, Spain, the United Kingdom, France, Canada, the Netherlands, Italy, Belgium, Japan, Australia, Austria, Greece, Brazil, the Republic of Korea, Israel, Switzerland, Poland and Denmark.

80. In 2016, global stocks of fentanyl stood at 3.6 tons, a slight decrease from the previous year's level (3.7 tons), but still lower than that of 2010 (5 tons). The largest stocks were held by the United States (39.1 per cent of global stocks), Germany (27.7 per cent) and Belgium (15.2 per cent).

Fentanyl analogues

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

Alfentanil

82. The manufacture of alfentanil has fluctuated significantly since 2002. In 2012, global manufacture peaked at 78.3 kg, whereas in 2009 only 5.5 kg were manufactured. In 2015, global manufacture of alfentanil more than tripled, to 51.1 kg from 15.2 kg in 2014, but dropped to 17.6 kg in 2016. The principal manufacturers in 2016 were Slovakia (61.1 per cent of global manufacture) and the United States (35.1 per cent).

83. In 2016, global consumption of alfentanil (21.2 kg) increased from the level of the previous year. The United Kingdom was the main consumer country for alfentanil (38.1 per cent of global consumption), followed by Italy (12.8 per cent), Brazil (6.8 per cent), the United States (6.7 per cent), Colombia (6.3 per cent) and Germany (6.2 per cent). Detailed information on the consumption of fentanyl analogues is provided in table XIII.1. Global stocks of alfentanil decreased by half, from 183.2 kg in 2015 to 79.3 kg in 2016. With stocks of 49.7 kg, Belgium was the main holder of alfentanil; much smaller quantities were held by Germany, Italy, the United Kingdom and Chile.

Remifentanil

84. 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 93 kg in 2011, but has decreased gradually since then, down to 40.4 kg in 2016. The United Kingdom replaced Belgium as the main manufacturing country, with 38.4 per cent of global manufacture; it was followed by Spain (34.4 per cent) and Argentina (18.2 per cent). Belgium, Italy and the United Kingdom were the main exporting countries. Italy was also the main importing country, with 47.5 per cent of global imports; it was followed by Japan (10.4 per cent) and Germany (9.5 per cent). Despite the decrease in manufacture, consumption remained stable at 69.6 kg in 2016. The main consumer countries were China (16.6 per cent of global consumption), Italy (10.2 per cent) and Japan (10 per cent). In 2016, global stocks of remifentanil increased to 140.7 kg, of which 30.6 per cent were held by Belgium, followed by Italy (25.8 per cent), Hungary (8.4 per cent), China (7.1 per cent), the United Kingdom (5.8 per cent) and Germany (5.2 per cent).

Sufentanil

85. In 2016, global manufacture of sufentanil decreased to 7.8 kg, interrupting its long-term upward trend. The main countries manufacturing sufentanil were the United States (39.7 per cent), Slovakia (27.9 per cent), the United

Kingdom and Belgium (both at 14 per cent). The main exporting countries were the United States (42.7 per cent), Belgium (16.1 per cent), Slovakia (14.3 per cent) and the United Kingdom (10.5 per cent). In 2016, global consumption of sufentanil increased to 4.9 kg, the highest level ever recorded. The largest consumers of sufentanil were, in descending order, China, Germany, the United States, France, Spain and Serbia, together accounting for 88.3 per cent of the global total. In 2015, global stocks of sufentanil totalled 18.6 kg, most of which was held by the United States (36.9 per cent), China (18.1 per cent), Belgium (10.2 per cent), Slovakia and Germany (both at 9 per cent).

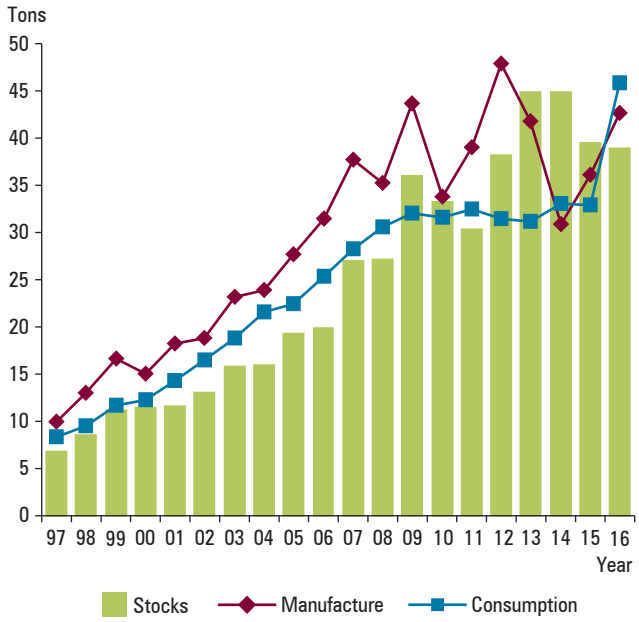
Ketobemidone

86. Ketobemidone is a powerful opioid analgesic with an effectiveness against pain similar to morphine. Its manufacture and use is concentrated in a small number of European countries. Overall, its consumption has been decreasing from year to year; in 2016, it reached its lowest point in decades (36.3 kg). Similarly, stocks have been fluctuating, from 142 kg in 2013 to 88 kg in 2014, 196 kg in 2015 and 151 kg in 2016. No manufacture of ketobemidone was reported in 2016. Germany, which was the only manufacturer in 2015, was the main exporter in 2016 (78.7 per cent of global exports), followed by France (20.2 per cent). Germany held 77.3 per cent of global stocks of ketobemidone (117.1 kg); it was followed by Denmark (8.4 per cent), Norway and France (both with 5 per cent) and Sweden (2.6 per cent).

Methadone

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 1997–2016, albeit with some fluctuations. The manufacture of methadone increased from 36.4 tons in 2015 to 42.6 tons in 2016. The main producing countries were the United States (53.4 per cent) and Switzerland (30 per cent). Smaller quantities were manufactured by China, Germany, India and Spain. In 2016, Switzerland continued to be the main exporter of methadone (10.9 tons, or 60.5 per cent); it was followed by the United States (2.2 tons, or 12.5 per cent). The main importing countries were Italy (9.8 per cent of the global total), the United Kingdom and Canada (both at 8.9 per cent), France (7.5 per cent), the Netherlands (7.1 per cent), Germany (6.8 per cent) and Viet Nam (6.6 per cent). Stocks of methadone were concentrated in the United States (33.3 per cent), Switzerland (18.6 per cent) and Germany (11.8 per cent).

Figure 29. Methadone: global manufacture, consumption and stocks,[a] 1997-2016



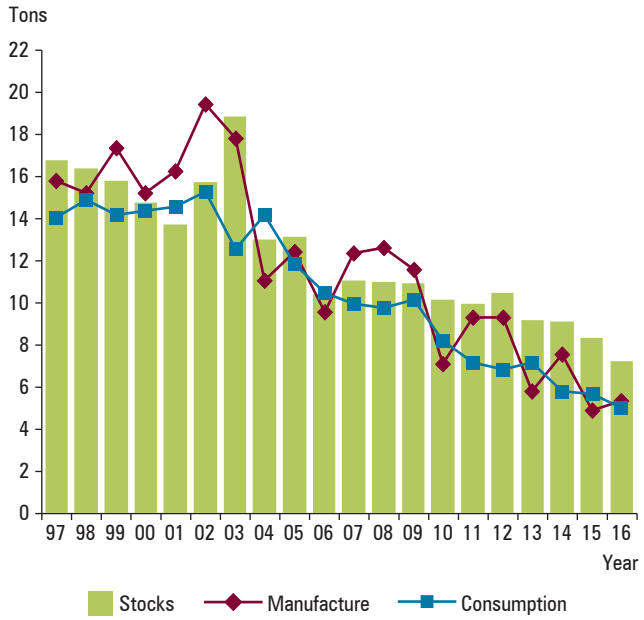
[a]Stocks as at 31 December of each year.

87. Consumption of methadone was concentrated in a few countries, and there were large differences in global consumption patterns. The main consuming countries were the United States (56.4 per cent), the United Kingdom (11.4 per cent), Canada (3.6 per cent), Germany, China and Viet Nam (all with 3 per cent). 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.

Pethidine

88. The manufacture of pethidine has continued to show a fluctuating decline since 1995. Manufacture increased slightly in 2014 to 7.5 tons, only to drop again in 2015 to 5.1 tons and remain at that level in 2016 (5.3 tons) (see figure 30). Consumption of pethidine, which stood at 15.3 tons in 2002, has been decreasing steadily since then, reaching 5.9 tons in 2016. 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.

Figure 30. Pethidine: global manufacture, consumption and stocks,[a] 1997-2016



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

89. In 2016, manufacture of pethidine was concentrated in Spain (34.3 per cent), the United States (27.6 per cent), China (17.9 per cent) and Slovakia (16.1 per cent). The main exporting country was Spain (2 tons), followed by Slovakia (0.8 tons) and the United Kingdom (0.4 tons). The main countries importing pethidine were the United Kingdom (13.8 per cent), the Islamic Republic of Iran (11.7 per cent), Germany (10.6 per cent) and Canada (7.6 per cent). A number of countries imported smaller quantities (each between 2 and 4 per cent of the global total), including, in descending order, the Republic of Korea, Bangladesh, Austria, Turkey, Kenya, Poland, the Netherlands and Italy. Further details on exports and imports of pethidine are contained in annex IV, tables 3 and 4.

90. Pethidine consumption amounted to 5 tons in 2016. The main consumer countries were the United States (15.9 per cent of the global total) and China (15.3 per cent). Other countries consumed smaller quantities; those included the Islamic Republic of Iran (8.5 per cent), South Africa (5.9 per cent), Brazil (5.6 per cent), Spain (5 per cent), Canada (4.9 per cent), the Republic of Korea (3.3 per cent) and Turkey (3.1 per cent). As a consequence of the overall decline in manufacture and consumption, stocks of pethidine also continued to decline, reaching 7 tons in 2016. The largest stocks were held by the United States (35.2 per cent of global stocks), Germany (11.6 per cent), China and Slovakia (both at 10 per cent).

Tilidine

91. In 2016, Germany continued to be the only manufacturer of tilidine. Manufacture continued to fluctuate, amounting to 49 tons in 2016. Exports of tilidine increased to 60.5 tons in 2016. Because it was the sole manufacturer, Germany also continued to be the principal exporting country in 2016, accounting for 53.6 per cent of global exports. That was still a considerable reduction from the level of 2012, when Germany accounted for 98 per cent of exports. Serbia was the second exporting country in 2016, with 45 per cent of reported exports.

92. After reaching a record level of 59.1 tons in 2012, consumption of tilidine dropped to 20 tons in 2013, but rose again gradually to 38.9 tons in 2016. Most tilidine is consumed in Germany (95.5 per cent), followed by Belgium (4.3 per cent). In 2016, nearly all global stocks of tilidine (38.7 tons) were held by Germany (97.8 per cent of the global total).

Trimeperidine

93. Before 2012, the quantity of trimeperidine manufactured fluctuated considerably for a number of years; from 2012 to 2016, it was more or less stable at around 200 kg. Manufacture in 2016 stood at 202.5 kg. The only manufacturers of trimeperidine were the Russian Federation (65.2 per cent of the global total) and India (34.7 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 former USSR, the post-Soviet states continued to be the main consumers and importers.

94. In 2016, the main exporter of trimeperidine was India (42.3 per cent of global exports), followed by Latvia (21 per cent), the Russian Federation (15.1 per cent), Slovakia (10.7 per cent) and Ukraine (10.6 per cent). The main importing countries in 2016 were the Russian Federation (42.7 per cent of global imports), Latvia (25.1 per cent), Slovakia (14.2 per cent) and Uzbekistan (4.9 per cent). In 2016, stocks decreased to 267.1 kg; they were mainly held by the Russian Federation (68.3 per cent), Kazakhstan (13.5 per cent), India (9.1 per cent), Belarus (6 per cent) and Latvia (1.6 per cent).

Opioid analgesics controlled under the 1971 Convention

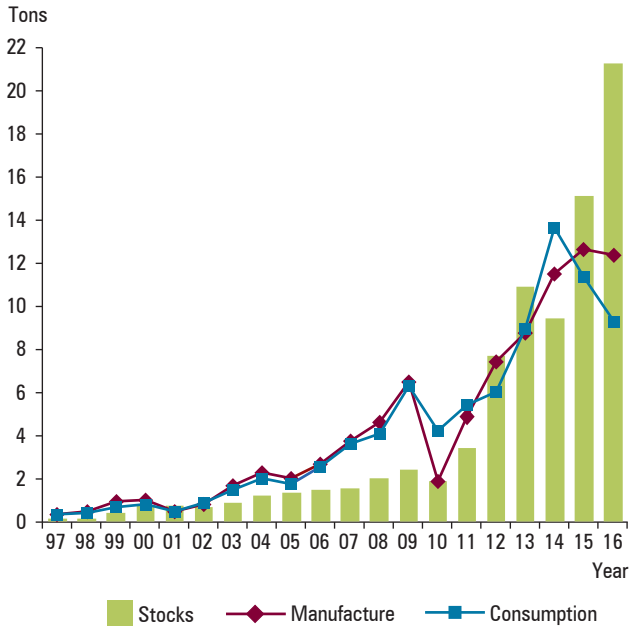
95. Buprenorphine and pentazocine are opioid analgesics controlled under the 1971 Convention. Brief information on these opioids is included in the present publication;

more detailed comments on statistics on buprenorphine and pentazocine can be found in the INCB technical report on psychotropic substances.[19]

Buprenorphine

96. 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 this 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 and remaining stable in 2016 at 12.3 tons (see figure 31). The main manufacturing countries in 2016 were the United Kingdom (8.5 tons), Germany (1.6 tons), Czechia (1 ton), the United States (0.8 tons) and India (0.2 tons). In 2016, the main exporters were, in descending order, the United Kingdom, Czechia, Belgium, Germany, France and Switzerland. The main countries importing buprenorphine in 2016 were, in descending order, the United States, Germany, France, the United Kingdom, Spain and Italy.

Figure 31. Buprenorphine: global calculated consumption,[a] reported manufacture and stocks,[b] 1997-2016



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

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

Pentazocine

97. Pentazocine is an opioid analgesic with properties and uses similar to those of morphine. In 2016, global manufacture of pentazocine increased to 3.5 tons. Most of that was accounted for by India (2.4 tons). Italy manufactured 913 kg. India was also the world's leading exporter of pentazocine in 2016, with 1 ton. The main importers were the United States (610 kg), Nigeria (602 kg) and Pakistan (397 kg).

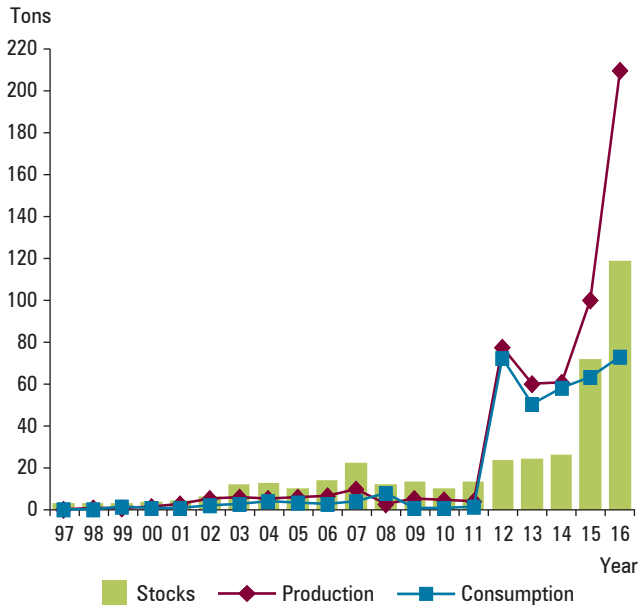
[19]E/INCB/2017/3.

Cannabis

98. 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[20] for medical purposes, as well as for scientific research. In 2000, total production was 1.4 tons; by 2016 it had increased to 209.9 tons (see figure 32). In 2016, the United Kingdom was the main producer, with 95 tons (44.9 per cent of the total), followed by Canada, with 80.7 tons, mostly intended for domestic consumption. They were followed by Portugal (21 tons), Israel (9.2 tons), the Netherlands and Chile (both 1.4 tons) (see table 1 below).

[20]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, consumption and stocks,[a] 1997-2016



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

99. The United Kingdom continued to be the main exporter of cannabis (2.1 tons, or 67.7 per cent of the total); it was followed by the Netherlands (0.5 tons or 16.4 per cent) and Austria (0.2 tons or 8.7 per cent). Countries exporting less than 0.1 tons each were Denmark, Germany and Canada. In 2016, the United States imported 56.6 tons (94.5 per cent of the global total). Much smaller quantities were imported by Germany (2.6 per cent) and Italy (1.1 per cent). The large majority of the stocks were held by the United Kingdom (93.1 tons, or 78.2 per cent) followed by Canada (21 tons, or 17.6 per cent) and Israel (1.8 tons, or 1.5 per cent).

Table 1. Cultivation of cannabis plant and production of cannabis, 2015-2016

Country[a]	Year	Area harvested (hectares)	Quantity produced (kilograms)
Austria	2015	0.04	59
	2016	0.09	116
Canada	2015	. .	48 491
	2016	10.22	80 732
Chile	2015	. .	36
	2016	1.00	1 416
Czechia[b]	2015	—	—
	2016	—	43
Israel	2016	7.45	7 758
	2016	8.45	9 263
Italy	2015	. .	. .
	2016	. .	300
Japan	2015	0.57	. .
	2016	0.58	. .
Netherlands	2015	0.50	1 100
	2016	0.50	1 460
Portugal	2015	15.00	169
	2016	7.00	21 000
Switzerland	2015	. .	315
	2016	. .	453
United Kingdom	2015	. .	41 706
	2016	117.00	95 000
United States[c]	2015	. .	566
	2016	. .	. .
Total	**2015**	**23.56**	**100 201**
	2016	**144.84**	**209 783**

Note: Two dots (. .) signify that a statistical information was furnished but data were not submitted for this specific item.

[a]In addition to the 12 countries listed in table 1, Australia, Colombia and Lesotho have furnished estimates for 2017 and/or 2018 on the cultivation of cannabis plant and the production of cannabis.

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

[c]Data submitted by the federal Government of the United States.

Coca leaf and cocaine

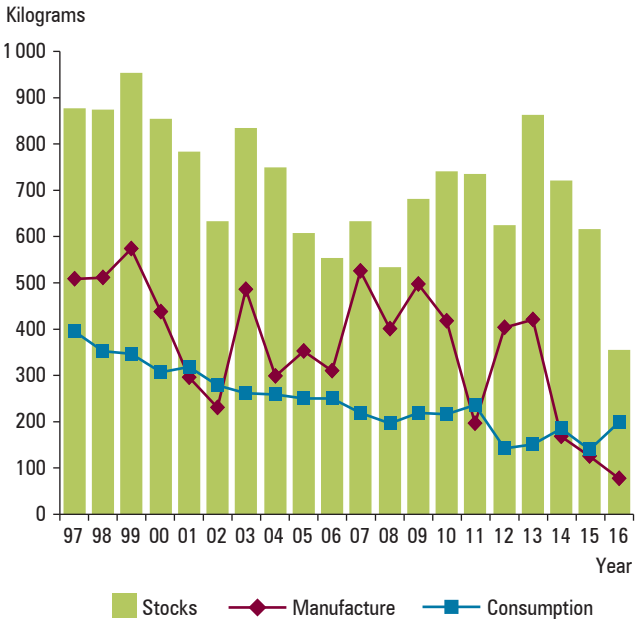
Coca leaf

100. 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 2016, but had reported an export volume of 136 tons, in line with previous years. The United States was the only importing country and accounted for the largest amount utilized (133 tons, or 100 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 have been fluctuating considerably, but in 2014, 2015 and 2016 were stable at around 136 tons. All stocks of coca leaf are maintained by the United States (99.9 per cent). The other major licit producer of coca leaf, the Plurinational State of Bolivia, provided information to the Board on the estimated cultivation (14,705 ha) and preliminary production data (23,217 tons) for 2016. 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 expressed in 2013, when the country reacceded to the 1961 Convention, as amended by the 1972 Protocol.

Cocaine

101. The global licit manufacture of cocaine continued to fluctuate as it has for more than 20 years, dropping from 178 kg in 2014 to 125 kg in 2015, then further to 76.1 kg in 2016 (see figure 33). The main manufacturing country was the United States (72.2 kg, or 94.9 per cent), followed by China (3.6 kg or 4.8 per cent). The main exporting country in 2016 was the United Kingdom (57.2 kg), followed by the Netherlands (13.7 kg). Denmark, Switzerland and Germany exported quantities smaller than 1 kg. The United Kingdom was the main importing country (330 kg), accounting for 82.6 per cent of the total imports of cocaine in 2016, followed by the Netherlands (12.2 kg), Switzerland (7.9 kg), Australia (6.7 kg) and Belgium (5.7 kg). 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 increased again to 191.4 kg in 2016. The main consumer country was the United Kingdom (90.5 kg, or 47.2 per cent), followed by the United States (37 kg, or 19.3 per cent), the Netherlands (12.4 kg, or 6.5 per cent), Belgium (8 kg, or 4.2 per cent) and Australia (7.2 kg, or 3.7 per cent). The largest stocks were held by the United Kingdom (160.4 kg, or 46.5 per cent), the United States (67.9 kg or 19.7 per cent), Japan (17.5 kg, or 5 per cent) and Switzerland (8.1 kg or 2.3 per cent).

Figure 33. Cocaine: global manufacture, consumption and stocks,[a] 1997-2016



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

Trends in the consumption of opioid analgesics

102. 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 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.

103. When comparing the trends in the consumption of the main opioid analgesics (codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone), expressed in defined daily doses for statistical purposes (S-DDDs)[21] (figures 34 and 35), it is evident that over the past 20 years there has been an exponential increase in the consumption of fentanyl. At a lower level of consumption, oxycodone and morphine have been alternating between second and third place for several years and were almost at the same level in 2016. Hydrocodone consumption increased for some years but has started to decline more recently. Hydromorphone consumption, after having increased, has stabilized since 2012. The United States accounted for 100 per cent of hydrocodone consumption, while fentanyl consumption was more diffused globally; though it has been concentrated in high-income countries, there have been significant increases in various countries in the Middle East, South-East Asia and Latin America.

104. Regional analysis confirms the disparity in the consumption of opioid analgesics (figures 36 and 37), with North America, Western Europe and Oceania reporting average consumption over 10,000 S-DDD (44,128, 13,200 and 11,406 S-DDD, respectively). The other regions reported average consumption well below those values: South-Eastern Europe (2,319 S-DDD), South America (1,217 S-DDD), West Asia (681 S-DDD), East and South-East Asia (415 S-DDD), Central America and the Caribbean (294 S-DDD), Eastern Europe (229 S-DDD), Africa (153 S-DDD) and South Asia (111 S-DDD).

[21]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.

Figure 34. Consumption of fentanyl, oxycodone, morphine, hydrocodone, codeine and hydromorphone, expressed in S-DDD, 1997-2016

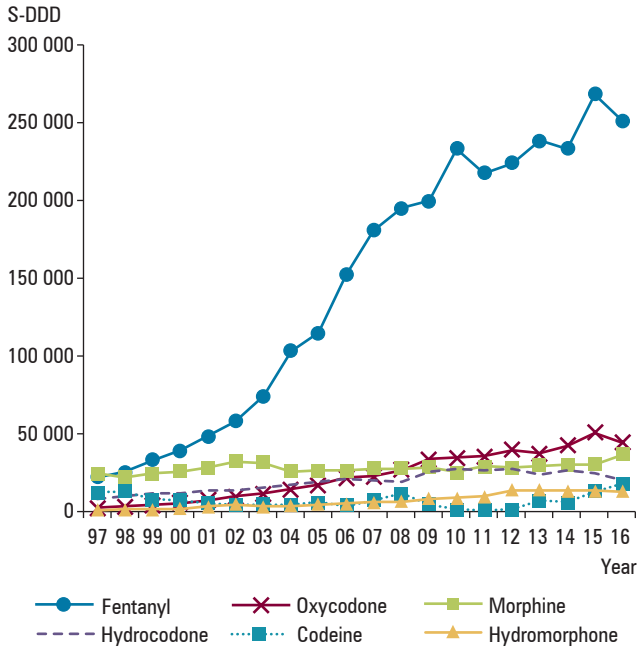


Figure 35. Consumption of oxycodone, morphine, hydrocodone, codeine and hydromorphone, expressed in S-DDD (excluding fentanyl), 1997–2016

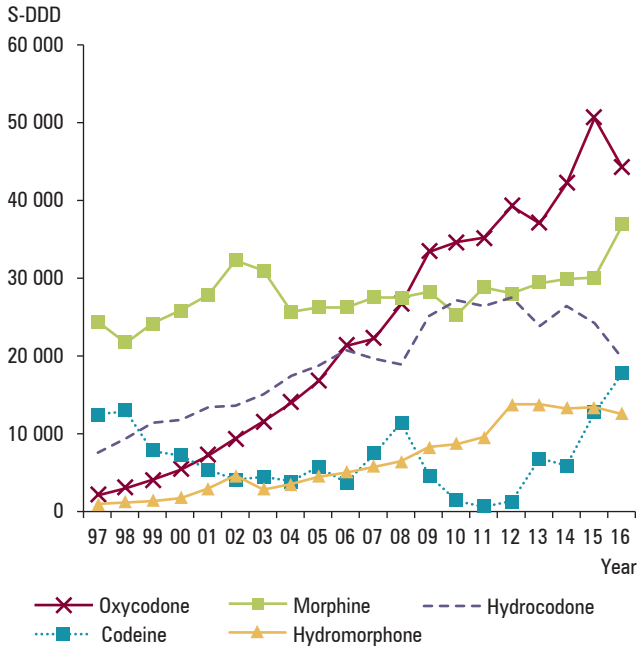


Figure 36. Average consumption of codeine, fentanyl, morphine, pethidine and other opioids, by region, expressed in S-DDD, 2016

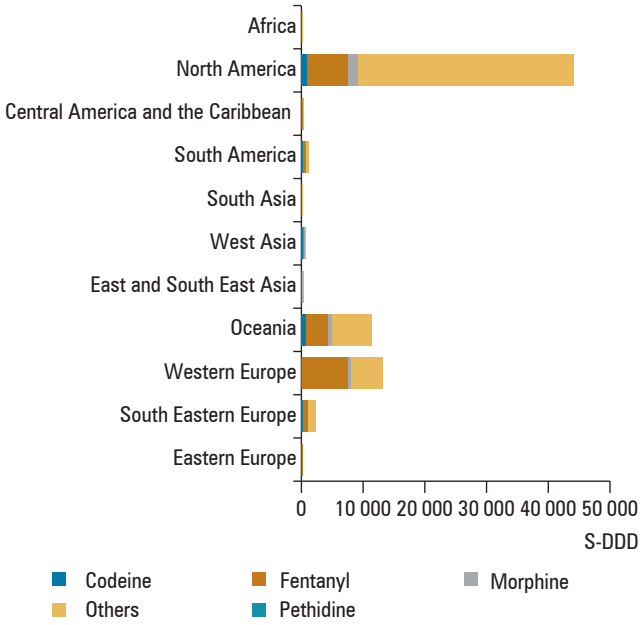


Figure 37. Average consumption in selected regions of codeine, fentanyl, morphine, pethidine and other opioids, expressed in S-DDD, 2016