

COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

Summary

Global production and stocks of opium increased significantly in 2019. Opium imports, on the other hand, showed a strong decrease, from 53.5 tons (5.8 tons in morphine equivalent) in 2018 to only 11.3 tons (1.2 tons in morphine equivalent) in 2019, with one traditional importer ceasing imports altogether. The continuing low demand for the drug could signal a trend towards the eventual elimination of the drug from the international market for opiate raw materials.

Overall utilization of poppy straw and concentrate of poppy straw derived from the morphine-rich variety of poppy straw decreased in 2019 compared with 2018. Global manufacture of morphine in 2019 continued to be below 400 tons, a development that began in 2017, contrary to the situation in the previous decade, when the global manufacture of morphine was always above 400 tons. In 2019, global manufacture of morphine amounted to 380.1 tons, 87 per cent of which was converted into other narcotic drugs or into substances not covered by the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol. The remaining amount was used mainly for palliative care purposes (for direct consumption and the manufacture of preparations listed in Schedule III of the 1961 Convention as amended).

The differences in consumption levels between countries continued to be very significant. In 2019, 80.4 per cent of the world's population, mainly in low- and middle-income countries, consumed only 12.8 per cent of the total amount of morphine used for the management of pain and suffering, or 1 per cent of the total of 380.1 tons manufactured. Although that is a slight improvement from 2014, when 80 per cent of the world's population consumed only 9.5 per cent, the disparity in the consumption of narcotic drugs for palliative care continues to be a matter of concern.

In 2019, the utilization of thebaine for the manufacture of other drugs increased compared with 2018; during the same period, there was a decrease in the production of thebaine and in the area of cultivation of poppy straw rich in thebaine. In 2019, after some fluctuations in the preceding years, global manufacture of thebaine remained high, at 127.5 tons, almost the same amount as in 2018 and considerably below the record level of 156 tons in 2016. The demand for medicines derived from thebaine may have been affected by the restrictions on prescription drugs imposed in the main market, the United States of America, in response to the abuse of such drugs and the high number of overdose deaths they have caused. Nonetheless, the data continued to indicate a high level of demand.

Of the semi-synthetic opioids, global manufacture of oxycodone and hydrocodone decreased again in 2019, after showing decreases in 2018 as well. Global manufacture of hydromorphone decreased to the lowest level of manufacture since 2004, and the manufacture of ethylmorphine and heroin increased.

In the case of synthetic opioids, global manufacture of fentanyl increased in 2019, after a strong decrease was recorded in 2018. Consumption of fentanyl, on the other hand, decreased while reported consumption of fentanyl analogues (alfentanil, remifentanil and sufentanil) all increased. The manufacture of diphenoxylate showed growth, after declines had been recorded for some time. Reported manufacture of tilidine rose in 2019, after historically low levels in 2018. The manufacture of pethidine has trended downward for 20 years but increased slightly in 2019. Trimeperidine manufacture continued to increase, for the second consecutive year.

There was no report of manufacturing of ketobemidone, and less than 1 kg of dextropropoxyphene was reported having been manufactured in 2019. The manufacture of methadone declined in 2019, after having increased in 2018.

The cultivation and production of cannabis for medical and scientific purposes has been on the rise over the past five years. Prior to 2010, only the United States reported production, which was related to scientific research. Since 2000, in particular since 2015, an increasing number of countries have started to use cannabis and cannabis extracts for medical purposes as well as for scientific research and have also authorized the cultivation of cannabis. For 2019, the licit production of 468.3 tons has been reported. However, as manufacturing processes and yields are not standardized, some data are being clarified with the relevant Governments in order to ensure consistency.

With respect to coca leaf, the United States continued to import coca leaf for the extraction of a flavouring agent. The global licit consumption of cocaine, which has been stable for the past two decades, ranging between 100 and 300 kg, amounted to 466 kg in 2019, a further increase, after 394.1 kg were recorded in 2018.

Sixty years of the Single Convention on Narcotic Drugs of 1961

1. On 30 March 1961, the Single Convention on Narcotic Drugs¹ was adopted in New York, and with that adoption, the international community successfully created and agreed on a single instrument that codified all previous international treaties, protocols and other agreements on narcotic drugs. The Convention entered into force less than four years later, on 13 December 1964, demonstrating the high level of commitment of Member States to establishing a drug control system to ensure that the use of narcotic drugs was limited to medical and scientific purposes.

2. The 1972 Protocol that amended the 1961 Convention introduced additional important elements of control, for example, for poppy straw. The Protocol also includes an obligation for Member States to take action to reduce the demand for illicit drugs, including drug prevention and treatment and rehabilitation measures, reflecting a change in attitude towards drug use and drug users. The Protocol quickly gained acceptance and entered into force in 1975, and by 1980, 66 States had become parties to the 1971 Protocol, which amended the 1961 Convention.

3. The number of States parties has consistently increased, and today, 186 States from all regions are parties to the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol.² Only one country is party to the 1961 Convention in its unamended form. This near-universal adherence to the 1961 Convention means that all major manufacturing, consuming and trading countries in the world, representing 99 per cent of the world's population, are parties to the Convention as amended.

4. The sixtieth anniversary of the adoption of the Convention provides a good opportunity to review the main achievements and successes of the Convention and to reflect on general developments with respect to the related data and information provided, after more than half a century of monitoring global manufacture, consumption, imports and exports of narcotic drugs.

Scope of control

5. More than 136 drugs are controlled under the 1961 Convention as amended, mainly natural products such as opium and its derivatives, morphine, codeine and heroin and also synthetic narcotic drugs such as fentanyl, methadone and pethidine. In addition to the itemized substances, control is extended over the isomers, ethers and esters, and salts, as well as the isotopic forms of internationally controlled narcotic drugs.

6. The drugs controlled under the 1961 Convention as amended are listed in either Schedule I or II depending on the relationship between their therapeutic usefulness and abuse liability. The control provisions for drugs in Schedule I constitute the standard control system under the 1961 Convention as amended; Schedule II consists of drugs which are considered to be less liable to abuse and which are more widely used in medicine. Schedule III covers preparations of drugs in Schedule I and II with wide legitimate medical uses, whereas Schedule IV contains selected drugs from Schedule I considered to have particularly dangerous properties and limited or no therapeutic use.

7. Ninety-eight drugs were included in the original list of the 1961 Convention as amended, including major narcotic drugs such as opium, morphine, cocaine, heroin and cannabis. Over the years, the World Health Organization reviewed several psychoactive substances for possible scheduling under the 1961 Convention as amended, and the Commission on Narcotic Drugs decided to add drugs to the schedules of the Convention, bringing the total number of scheduled drugs to 136. Following a period of relative inactivity during the 2000s, scheduling activity has picked up recently. Since 2016, a total of 15 new drugs have been added to the schedules of the Convention, and most of the newly scheduled drugs in the Convention are connected to the emergence of synthetic opioids related to fentanyl. The Convention also includes control measures for coca leaf, cocaine and cannabis, and the Convention was the first international treaty to include controls on poppy straw.

Submission of treaty-mandated information on statistics and estimates

8. Most Governments have cooperated with the provisions of the Convention and their obligation to submit data and information. In 1975, for example, the Board received 91 per cent of the replies expected to a questionnaire that had been distributed to Governments. The rate of submission of data has remained high, with at least 75 per cent of Governments providing treaty-mandated information. Annual statistics on the manufacture, utilization, consumption and stocks of narcotic drugs are received from at least 175 Governments, and the highest number of submissions came in 2016, when 181 Governments submitted such data. In any given year, between 170 and 180 Governments submit a full set of quarterly statistics on the import and export of narcotic drugs, information that is mandatory under the 1961 Convention as amended, and an additional 30 Governments supply at least partial records. The submission record is higher for major manufacturing, trading and importing countries, which consistently supply data.

¹United Nations, *Treaty Series*, vol. 520, No. 7515.

²*Ibid.*, vol. 976, No. 14152.

9. With respect to the requirement to furnish annual estimates of narcotic drug requirements, about 180 Governments submit these every year. In case estimates are not received, the 1961 Convention as amended provides for the establishment of estimates by the Board to ensure that countries and territories are able to import narcotic drugs for medical purposes. The high submission rates show the commitment of Governments to cooperating with the Board and ensuring the continued functioning of the international drug control system.

Manufacture, consumption and trade of narcotic drugs over the years

10. When the 1961 Convention was adopted, opium was the most widely used starting material for the manufacture of narcotic drugs. While opium production stood at 1,261 tons in 1960, the highest amount recorded since the Second World War, the following years saw significant declines; by the mid-1960s, the amounts produced were frequently insufficient to meet requirements, and it became necessary to draw on available stocks of the drug. At that time, the alternative production route from poppy straw or indirectly through concentrate of poppy straw gained more importance, and in 1968, 59 tons were reported having been produced by means of those production routes, representing a 39 per cent share of total manufacture. By 1969, production had bounced back, and, as reported by Governments to the Board, it had reached 1,261 tons, the highest level recorded since 1960.

11. Morphine production continued to increase during that decade, and most of the manufactured morphine was subsequently converted into other narcotic drugs, primarily codeine, along with smaller quantities of ethylmorphine and pholcodine. The 1960s also saw the emergence of synthetic narcotic drugs being used in medical practice. Whereas in 1952 – that is, prior to the adoption of the 1961 Convention – only 13 synthetic narcotic drugs had been under international control (under previous treaties on narcotic drugs), their number had increased to 59 by 1964. One synthetic narcotic drug that gained widespread acceptance for medical purposes during that time was pethidine, which came to be viewed as a viable alternative to morphine. The manufacture of methadone also reached high levels (357 kg), and the Board reported in its report on statistics on narcotic drugs for 1968³ that the drug was used experimentally in the treatment of drug users.

12. During the 1970s, the use of poppy straw or concentrate of poppy straw in the process for the production of narcotic drugs continued to rise, and in 1977, the amount of opium used for the extraction of alkaloids fell below

1,000 tons for the first time since 1968. The quantity of concentrate of poppy straw manufactured, on the other hand, exceeded the level of 100 tons for the first time in 1977. The extraction of thebaine from poppy straw also showed increases. Methadone manufacture continued to climb and amounted to 2 tons in 1974 and pethidine manufacture rose to 20 tons that year. The consumption of cannabis for therapeutic purposes and research, which had also been reported during the 1960s, continued in the 1970s, with quantities of consumption of between 245 kg and 4,472 kg being reported to the Board for that purpose.

13. The 1980s and 1990s saw a further trend towards alkaloid extraction from concentrate of poppy straw instead of from opium. The growing demand for thebaine led to an increase in the utilization of concentrate of poppy straw manufactured from a new variety of opium poppy with high thebaine content. The global manufacture of synthetic narcotic drugs continued to expand. This was particularly apparent in the case of dextropropoxyphene, a narcotic drug that was placed under international control in 1980. The global manufacture and consumption of dextropropoxyphene continued to increase over the following two decades, from the 50 tons reported in 1980 to the manufacture of 298 tons in 1999. Tilidine, which was also placed under international control in 1980, showed a similar development. The use of fentanyl underwent a transformation, with new delivery methods being developed to allow for its wider use. Until the 1980s, fentanyl had primarily been used for surgery. Meanwhile, anileridine and dipipanone, which had been widely used in the previous decades were used in ever smaller quantities, and eventually production and consumption of those drugs stopped.

14. The 2000s and 2010s saw a further expansion of fentanyl use, which, expressed in defined daily doses for statistical purposes (S-DDD), became the most widely used opioid – more than morphine. In 2009, the amount of S-DDD recorded for oxycodone overtook the amount for morphine. Today, fentanyl, oxycodone and morphine remain the most widely used opioid analgesics. As regards opiate raw materials, the production of opium has declined to the levels seen in the mid-1960s, and most alkaloids are today extracted from poppy straw. A new codeine-rich variety of poppy has been developed and is being cultivated at relatively small levels. Whereas there were shortages of opiate raw materials at the beginning of the operation of the 1961 Convention, this is no longer the case today. The low consumption of narcotic drugs that persists in large parts of the world today, in particular in developing countries, is therefore not due to a lack of supply, as there are large quantities of opiate raw materials produced every year.

15. One other trend that has emerged over the past five years is the cultivation of cannabis for medical and scientific

³E/INCB/7.

purposes. Such cultivation is subject to a number of control measures as set out in articles 28 and 23 of the 1961 Convention as amended. The establishment of medical cannabis programmes, which now exist in several countries, and the cultivation of the drug for medical purposes have reached high levels, with more than 400 tons produced for these purposes being reported by Governments for the first time in 2017. **The Board calls on countries to strictly comply with the treaty requirements that are designed to prevent the diversion of cannabis to non-medical use.**

16. The strength of the control system established by the 1961 Convention as amended is also evident in a review of the global trade data. International trade in all goods

has undergone unprecedented growth since the 1961 Convention was first adopted, and this is also the case with narcotic drugs, which are frequently shipped across borders. Since 1980, the number of export transactions reported to the Board has multiplied and continued to trend upward. At the same time, however, the number of trade discrepancies has remained largely stable. Trade discrepancies are identified by the Board in its analysis of global import and export transactions that are reported by Governments on a quarterly basis. These inconsistencies are subsequently raised with the Governments concerned. No diversion of narcotic drugs into illicit trafficking has been identified in the past five years, which shows the robustness of the control system in place.

Introduction to the comments on the reported statistics on narcotic drugs

17. The present comments are intended to facilitate the use of the statistical information on the licit production, manufacture, consumption,⁴ utilization⁵ 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. Unless otherwise indicated, the comments refer to developments during the period 2000–2019.

⁴For the purposes of the Single Convention on Narcotic Drugs of 1961 as amended, 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, of the Convention).

⁵Pursuant to article 20 of the 1961 Convention as amended, the parties furnish the International Narcotics Control Board (INCB) with statistical returns on the utilization of narcotic drugs for the manufacture of other drugs, of preparations in Schedule III of the Convention and of substances not covered by the Convention and on the utilization of poppy straw for the manufacture of drugs.

18. 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 1961 Convention as amended by the 1972 Protocol. The most recent statistical data reflected in the comments are those relating to 2019. The failure by some Governments to submit reports or to provide precise and complete reports, which in some cases has been notable, may have a bearing on the accuracy of some of the information presented in this report.⁶ The most pertinent conclusions and recommendations of INCB based on the analysis of statistical data are included in chapter II of its annual report.⁷

⁶Details on the submission of statistical reports by individual Governments are contained in annex I to the present publication.

⁷E/INCB/2020/1.

Opiate raw materials

19. 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 as amended. 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.

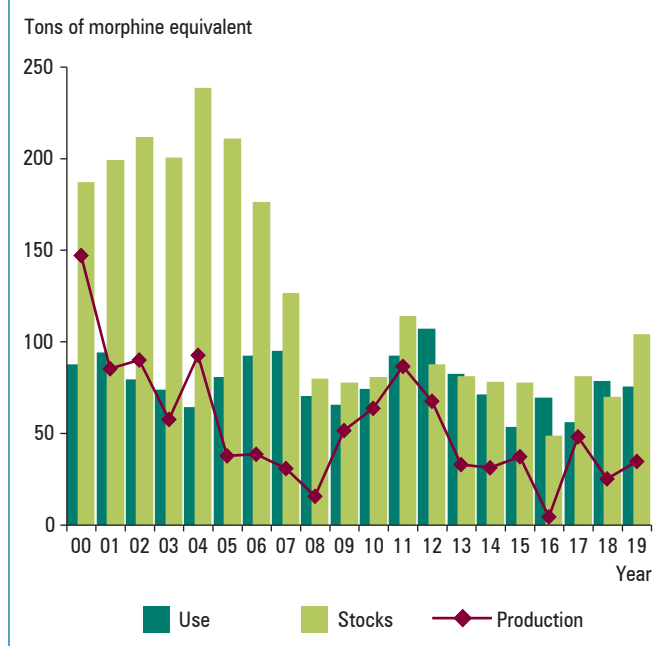
Opium

20. 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,⁸ 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 2000–2019, expressed in morphine equivalent.

⁸The 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 morphine equivalent, 2000–2019



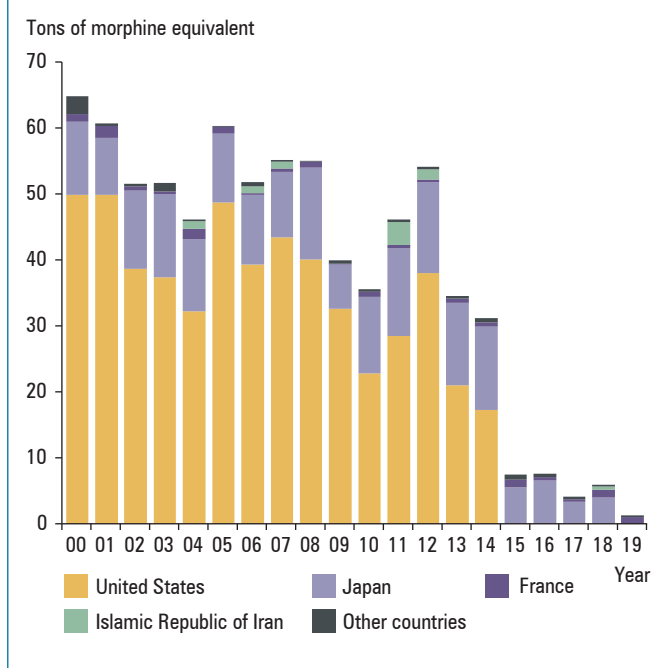
^a Stocks as at 31 December of each year.

^b Including the use of seized opium in Iran (Islamic Republic of) and Myanmar.

21. Opium production was over 1,300 tons in 2000 (147.6 tons in morphine equivalent), but since then, production has followed a strong overall downward trend, going as low as 143.7 tons in 2008 (15.8 tons in morphine equivalent). There was a steady increase until 2011 when it reached 789.1 tons in gross weight (86.8 tons in morphine equivalent), but subsequently, production continued to decrease, falling to its lowest level in 20 years, 42.3 tons (4.6 tons in morphine equivalent) in 2016. Production increased again in 2017, to 439.3 tons (48.3 tons in morphine equivalent), and subsequently decreased again, reaching 232 tons (25.5 tons in morphine equivalent) in 2018. In 2019, it increased to 318.4 tons (35 tons in morphine equivalent). India was the main producer, and the only licit exporter, of raw opium in 2019, accounting for 312 tons of production (34.2 tons in morphine equivalent) or 98 per cent of total global production. It was followed by China, which produced 6 tons (0.7 tons in morphine equivalent), which was 1.9 per cent of the global total. However, in China, poppy straw has replaced opium as the main raw material used in the manufacture of alkaloids since 2000. Small quantities were also produced by the Democratic People's Republic of Korea and Japan, together amounting to 0.1 per cent of the global total.

22. Imports of opium (see figure 2) have continued the sharp downward trend that started in 2015. Compared with the imports of 53.5 tons (5.8 tons in morphine equivalent) reported in 2018, imports in 2019 decreased to a third, to

Figure 2. Opium: imports from India, in morphine equivalent, 2000–2019



Note: The amounts of opium imported by the United States stood at 100 kg in 2015, 56 kg in 2016, 569 kg in 2017, 50 kg in 2018 and 474 kg in 2019. Japan ceased to import opium in 2019.

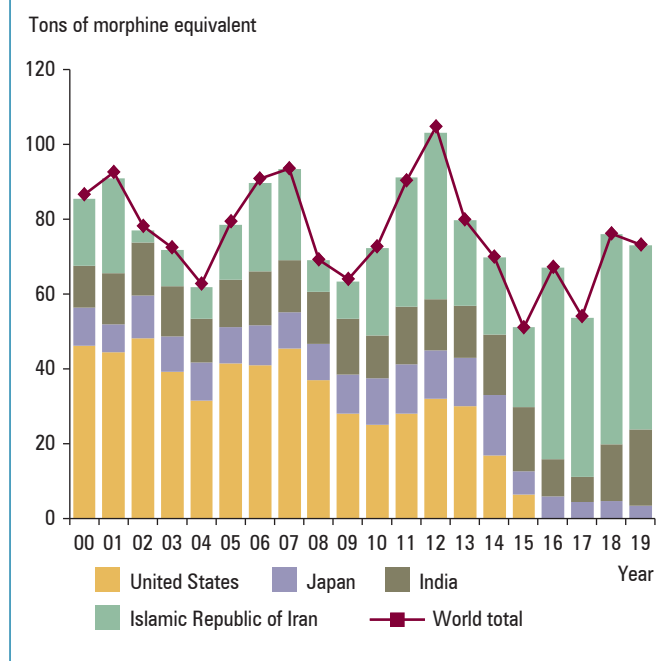
14.6 tons⁹ (1.6 tons expressed in morphine equivalent). This is the lowest level of imports in 20 years and a very significant decrease compared with 2000 (589.1 tons, or 64.8 tons in morphine equivalent). The main countries importing opium in 2019 were France (8.8 tons, or 77.6 per cent of all imports), followed by Spain (0.7 tons, or 6.3 per cent), Germany (0.5 tons, or 4.5 per cent), Thailand (0.5 tons or 4.4 per cent) and the United States of America (0.5 tons or 4.1 per cent). It should be noted that in 2019 Japan ceased importing opium altogether and switched to importing concentrate of poppy straw. That, in turn, had an impact on the decreases in both the import and export, as well as on the increase in stocks.

23. The stocks of opium rose to 949.6 tons (99.1 tons in morphine equivalent) for 2019, compared with 640.1 tons in 2018. This is the first notable increase in the past decade, during which stocks averaged 700 tons (77 tons in morphine equivalent). A trend may be observed of an overall declining demand for opium produced by India, which has had an impact on the rise in stocks (see figure 1).

24. As in previous years, the bulk of opium was used for the extraction of alkaloids, with only a small amount

⁹A trade discrepancy should be noted: India reported an export of 16.1 tons of opium expressed in morphine equivalent, while importers reported 12.4 tons imported. Conversely, in the previous report the importers reported a higher number, 53.5 tons, as opposed to the 45.3 tons that were reported as exports. In both cases, the higher number was used in this report.

Figure 3. Opium: utilization^a for the extraction of alkaloids, in morphine equivalent, 2000–2019



Note: The United States utilized an amount of 490 kg in 2018 and 160 kg in 2019.

^aIncluding the utilization of seized opium in Iran (Islamic Republic of) and Myanmar.

(24.4 tons, or 2.7 tons in morphine equivalent) being used for the manufacture of Schedule III preparations. Utilization (including the utilization of seized opium in Iran (Islamic Republic of) and Myanmar) in 2019 decreased slightly, from 692.7 tons (76.2 tons in morphine equivalent) tons in 2018 to 666 tons in 2019 (73.2 tons in morphine equivalent).¹⁰ In 2019, similar to 2018, the main countries reporting utilization of opium for the extraction of alkaloids were the Islamic Republic of Iran (449.3 tons, or 49.4 tons of morphine equivalent), India (184.3 tons, or 20.3 tons in morphine equivalent) and Japan (31.7 tons, or 3.5 tons in morphine equivalent) (see figure 3). The opium reported as utilized by the Islamic Republic of Iran originated from seized material. The Democratic People's Republic of Korea reported the utilization of opium in the amount of 0.4 tons (0.05 tons in morphine equivalent), and the United States reported utilization of 0.2 tons (0.02 tons in morphine equivalent). Details on the utilization of opium for the extraction of alkaloids and the alkaloids obtained are provided in table III of part four of the present publication.

25. While most of the opium produced is used for the extraction of alkaloids, opium is also consumed in some

¹⁰In the Islamic Republic of Iran, in addition to the licitly produced opium declared as imported from India (in the years 2004, 2006, 2007, 2011, 2012, 2016 and 2018 only), seized opium is used regularly in large quantities for licit purposes (i.e., for the extraction of alkaloids). The extraction yield from seized opium is usually less than that from licitly produced opium.

countries in the form of preparations, mainly for the treatment of diarrhoea and coughs. Most of those preparations are included in Schedule III of the 1961 Convention as amended.¹¹ Global consumption of opium for those purposes has fluctuated since 2001. In 2019, the consumption and the utilization of opium for the manufacture of preparations in Schedule III amounted to 25.2 tons (2.8 tons in morphine equivalent), including 9.4 tons (1 ton in morphine equivalent) in China, 7 tons (0.8 tons in morphine equivalent) in France and 6.6 tons (0.7 tons in morphine equivalent) in India.

26. Global stocks of opium reached a peak in 2004 (2,176.2 tons, or 239.3 tons in morphine equivalent). They began to decrease thereafter until 2018, when they stood at 640.1 tons (70.4 in morphine equivalent). However, in 2019 the stocks increased significantly and reached a level of 949.6 tons (104.5 tons in morphine equivalent) globally (see figure 1). India continued to maintain the largest stocks of opium, increasing stocks by nearly 200 tons in 2019 to a total of 729.1 tons (80.2 tons in morphine equivalent), constituting 76.7 per cent of the global total. The second largest amount of stocks held is that of the Islamic Republic of Iran, which reported stocks of 160 tons (17.6 tons in morphine equivalent) in 2019, a 10-fold increase over the 15.3 tons (1.7 tons in morphine equivalent) reported in 2018. Japan reduced its stocks to 44.2 tons (4.9 tons in morphine equivalent) in 2019, a notable decrease from 76 tons in 2018, while France increased its stocks to 9.6 tons (1 ton in morphine equivalent) in 2019, a small increase from the 8.6 tons reported in 2018. The last among the top five holders of opium stocks is China, which reduced its stocks in 2019 to 5.1 tons (0.6 tons in morphine equivalent) from 8.5 tons in 2018.¹²

Poppy straw

27. 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

¹¹Preparations included in Schedule III of the 1961 Convention as amended are exempt from several control measures that are otherwise mandatory for preparations containing narcotic drugs, including reporting on their consumption and international trade.

¹²For further information on the production and stocks of and demand for opium, see part three of the present publication.

straw (C)”, poppy straw produced from varieties of opium poppy plant rich in oripavine is referred to as “poppy straw (O)”, 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, oripavine, or noscapine), other alkaloids that can be extracted.

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

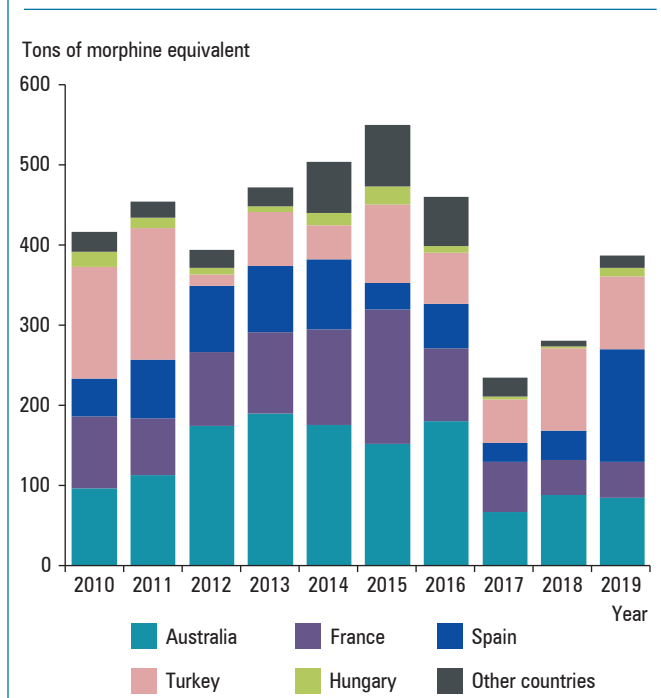
Poppy straw produced mainly from opium poppy rich in morphine¹³

29. Although the submission of statistics on the production of poppy straw is voluntary, most countries cultivating opium poppy plants for the extraction of alkaloids provided such statistics in 2019. Global production of poppy straw (M) expressed in morphine equivalent followed an increasing trend in the two decades prior to 2019. Over the years, production fluctuated sharply, mainly because of unstable weather conditions and in response to the demand in manufacturing countries. It reached about 430 tons in morphine equivalent in 2003, decreased to about 218 tons in 2008, but then increased again significantly, reaching 586 tons in 2015 before decreasing again, falling to 304 tons in 2018, and rising to 392 tons in 2019. Throughout the two decades prior to 2019, Australia, France, Spain and Turkey had been the main producer countries. In 2019, the leading producer was Spain (141 tons in morphine equivalent), followed by Turkey (91 tons), Australia (85 tons),¹⁴ France (44 tons) and Hungary (11 tons) (see figure 4). Other producers of poppy straw (M) together accounted for the remaining 15 tons of global production in 2019. For accounting purposes, quantities of poppy straw (C), rich in codeine, were included in the calculation of the quantities in morphine equivalent. Such quantities have become more significant in recent years. Changes in the area cultivated with opium poppy plant, the amounts of poppy straw (M) harvested and the yields obtained in producing countries are shown in table II of part four.

¹³Morphine and codeine alkaloids (expressed in morphine equivalent) contained in other varieties of poppy straw such as poppy straw (T) and poppy straw (C) are also included in the total production figures in this subsection, where applicable.

¹⁴This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 4. Total anhydrous morphine alkaloid contained in all poppy straw varieties: production in the main producing countries, in morphine equivalent, 2010–2019



30. International trade in poppy straw (M) as a raw material continues to be limited. In 2019, Hungary was the main exporter of poppy straw (M) for the extraction of alkaloids (56.9 per cent), followed by the United Kingdom of Great Britain and Northern Ireland (26.3 per cent), Slovakia (16.7 per cent) and Austria and Germany, which exported very small amounts (see annex IV, table 1).

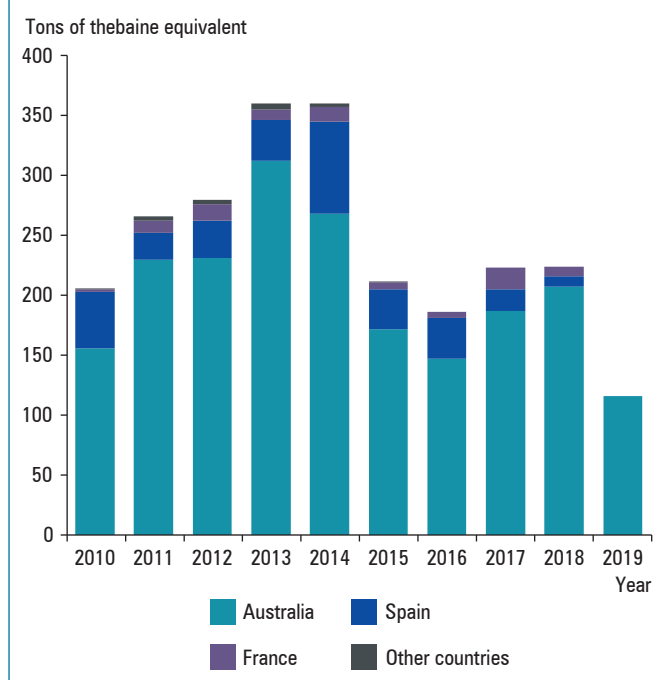
31. The utilization of poppy straw (M) in 2019 fell to half the amount of 2018. The main countries utilizing poppy straw (M) in 2019 were Spain (6,851.0 tons in gross weight), France (4,008.0 tons), Australia (3,541.7 tons),¹⁴ Slovakia (2,074.6 tons) and China (1,527.3). North Macedonia and Turkey utilized less than 100 tons each. 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 from opium poppy rich in thebaine¹⁵

32. 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. Canada, China, Hungary and New Zealand have reported sporadic production in recent years. More details on the production of poppy straw (T) can be found in table II.

¹⁵The quantities in thebaine equivalent of the thebaine and oripavine alkaloids contained in other varieties of poppy straw such as poppy straw (M) and poppy straw (C) are also included in the total production figures in this subsection, where applicable.

Figure 5. Total anhydrous thebaine alkaloid contained in all poppy straw varieties: production in the main producing countries, in thebaine equivalent, 2010–2019



33. Production of poppy straw (T) in the main producing countries during the period 2010–2019, expressed in thebaine equivalent, is shown in figure 5. Total production decreased by half, going from 230 tons in 2018 to 116 tons in 2019, expressed in thebaine equivalent. In 2019, Australia was the only producer, with 116 tons¹⁶ in thebaine equivalent, a considerable decrease compared with 2018 (207 tons).

34. 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

35. Australia reported the cultivation of poppy straw (C), rich in codeine, for commercial purposes for the first time in 2009 and France in 2013. This new variety was cultivated specifically to meet the high global demand for codeine. Its production increased steadily, from 415.3 tons (expressed in gross weight) in 2010 to 6,706.9 tons in 2015, but dropped considerably, to 1,313.2 tons, in 2016, subsequently increasing in 2017 and 2018. It reached 3,356.2 tons in 2019. Australia produced 65.5 per cent¹⁶ of poppy straw (C), while Spain produced the remaining 34.45 per

cent. Australia also accounted for most of its utilization (52.6 per cent),¹⁶ followed by Spain (47.4 per cent), with minor utilization for the manufacture of other drugs by North Macedonia (0.02 per cent) and Denmark (0.01 per cent). Stocks of poppy straw (C) were held by Spain (1,759.2 tons, or 44.6 per cent), France (1,631 tons, or 41.4 per cent) and Australia (0.6 tons, or 14 per cent).¹⁶

Poppy straw produced from opium poppy rich in noscapine

36. In recent years, an increase in the cultivation of poppy straw (N) had been reported in some countries. Noscapine is not under international control, but as this variety contains opiates under international control, such as morphine, it needs to be monitored in accordance with the requirements of the 1961 Convention as amended. In 2019, France was the only country to report its cultivation, with a total production of 1,429 tons of poppy straw (N) (expressed in gross weight). Spain and Hungary are the only countries to report stocks of poppy straw (N): they held 232.5 tons (expressed in gross weight). Australia, which reported stocks of 638 tons in 2018 did not report any stocks in 2019.

Poppy straw used for decorative purposes

37. In some countries, the poppy plant is cultivated for purposes other than the production or manufacture of narcotic drugs, such as culinary and decorative purposes. In 2019, the countries that reported such use of poppy straw were Austria, Canada, Czechia, Germany and Japan. Traditionally, the Netherlands, Poland and Ukraine have also cultivated the poppy plant for purposes other than the production or manufacture of narcotic drugs, but in 2019 they did not report such cultivation.

Concentrate of poppy straw

38. 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

¹⁶This figure was calculated by INCB using available data series. It is being followed up with the Government.

concentrate of poppy straw are distinguished by the main alkaloid contained in them.¹⁷

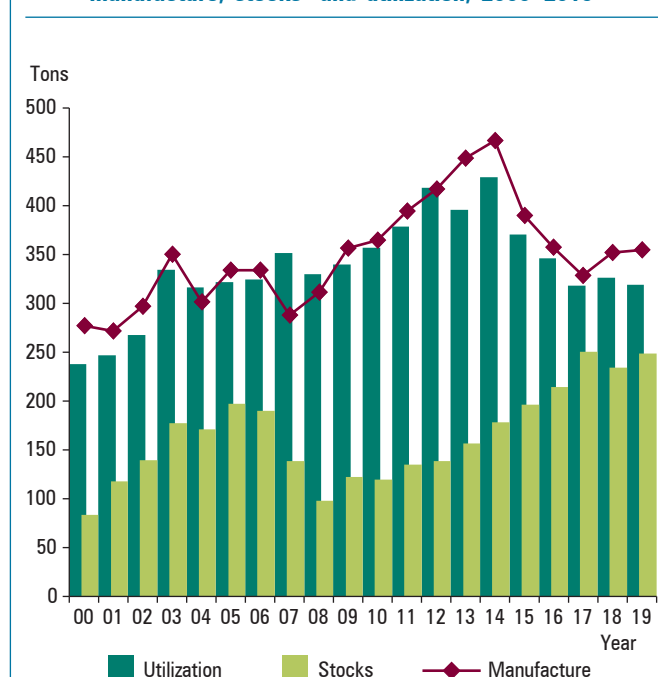
39. Since the actual content of alkaloids in concentrate of poppy straw may vary significantly, for the purposes of comparison and for statistical purposes, all data referring to concentrate of poppy straw are expressed in terms of the quantity of the relevant anhydrous alkaloid contained in the material.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

Anhydrous morphine alkaloid contained in concentrate of poppy straw

40. 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 2000–2019.

¹⁷Currently, 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.

Figure 6. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: global manufacture, stocks^a and utilization, 2000–2019



^aStocks as at 31 December of each year.

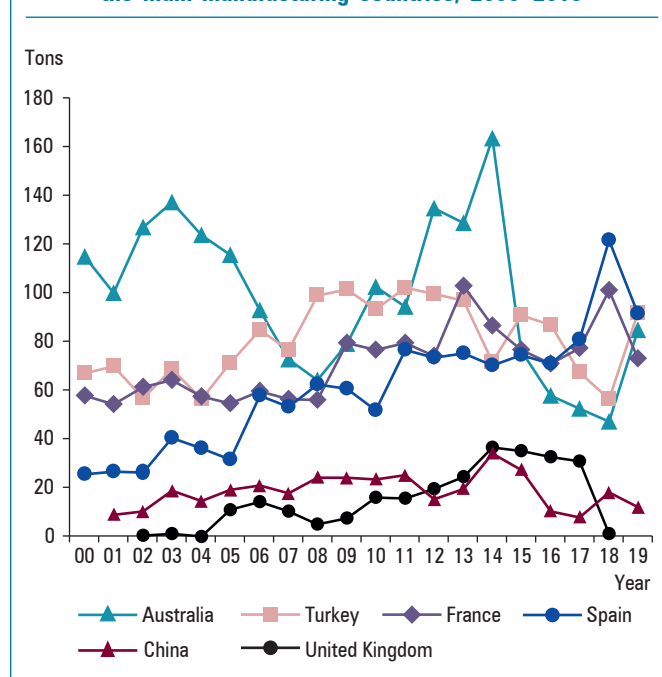
41. Global manufacture of AMA (CPS) increased steadily after 2001, reaching its highest level ever in 2014 (466.3 tons). After that year, manufacture of AMA (CPS) decreased gradually, falling to 327.9 tons in 2017. However, since 2017 manufacture has been increasing again, reaching 354.5 tons in 2019 (see figure 6). Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 2000–2019 are presented in figure 7.

42. Turkey was the leading manufacturers of AMA (CPS) in 2019, reporting 91.9 tons (25.9 per cent of global manufacture), followed closely by Spain at 91.6 tons (25.8 per cent of the global total). Australia manufactured 85.0 tons (23.9 per cent),¹⁸ France 73.3 tons (20.6 per cent), China 12.1 tons (3.4 per cent) and North Macedonia 0.6 tons (0.1 per cent of the global total) (see figure 7).

43. After reaching a record high of 239 tons in 2012, global exports of AMA (CPS) began to decrease until 2018, when they stood at 154.5 tons, but in 2019, they grew again, to 167.3 tons. Spain exported the largest quantity of AMA (CPS) in 2019 (92.6 tons, or 55.3 per cent), followed by Turkey (34.9 tons, or 20.9 per cent), Australia¹⁸ (33.3 tons, or 19.9 per cent) and France (6.5 tons, or 3.9 per cent). The United Kingdom remained the main importer of AMA (CPS), accounting for 49 per cent of global imports, followed by Norway (13.6 per cent), the United States (10.3 per cent), Japan (8.8 per cent), France (7.2 per

¹⁸This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 7. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: manufacture in the main manufacturing countries, 2000–2019



cent) and South Africa (7.1 per cent). Other importing countries were, in descending order of the amounts imported, Hungary, Italy, Switzerland and North Macedonia, together accounting for 3.6 per cent of the global imports. Further details on international trade in AMA (CPS) can be found in annex IV, tables 1 and 2.

44. 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 has decreased since then (see figure 6). In 2019, the total world utilization amounted to 318.5 tons, a small decrease from 326.1 tons in 2018. INCB calculated that in 2019 the United Kingdom was the country with the largest utilization of AMA (CPS), accounting for 85 tons,¹⁹ or 26.6 per cent of the global total. France was second with 73.4, or 23 per cent, followed by Australia with 51 tons (16 per cent),²⁰ Norway with 33.3 tons (10.4 per cent), the United States with 20.5 tons (6.4 per cent) and China with 19.8 tons (6.2 per cent) (see figure 8). Other countries that reported utilization of AMA (CPS), in descending order of the amounts utilized, are South Africa, Japan, Turkey, Italy, Switzerland, Spain and North Macedonia.

45. Global stocks of AMA (CPS) have continuously increased in the past 10 years, and in 2019 they were at 248.7 tons (see figures 6 and 9). Turkey held 140.7 tons in

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

stock, or 56.6 per cent of the global total, followed by Australia (28 tons, or 11.2 per cent), the United States (26.9 tons, or 10.8 per cent), the United Kingdom (18.8 tons, or 7.5 per cent) and China (15.8 tons, or 6.3 per cent) (see figure 9). Other holders of stock, together accounting for less than 10 per cent of global stocks, in descending order, are Japan, South Africa, France, Spain, Norway, Belgium, North Macedonia and Slovakia.

Anhydrous thebaine alkaloid contained in concentrate of poppy straw

46. Figure 10 provides an overview of the manufacture, stocks, and utilization of ATA (CPS) during the period 2010–2019. Industrial manufacture of ATA (CPS), which started in 1998, increased rapidly until 2012 and followed a downward trend from 2013 until 2016. It has fluctuated since then, with an increase in 2017, a decrease in 2018, and finally another increase in 2019, reaching 173.3 tons. The only countries manufacturing ATA (CPS) in 2019 were Australia²⁰ (140 tons, or 80.8 per cent) and Spain (33.3 tons, or 19.2 per cent). Australia was also the main exporter, accounting for 77.9 per cent of the global total, or 71.4 tons. Spain was the only other exporter with 22.1 per cent, or 20.3 tons. The United States has been the leading importer of ATA (CPS) for many years; in 2019, it accounted for 98.8 per cent of total imports, or 91.3 tons. The other two

²⁰This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 8. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: utilization for the manufacture of opiates, 2000–2019

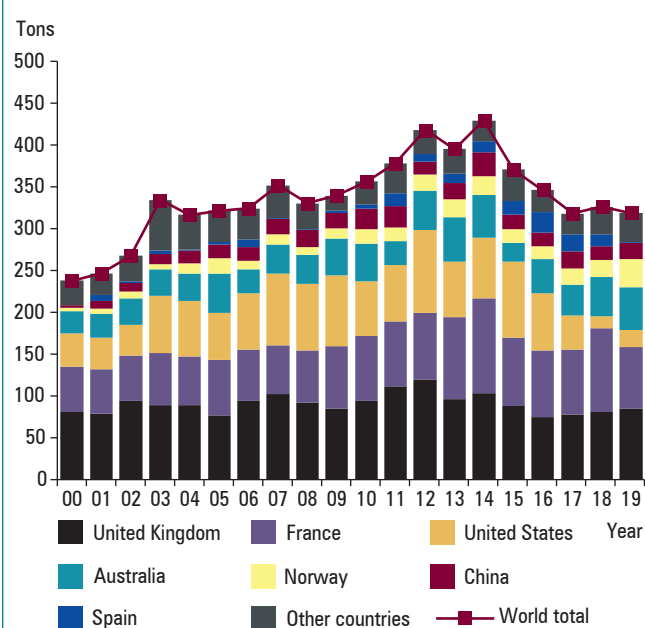
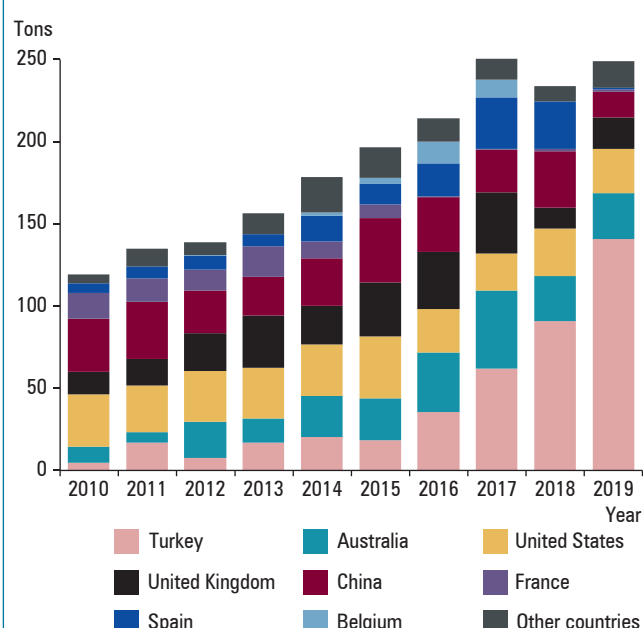
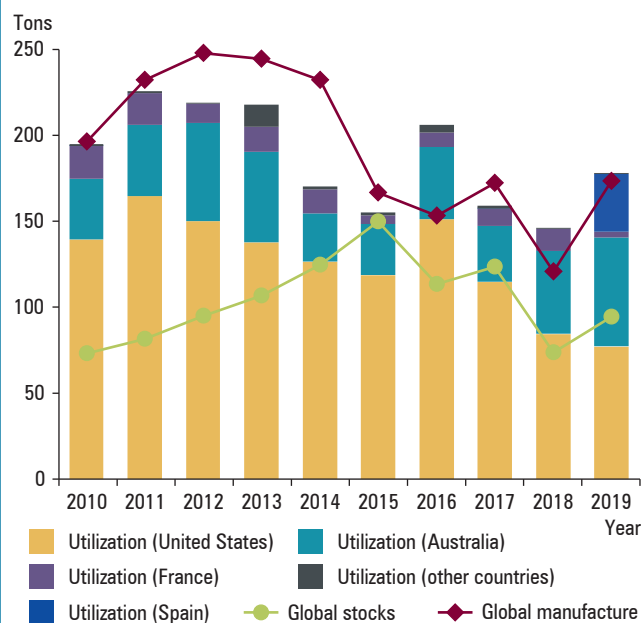


Figure 9. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: stocks,^a 2010–2019



^aStocks as at 31 December of each year.

Figure 10. Total anhydrous thebaine alkaloid contained in all varieties of concentrate of poppy straw: utilization, global manufacture and stocks,^a 2010–2019



^aStocks as at 31 December of each year.

importers were Japan and Italy, each importing less than 1 per cent of the global total.

47. ATA (CPS) is an intermediate product for the manufacture of thebaine. Global utilization of ATA (CPS) increased sharply from 2001 to 2011, when it peaked at 225.9 tons. After that, it decreased steadily, reaching 177.5 tons in 2019, an increase over the previous year's 146 tons. This trend reflects the reduction in the demand for thebaine and for narcotic drugs obtained from it, such as oxycodone and hydrocodone, in particular in the North American market (see paras. 88–89 and 83–85 below, respectively). However, despite this reduction, in 2019, the United States continued to be the main user of ATA (CPS) (accounting for 43.4 per cent of global utilization, or 77.2 tons). It was followed by Australia²¹ (35.6 per cent, or 63.2 tons), Spain (18.7 per cent, or 33.3 tons), France (2 per cent, or 3.7 tons), and Japan (less than 0.1 per cent, or 0.1 tons). Global stocks of ATA (CPS) increased from 73.6 tons in 2018 to 94.1 tons in 2019, held primarily by the United States (72.9 tons, or 77.4 per cent), Australia²¹ (10 tons, or 10.6 per cent), Spain (7.2 tons, or 7.6 per cent) and France (3.1 tons or 3.3 per cent). Japan held less than 1 per cent of stocks, or 0.8 tons (see figure 10).

Anhydrous oripavine alkaloid contained in concentrate of poppy straw

48. Manufacture of AOA (CPS) in commercially usable quantities started in 2001. Australia²¹ was the main

manufacturing country in 2019, with a total of 40.4 tons (91.5 per cent of the global total). Spain manufactured the remaining 8.5 per cent, or 3.7 tons, a notable increase from just 0.2 tons the previous year. Total utilization of AOA (CPS) in 2019 reached 34 tons, a notable increase over the previous year's 28 tons. Global stocks of AOA (CPS) have been fluctuating since 2001. In 2019, stocks increased to 49.3 tons as opposed to the previous year's 40 tons. The stocks are held mainly by Australia,²¹ which kept the same level of stocks (or 30 tons, or 60.7 per cent), the United States, which increased the stocks somewhat (12 tons or 24.4 per cent), with a large quantity of new stocks reported by Switzerland (6.6 tons of 13.3 per cent). Spain held around 1 per cent of global stocks (0.7 tons), and Hungary held a very small amount of stock.

Anhydrous codeine alkaloid contained in concentrate of poppy straw

49. Manufacture of ACA (CPS) increased from 2001 until 2015, when it reached a record 108.9 tons, which was nearly double the amount manufactured (57.7 tons) in 2014. After decreasing to 56.1 tons in 2016, it increased again, reaching 85.6 tons in 2019, a notable increase over 69.9 tons reported in 2018. ACA (CPS) is used for the extraction of codeine. The only countries that manufactured ACA (CPS) in 2019 were Australia²¹ (53.7 per cent of the global total), Spain (40.5 per cent) and Turkey (5.8 per cent). It is worth noting that France, which accounted for 14.3 per cent of production in 2018, reported no production of ACA (CPS) in 2019. Global utilization of ACA (CPS) steadily increased to 79.2 tons in 2015. It then decreased notably to 35.8 tons in 2018, but almost doubled in 2019, reaching 66 tons. Spain, which was not on the list of countries utilizing ACA (CPS) in 2018, was the main country to utilize ACA (CPS) in 2019 (52.5 per cent or 21.4 tons), followed by the United States (33 per cent, or 21.7 tons), Italy (13.3 per cent of 9.5 tons) and Turkey (0.2 per cent or 0.1 tons). Global stocks of ACA (CPS) dropped notably from the previous year's 68.6 tons, the highest amount ever recorded, and stood at 50.6 tons in 2019. Those stocks were held in the United States (20.4 tons, or 40.2 per cent), Australia²¹ (15 tons, or 29.6 per cent), Turkey (8.3 tons, or 16.4 per cent), the United Kingdom (4.3 tons, or 8.6 per cent) – a notable decrease over last year's 28.6 tons – and Spain (2.5 tons, or 5 per cent), with France and Japan holding only small amounts.

²¹This figure was calculated by INCB using available data series. It is being followed up with the Government.

Opiates and opioids

50. “Opiate” is the term generally used to designate drugs derived from opium and their chemically related derivatives, such as semi-synthetic alkaloids, while “opioid” is a more general term for both natural and synthetic drugs with morphine-like properties, although the chemical structure may differ from that of morphine.²²

51. Opioids are used mostly for their analgesic properties to treat severe pain (fentanyl, hydromorphone, methadone, morphine and pethidine), moderate to severe pain (buprenorphine²³ 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

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

Morphine

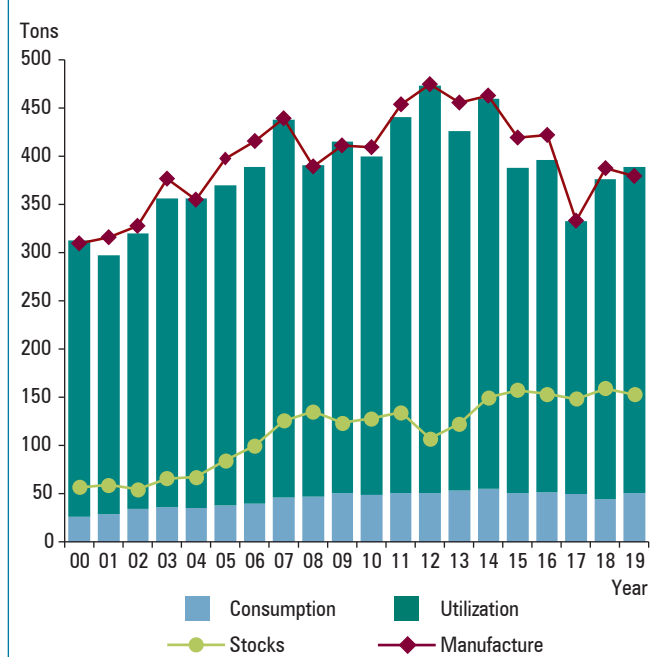
53. In the 20-year period 2000-2019, the manufacture²⁴ of morphine increased considerably from the 310.2 tons manufactured in 2000 to 475.3 tons in 2012, when the global morphine manufacture reached its peak. After 2012, global production decreased until 2017 (333.5 tons), when it reached its lowest level since 2002. In 2019, the global production of morphine was 380.1 tons, a slight decrease

²²From a clinical point of view, opioids may be classified according to their actions compared with those of morphine: similar affinity (agonist), competitive (antagonist) or mixed (agonist/antagonist) for the same receptor sites (the so-called “opioid receptors”) in the central and peripheral nervous systems.

²³Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971. Comments on its licit movement are contained in paragraph 117 below.

²⁴In Australia, China, Italy, Norway, Turkey and the United Kingdom, concentrate of poppy straw is used in continuous industrial processes for the manufacture of other narcotic drugs, without first separating morphine. For statistical and comparative purposes, the theoretical quantity of morphine involved in such conversions is calculated by INCB and included in the present publication in the statistics on global manufacture and utilization of morphine.

Figure 11. Morphine: global manufacture, stocks,^a consumption and utilization, 2000–2019



^aStocks as at 31 December of each year.

from the 388.2 tons manufactured in 2018 (see figure 11). In 2019, 87 per cent of the morphine manufactured globally was converted into other narcotic drugs or into substances not covered by the 1961 Convention as amended (see paras. 59–60 below). The rest was used directly for medical purposes (for direct consumption and for the utilization to manufacture preparations listed in Schedule III), mainly for palliative care.

54. In 2019, France (71.3 tons of morphine, or 18.9 per cent) and the United Kingdom were the leading morphine manufacturing countries (an estimated 82 tons, or 21.6 per cent of global manufacture).²⁵ These two countries have been alternating as the leading morphine manufacturing countries since 2016, when morphine manufacture in the United States started decreasing considerably. In 2019, France manufactured 71.3 tons of morphine, or 18.9 per cent of global manufacture, followed by Australia²⁶ (55 tons, or 14.5 per cent), Norway (32.2 tons, or 8.5 per cent), the Islamic Republic of Iran (26 tons, or 6.9 per cent), China (20.7 tons, or 5.5 per cent), the United States (19.8 tons, or 5.2 per cent), India (18.2 tons, or 4.8 per cent), Japan (15.4 tons, or 4.1 per cent) and Slovakia (14.9 tons or 3.9 per cent). Together, these 10 countries accounted for 93.8 per cent of global manufacture.

²⁵This figure was calculated by INCB using available data series. It is being followed up with the Government.

²⁶This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 12. Morphine: percentage share of total exports, by country, 2009–2019

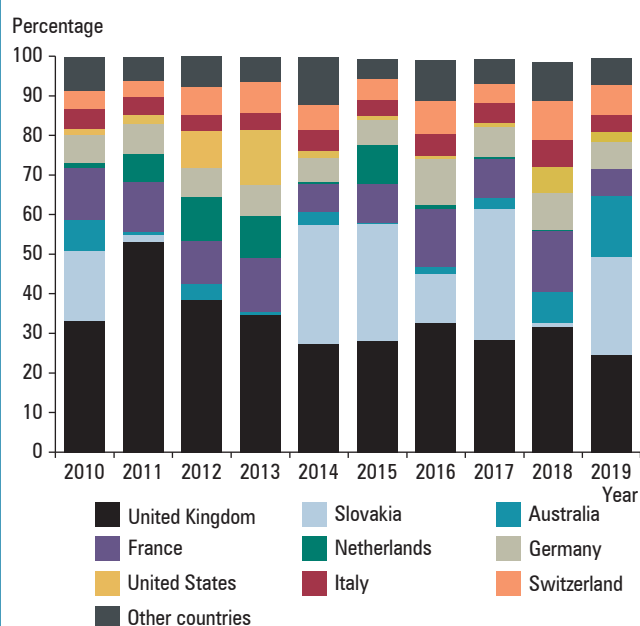
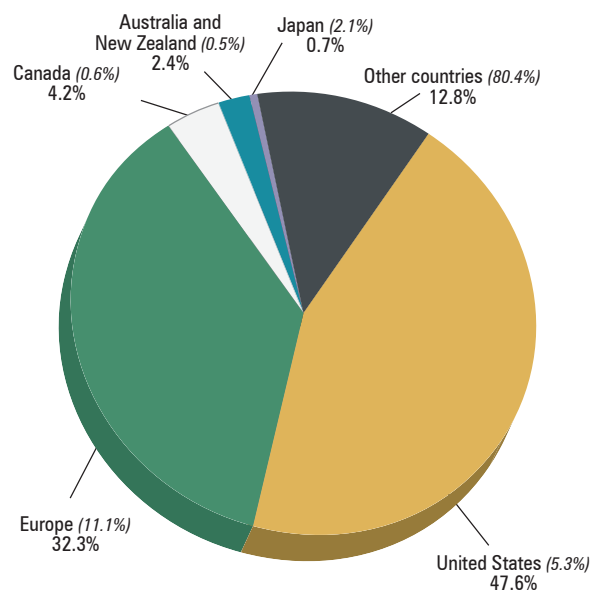


Figure 13. Morphine: distribution of consumption in relation to share of world population, 2019



Note: Percentages in parentheses refer to share of the world population (i.e., total population of all reporting countries).

55. Exports of morphine reached an all-time high level of 39.7 tons in 2019. It had previously decreased from 28.1 tons in 2017 to 24.7 tons in 2018. The main exporting countries in 2019 were the United Kingdom and Slovakia (24.7 per cent each), Australia²⁷ (15.4 per cent), Switzerland (7.5 per cent), France and Germany (6.8 per cent each), Italy (4.3 per cent), and the United States (2.4 per cent). Other countries exported less than 2 per cent (see figure 12).

56. The main importing countries in 2019 were France (10.2 tons, or 25.9 per cent), Hungary (6.2 tons, or 15.7 per cent), Germany (4.5 tons, or 11.4 per cent), Austria and the United Kingdom (3.1 tons, or 8 per cent, each), Switzerland (2.3 tons, or 5.4 per cent) and Canada (1.8 tons, or 4.7 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.

57. In 2000, morphine used for direct consumption amounted to 26.4 tons, or 8.5 per cent of the total morphine manufactured; 20 years later, in 2019, it stood at 50.7 tons, or 13.3 per cent. That percentage for direct consumption was an increase from 11.5 per cent in 2018. Many countries continue to report having difficulties procuring medications containing morphine, which is surprising as opiate raw materials are available in sufficient quantities.

58. 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 2019, many people still had limited access to it.

59. Over the last 20 years, from 2000 to 2019, of the total amount of morphine utilized globally, on average only 9 per cent was reported to have been used for palliative care directly. A smaller amount has been used for the manufacture of Schedule III preparations containing morphine and of substances not covered by the 1961 Convention as amended (2 per cent each on average). The majority (85 per cent on average) has been converted into other narcotic drugs (mostly codeine). Further details on the utilization of morphine can be found in part four, table VI.

60. In 2019, 80.4 per cent of the world population, mainly in low- and middle-income countries, consumed only 12.8 per cent of the total amount of morphine used for the management of pain and suffering. The remaining 87.2 per cent of the total consumption of morphine, excluding Schedule III preparations, continued to be concentrated in a small number of countries located mainly in Europe and North America. The relative share of morphine used for direct consumption has not changed considerably in the past 20 years (see para. 57 above) and the disparity in the consumption of narcotic drugs for palliative care continues to be a matter of concern, particularly in relation to access and availability of affordable opioid analgesics such as morphine. In 2019, 81.7 per cent of the morphine used for

²⁷This figure was calculated by INCB using available data series. It is being followed up with the Government.

the management of pain and suffering was consumed by only seven countries, which reported consumption between 1.5 tons and 17 tons. In line with previous trends, the United States accounted for 47.6 per cent of global consumption of morphine, a higher share than European countries, which, in 2019, accounted for 32.3 per cent of total consumption. All other countries consumed less than 1 ton in 2019.

61. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention as amended. In 2019, the countries using morphine for that purpose in significant quantities were China (8.8 tons, or 58.4 per cent of total), the United Kingdom (5 tons, or 33.2 per cent) and Italy (1.2 tons, or 7.8 per cent).

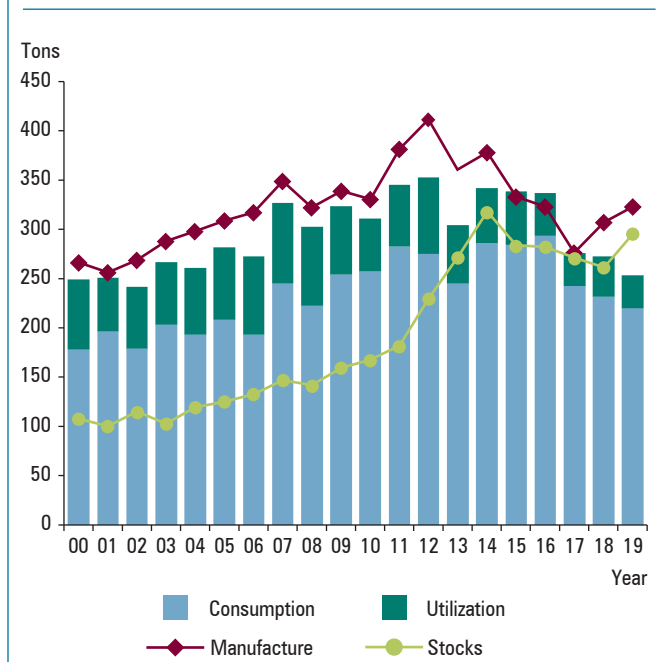
62. The largest share of morphine is used for conversion into other opiates, such as codeine, ethylmorphine and pholcodine (see table VI), although it is important to note that codeine is increasingly obtained directly from opium poppy rich in codeine. The amounts utilized for conversion into other opiates, which fluctuated at around 200 tons per year until the beginning of the 1990s, increased steadily until 2012, but have been decreasing, amounting to 281.4 tons in 2017. That amount started increasing again in 2018 (329.9 tons) and reached 336.7 tons in 2019. Morphine is also used for the manufacture of substances not controlled under the 1961 Convention as amended, such as noroxymorphone and apomorphine. The quantity of morphine utilized for that purpose fluctuated considerably in the period between 2000 (13.7 tons) and 2012 (2.6 tons) but has been relatively stable since then and amounted to 2.2 tons in 2019, most of which was used by France and the United Kingdom.

63. Global stocks of morphine stood at 153.1 tons in 2019, an increase from 141.2 tons in 2018. The largest stocks were held by France (64.6 tons, or 42.2 per cent of global stocks), followed by the United States (32.1 tons, or 21 per cent), Japan (12.6 tons, or 8.3 per cent), the United Kingdom (9.5 tons, or 6.2 per cent), Slovakia (8.8 tons, or 5.8 per cent), Hungary (3.9 tons, or 2.6 per cent) and Switzerland (3.3 tons, or 2.2 per cent). Other countries held stocks in quantities representing less than 2 per cent each.

Codeine

64. 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

Figure 14. Codeine: global manufacture, stocks,^a consumption and utilization, 2000–2019



^aStocks as at 31 December of each year.

manufacture of preparations in Schedule III of the 1961 Convention as amended, 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 2000–2019 are shown in figure 14.

65. Global manufacture of codeine increased from 2001 until 2012, when it reached a peak of 411.9 tons. Since then, global manufacture had been decreasing, dropping to 277.3 tons in 2017, but increased again in 2018 (308.1 tons) and 2019 (323.4 tons). In 2019 the main manufacturing countries were France (61.1 tons, or 18.9 per cent), the United Kingdom (60 tons, or 18.6 per cent), Australia²⁸ (50 tons, or 15.5 per cent), Norway (29.5 tons, or 9.1 per cent), the United States (17.7 tons, or 5.5 per cent) and India (17.4 tons, or 5.4 per cent). Smaller, yet still considerable quantities were manufactured in, in descending order, Spain, Japan, the Islamic Republic of Iran, Italy, South Africa, Turkey, China, Hungary, Slovakia and North Macedonia (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. Also, there have been reports of an increase in the misuse of schedule III preparations containing codeine in a number of countries (such as Bangladesh, India, Japan, Nigeria and the United States and in Hong Kong, China).

²⁸This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 15. Codeine: manufacture, 2000–2019

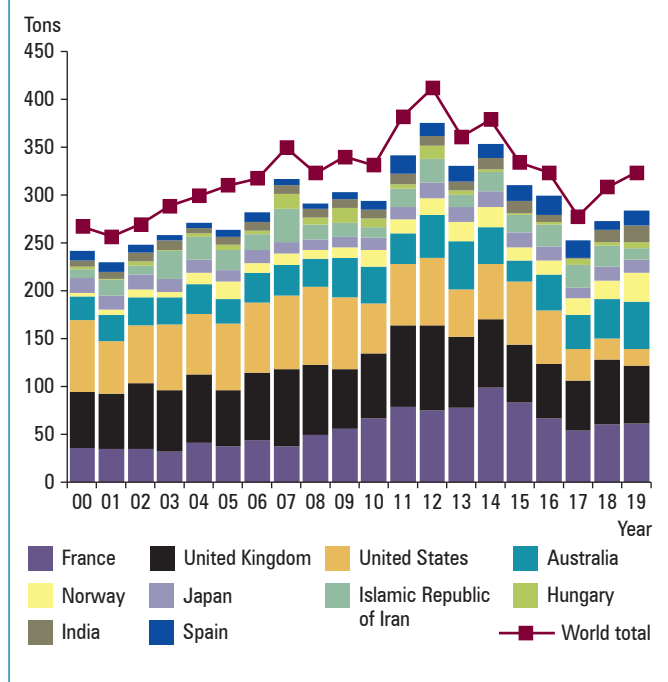
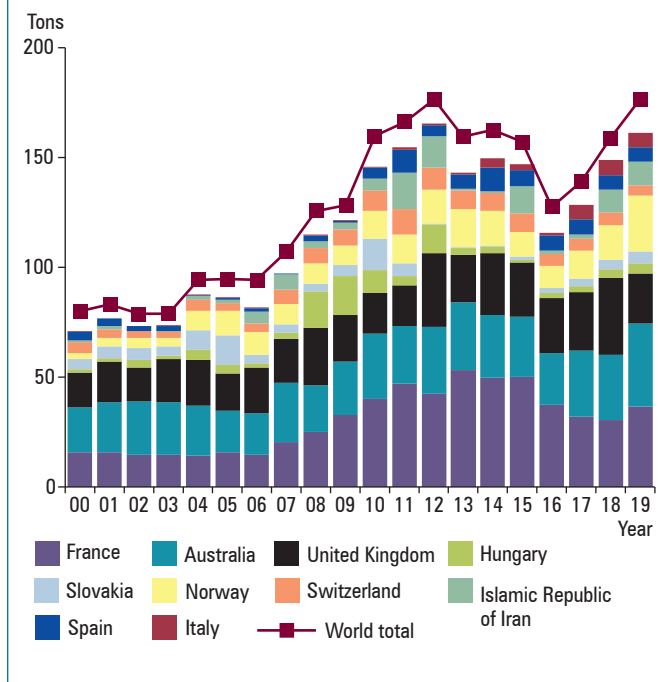


Figure 16. Codeine: exports, 2000–2019



66. Since 2012, global stocks of codeine have been decreasing, amounting to 271.8 tons in 2017. However, stocks increased to 262.1 tons in 2018, and in 2019 they reached 296.3 tons. This increase of 34.2 tons in global stocks was mostly concentrated in France, where stocks increased from 40.5 tons, or 16 per cent of global stocks, in 2018 to 71.9 tons, or 24 per cent, in 2019. France is also the country with the most significant quantities of codeine in stock, followed by the United Kingdom (45 tons, or 15.2 per cent), Australia²⁹ (30 tons, or 10.1 per cent), the United States (27.1 tons, or 9.1 per cent), India (23.5 tons, or 7.9 per cent) and Spain (17.3 tons, or 5.9 per cent). Five additional countries (Japan, Germany, Canada, Italy and Norway) account for at least 2 per cent each of all reported stocks of codeine.

67. In 2019, world exports of codeine reached an all-time high of 176.8, surpassing the previous peak of 176.5 tons recorded in 2012 (see figure 16). The leading exporting country for codeine in 2019 was Australia²⁹ (37.7 tons, or 21.3 per cent), followed by France (36.6 tons, or 20.7 per cent), Norway (25.6 tons, or 14.5 per cent), the United Kingdom (22.8 tons, or 12.9 per cent), Italy (13.2 tons, or 7.5 per cent), the Islamic Republic of Iran (10.9 tons, or 6.2 per cent), Spain (6.5 tons, or 3.7 per cent), Slovakia (5.2 tons, or 2.9 per cent), Switzerland (4.7 tons, or 2.7 per cent) and Hungary (4.7 tons, or 2.7 per cent). The remaining countries account for less than 2 per cent each of all reported exports of codeine.

68. The 10 main countries importing codeine in 2019 were India (22.8 tons), Italy (20.7 tons), Germany

(20.3 tons), the United Kingdom (17.6 tons), Canada (10.5 tons), Brazil (7.3 tons), Hungary (6.1 tons), Switzerland (5.3 tons), Viet Nam (4.7 tons), and Norway (3.6 tons). More details on the international trade in codeine can be found in annex IV, tables 3 and 4.

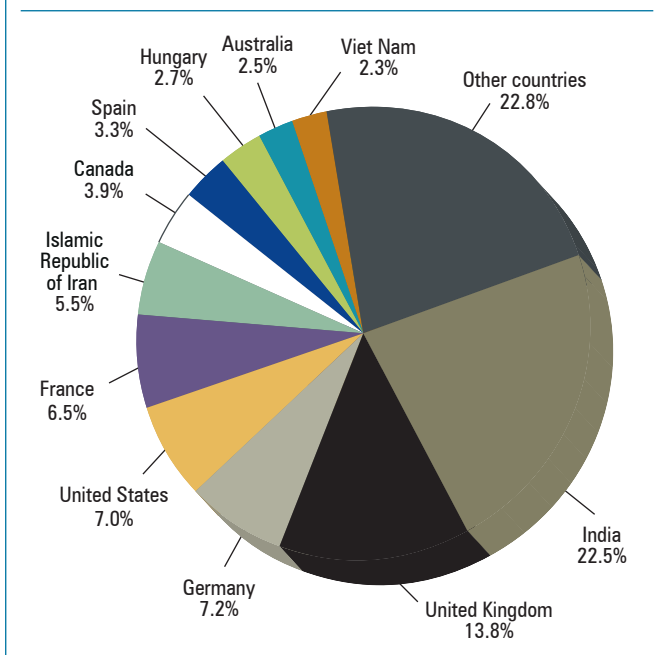
69. In 2019, codeine used for the manufacture of preparations listed in Schedule III accounted for 99 per cent of all global consumption of codeine,³⁰ an even higher share than the 98.5 per cent in 2018. The use of codeine for that purpose grew from 170 tons in 2000 to 218.1 tons in 2019 (see figure 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.

70. Global consumption (including Schedule III preparations) has been decreasing since it peaked in 2016 at 293.7 tons, and in 2019 it stood at 220.4 tons (see figure 17). The main countries reporting data in that respect were India (49.1 tons, or 22.5 per cent of global total), the United Kingdom (30 tons, or 13.8 per cent), Germany (15.6 tons, or 7.2 per cent), the United States (15.4 tons, or 7 per cent), France (14.1 tons, or 6.5 per cent) and the Islamic Republic of Iran (12 tons, or 5.5 per cent). Other countries with a level of codeine consumption between 2 and 10 tons, in descending order of the amounts consumed, were Canada,

²⁹This figure was calculated by INCB using available data series. It is being followed up with the Government.

³⁰“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 as amended.

Figure 17. Codeine: utilization for the manufacture of preparations listed in Schedule III of the 1961 Convention as amended, 2019



Spain, Hungary, Australia, Viet Nam, China, Norway, South Africa, Oman, Ireland and Italy.

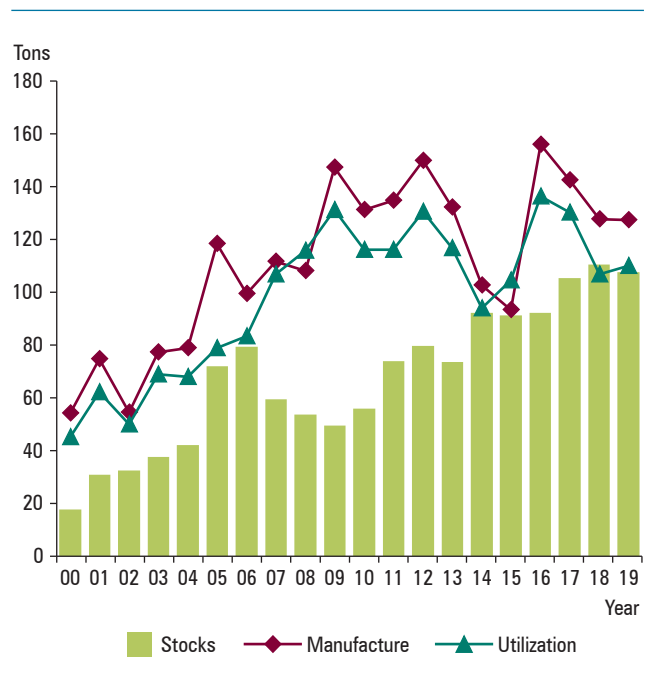
71. Utilization of codeine for the manufacture of other narcotic drugs, mainly dihydrocodeine and hydrocodone, increased steadily until reaching its highest level in 2007 (81.8 tons). Utilization has gradually declined and stood at 33.5 tons in 2019. Of the amount reported for 2019, 12.2 tons, or 36.4 per cent of global total, were used in Japan; 9.7 tons, or 28.9 per cent, in Italy; 8 tons, or 23.9 per cent, in the United Kingdom; 1.9 tons, or 5.6 per cent, in Hungary; and 1.8 tons, or 5.3 per cent, in Slovakia. Smaller quantities amounting to less than 1 per cent of global utilization were reported by Argentina.

Thebaine

72. 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 as amended) and buprenorphine (which is a substance controlled under the Convention on Psychotropic Substances of 1971³¹), as well as of substances not under international control, such as the derivatives naloxone, naltrexone, nalorphine and nalbuphine.

³¹United Nations, *Treaty Series*, vol. 1019, No. 14956.

Figure 18. Thebaine: global manufacture, utilization and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

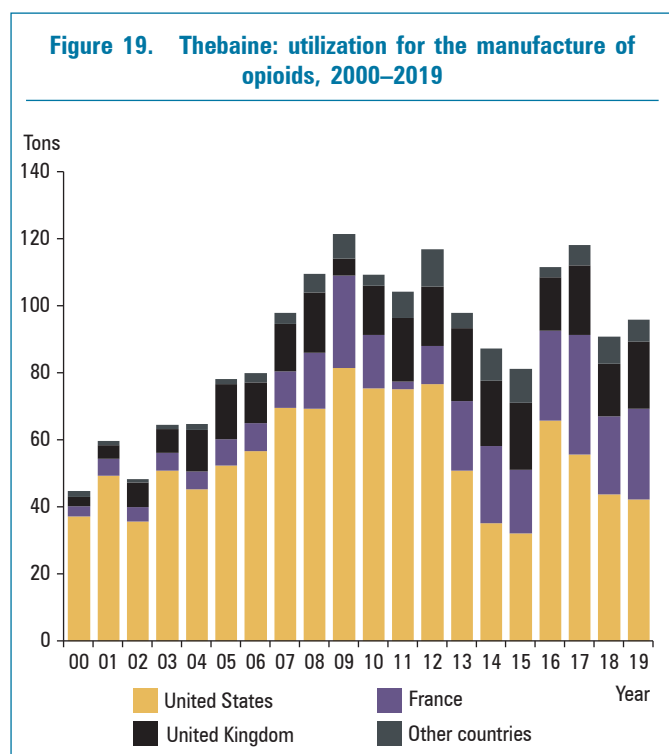
73. Global manufacture of thebaine has increased sharply since the late 1990s, because of the growing demand for oxycodone and other drugs and substances that may be derived from it. In 2019, after some fluctuations in the preceding years, global manufacture of thebaine remained high, at 127.5 tons. However, that is considerably below the record level of 156 tons in 2016 (see figure 18). The demand for medicines derived from thebaine, after decreasing in the past years, appears to have increased again despite restrictions on prescription drugs recently imposed in the main market (the United States) in response to their abuse and the related high number of overdose deaths. Australia³² was the main manufacturer in 2019 (60 tons, or 47 per cent of global total), followed by the United States (40.7 tons, or 31.9 per cent) Spain (21.7 tons, or 17.1 per cent), France (4.6 tons, or 3.6 per cent) and India (1.3 tons, or 1 per cent). Japan and Hungary manufactured smaller quantities. After increasing to 76.1 tons in 2018, exports decreased again to 64.5 tons in 2019. The only two major exporting countries in 2019 were Australia³² (54.2 tons, or 83.7 per cent of total exports) and Spain (10.6 tons, or 16.3 per cent). Smaller quantities were exported by China, Ukraine and the United States. The main countries importing thebaine were the United Kingdom (29.2 tons, or 45.2 per cent), France (21 tons, or 32.6 per cent), Switzerland (4.3 tons, or 6.7 per cent), Slovakia (3.8 tons, or 5.9 per cent), Czechia (2.8 tons, or 4.4 per cent) and Hungary (2 tons, or 3.1 per cent). Other countries imported less than 2 per cent of the global total.

³²This figure was calculated by INCB using available data series. It is being followed up with the Government.

74. The utilization of thebaine for the manufacture of other narcotic drugs increased slightly from 106.8 tons in 2018 to 110.2 tons in 2019 (see figure 19 and table VII of part four). The United States was the main country to use thebaine during the 20-year period 2000–2019. In 2019, the United States accounted for 44.1 per cent of global use for that purpose or 42.2 tons, followed by France (27 tons, or 28.1 per cent) and the United Kingdom (20 tons, or 20.9 per cent). Other countries have reported much lower quantities of utilization. The quantity of thebaine reported having been used for the manufacture of substances not covered under the 1961 Convention as amended (mainly buprenorphine) fluctuated during the 10-year period 2010–2019: from the peak of 24.9 tons in 2016, it decreased to 14.2 tons in 2019. The United Kingdom, Czechia, the United States, Germany, India, Denmark, China and Armenia, in that order, account for 100 per cent of the world total.

75. After an overall fluctuating upward trend in the period since 2000, global stocks of thebaine reached the record level of 110.6 tons in 2018 and decreased to 107.7 in 2019. Major stocks were held in Australia³³ (30 tons, or 27.2 per cent), Spain (20.1 tons, or 18.2 per cent), France (16.9 tons, or 15.3 per cent), the United States (16 tons, or 14.5 per cent of global stocks), the United Kingdom (10 tons, or 9.1 per cent), Hungary (6.3 tons, or 5.7 per cent) and Switzerland (5.1 tons, or 4.6 per cent). Other countries reported stocks that represented less than 2 per cent of the global total each.

³³This figure was calculated by INCB using available data series. It is being followed up with the Government.



Oripavine

76. In 2007, oripavine was included in Schedule I of the 1961 Convention as amended. The amount of oripavine manufactured globally has been increasing since 2008 and peaked in 2018 with 33.9 tons, decreasing to 30 tons in 2019. The only two manufacturing countries in 2019 were the United States (26.4 tons, or 87.9 per cent of global manufacture) and Spain (3.6 tons, or 12.1 per cent). The use of oripavine in significant quantities for the manufacture of other drugs was reported in 2019 by the main producer, the United States (25.3 tons, or 86 per cent) and Germany (4.1 tons, or 14 per cent), mainly to manufacture oxycodone. In 2016, global stocks of oripavine reached its highest level, 18.1 tons. Since then the global stocks of oripavine have been decreasing and in 2019 stood at 8.5 tons. Of the stocks reported for 2019, Germany held 2.5 tons or 29.4 per cent, followed by the United States with 2 tons or 23.3 per cent, Italy with 1.8 tons or 20.7 per cent and India with 1.1 ton or 13.2 per cent. Quantities smaller than 1 ton were held by Spain and Switzerland and marginal quantities were held by seven other countries.

Semi-synthetic opioids

77. Semi-synthetic opioids are made by means of relatively simple chemical modifications of natural opiates such as morphine, codeine and thebaine. Some examples of semi-synthetic opioids are dihydrocodeine, ethylmorphine, heroin, hydrocodone, oxycodone and pholcodine. Some of the main manufacturers have reported that large losses occur during the processing of some semi-synthetic opioids.³⁴ 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

78. Global manufacture of dihydrocodeine remained relatively stable during the last 20 years at an average of about 30 tons a year, and peaked in 2018 at 35.9 tons. In 2019, the quantity manufactured worldwide decreased to 33.8 tons (see figure 20). The main countries manufacturing significant quantities continued to be Japan (12 tons, or 35.5 per cent), Italy (9.1 tons, or 27 per cent), the United Kingdom (7.5 tons, or 22.2 per cent), Slovakia (1.9 tons, or 5.6 per cent) and Hungary (1.8 tons, or 5.4 per cent), together accounting for 95.7 per cent of total global manufacture in

³⁴Manufacturing 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.

2019. Global exports of dihydrocodeine amounted to 13.3 tons in 2019. The main exporting country was Italy (6.6 tons, or 49.6 per cent), followed by the United Kingdom (3.5 tons, or 26.7 per cent), Hungary (1.5 tons, or 11.5 per cent) and Slovakia (1.3 tons, or 9.7 per cent). Other countries imported less than 2 per cent of the global total. In 2019, the United Kingdom continued to be the leading importing country for dihydrocodeine (7.1 tons, or 54.7 per cent), followed by the Republic of Korea (4.1 tons, or 31.6 per cent). China imported 0.5 tons, or 3.6 per cent, and Colombia 0.4 tons, or 2.9 per cent). Other countries imported less than 2 per cent of the global total each.

79. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention as amended, which accounted for 92.4 per cent of total consumption in 2019. The main user countries for this purpose, in descending order of the amounts used, were Japan, the United Kingdom and the Republic of Korea. These three countries together accounted 92.6 per cent of the global total. In 2019, direct consumption of dihydrocodeine amounted to 2 tons, the lowest level since 2012. Global stocks of dihydrocodeine amounted to 27.5 tons, an increase from 24.1 tons in 2018. Major stocks were held in Japan (11.4 tons, or 41.4 per cent), the United Kingdom (8 tons, or 29.1 per cent), Italy (3.1 tons, or 11.4 per cent) and the Republic of Korea (2.2 tons, or 7.9 per cent).

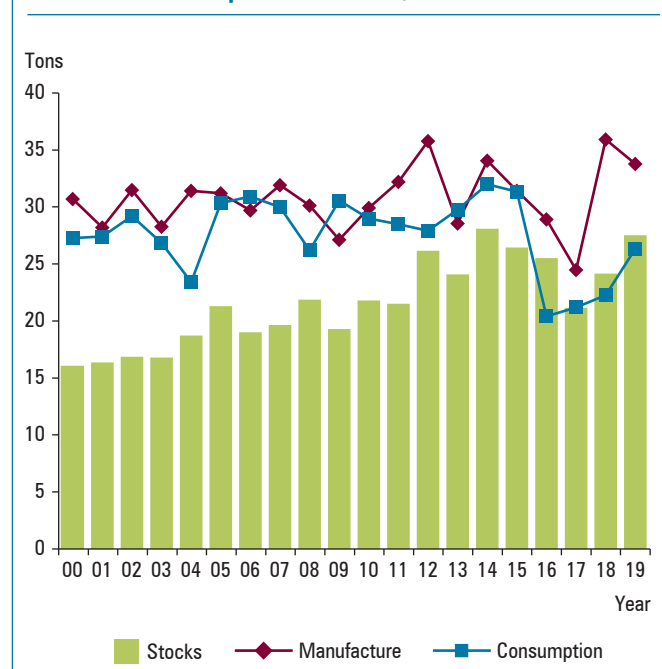
Ethylmorphine

80. The manufacture of ethylmorphine has fluctuated over the 20-year period 2000–2019, with a global yearly average of 1.5 tons. In 2019, global manufacture increased to 1.7 tons from 1.2 tons in 2018. France and Hungary were the only two manufacturing countries in 2019. France produced 1.5 tons, or 90.7 per cent, and Hungary produced 0.1 tons, or 9.3 per cent. France was also the leading exporting country (0.5 tons), accounting for over 87 per cent of global exports. The largest importer in 2019 was once again Sweden, which imported 0.3 tons or 60.4 per cent of the total, followed by Belgium with 0.1 tons, or 20.5 per cent. About 85.5 per cent of total consumption of ethylmorphine is in the form of preparations listed in Schedule III of the 1961 Convention as amended. Global consumption (consumption and utilization for manufacture of preparations in Schedule III) decreased again to 526.7 kg in 2019. The main consuming countries in 2019 were Sweden with 221.8 kg or 42.1 per cent of total of global consumption and Belgium with 128.3 kg or 24.4 per cent, followed by India, Hungary, Poland and Hong Kong, China, which all had a consumption below 100 kg but higher than 10 kg. In 2019, global stocks of ethylmorphine totalled 2.5 tons; the largest holders of stocks of more than 0.1 tons each were, in order of amount of stocks held, France, India, Sweden and Hungary, which together accounted for 92.3 per cent of global stocks or 2.3 tons.

Heroin

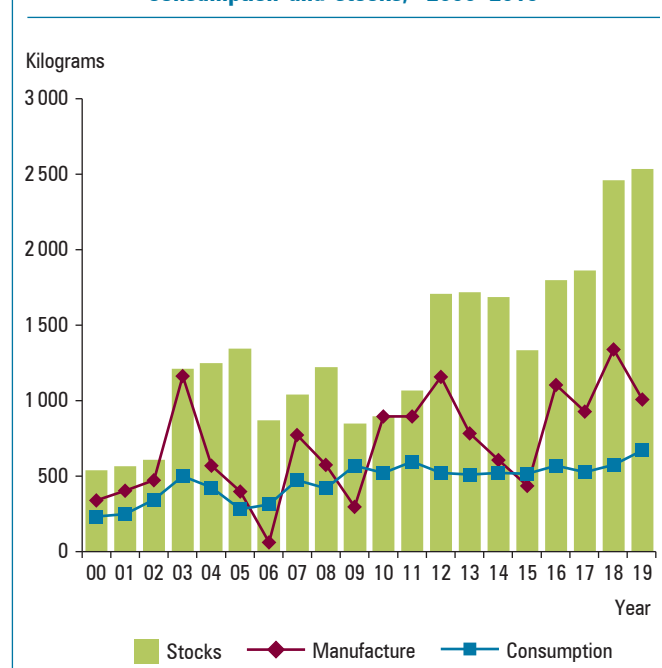
81. Over the past 20 years, the licit manufacture of heroin averaged 700 kg, with peaks of over 1,000 kg in 2003, 2012, 2016, 2018 and 2019. In 2019, a total of 1 ton was manufactured, mostly by Switzerland (557.2 kg, or 55.3 per cent) and the United Kingdom (450 kg, or 44.7 per cent) (see figure 21). These are also the two main countries exporting

Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

Figure 21. Heroin: global manufacture, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

heroin in 2019, with the United Kingdom exporting 282.7 kg, or 60.4 per cent of global exports, and Switzerland 155.3 kg, or 33.2 per cent. In 2019, the main importing country was Switzerland (174 kg, or 37.6 per cent), followed by Germany (118.4 kg, or 25.6 per cent), the Netherlands (108.7 kg, or 23.5 per cent), Canada (41.9 kg, or 9.1 per cent), the United Kingdom (14.4 kg, or 3.1 per cent) and Luxembourg (5.5 kg, or 1.2 per cent).

82. Global consumption of heroin increased from 579 kg in 2018 to 675.4 kg in 2019. Switzerland, where heroin is prescribed for individuals with long-term opiate dependency, reported heroin consumption of 318.5 kg for 2019 (47.2 per cent of global consumption). Other countries with significant heroin consumption for medical purposes in 2019 were the Netherlands (135.7 kg, or 20.1 per cent), Germany (124.1 kg, or 18.4 per cent), the United Kingdom (35 kg, or 5.2 per cent), Denmark (28.9 kg, or 4.3 per cent) and Canada (25.4 kg, or 3.8 per cent). Global stocks of heroin reached 2.5 tons in 2019, the highest level ever. The countries holding significant stocks in 2019 were Switzerland (1.2 tons, or 48.6 per cent), the United Kingdom (800 kg, or 31.6 per cent), Spain (221.3 kg, or 8.7 per cent) and the Netherlands (216 kg, or 8.5 per cent). Other countries each held stocks amounting to less than 1 per cent of the global total.

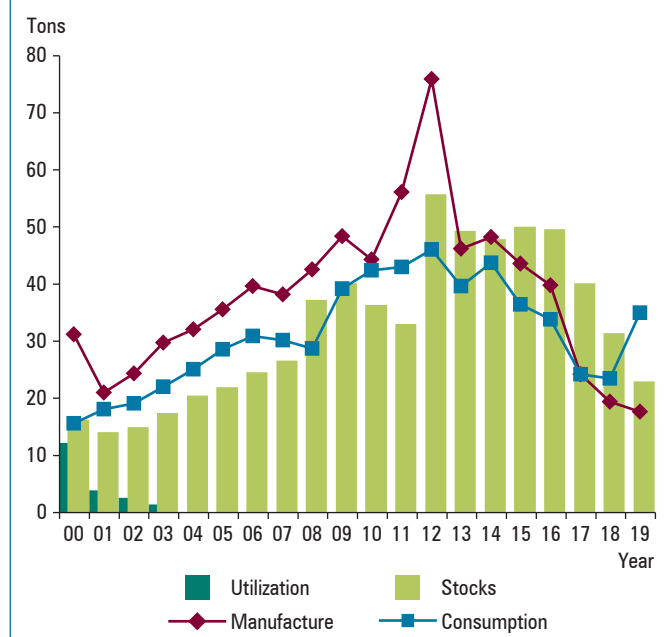
Hydrocodone

83. In 2019, global manufacture of hydrocodone decreased once again, to 17.6 tons, from 19.4 tons in the previous year. That was the lowest point in the 20-year trend since 2000, which peaked at 75.9 tons manufactured in 2012 (see figure 22). The United States accounted for almost all (99.9 per cent) of global manufacture. Other countries, manufacturing less than 0.1 per cent, were China, Argentina and Canada, in that order.

84. Global consumption of hydrocodone increased in 2019, reaching 34.9 tons, up from 23.5 tons in 2018. This is the first increase in global consumption since 2014, when hydrocodone combination products were rescheduled in the United States, where the number of prescriptions for liquid and tablet formulations declined. The United States accounted for almost all (99.4 per cent) of global consumption in 2019. Colombia consumed 175.7 kg, or 0.5 per cent of the global total; Canada, 23.6 kg or 0.07 per cent; and the Republic of Korea, 10.1 kg or 0.03 per cent; and 17 other countries consumed less than 10 kg in 2019.

85. 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 has gradually replaced the use of

Figure 22. Hydrocodone: global manufacture, consumption, utilization^a and stocks,^{b,c} 2000–2019



^aUtilization for the manufacture of other drugs.

^bStocks as at 31 December of each year.

^cConsiderable losses occur in the manufacturing process of this substance. This explains some gaps between the figures for manufacture and those for consumption/stocks.

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 by the United States (356 kg, or 96.8 of the global total exports), Slovakia (8.3 kg, or 2.3 per cent) and Switzerland (2.4 kg, or 0.7 per cent). Other countries that exported less than 1 kg were the Islamic Republic of Iran, Colombia, Australia and the United Kingdom, in that order. Importing countries were Colombia (76.1 per cent), Canada (17.7 per cent), the Republic of Korea (3.5 per cent) and Guatemala (1.3 per cent). In 2019, global stocks of hydrocodone decreased to 23 tons from 31.4 tons in 2018. The United States held 98.9 per cent of global stocks.

Hydromorphone

86. Global manufacture of hydromorphone decreased sharply in 2019 to 2.7 tons from 6.1 tons in 2018. This is the lowest level of manufacture since 2004. The leading manufacturing countries in 2019 were the United Kingdom (1.5 tons, or 55.1 per cent of the global total), the United States (0.6 tons, or 23.8 per cent) and Slovakia (0.5 tons, or 17.7 per cent). Total exports of hydromorphone remained stable at 3.2 tons in 2019. The leading exporting countries were the United Kingdom (1.4 tons, or 44.6 per cent of global exports), Slovakia (0.6 tons, or 18.5 per cent), the United States (0.4 tons, or 12 per cent), Switzerland (0.3 tons, or 9.3 per cent), Germany (0.2 tons, or 6 per cent)

and Italy (0.1 tons, or 4.5 per cent). In 2019, Germany was the main importing country (1.3 tons, or 41.5 per cent), followed by Canada (1 ton, or 31.9 per cent), Switzerland (0.3 tons, or 10.7 per cent).

87. In 2019, consumption of hydromorphone increased to 2.9 tons from 4.3 tons in 2018. The United States continued to be the main consumer country in 2019 (1.6 tons, or 54.5 per cent of global consumption, followed by Canada (0.8 tons, or 28.5 per cent). Global stocks of hydromorphone decreased to 6.6 tons in 2019, of which 2.4 tons (36.1 per cent) were held in the United States, followed by Germany with 1.1 tons (16.4 per cent), Canada with 1.1 tons (16.3 per cent) and the United Kingdom with 0.7 tons (10.6 per cent).

Oxycodone

88. 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 the last 20 years, reaching a record high of 138.1 tons in 2013. Since then, manufacture has decreased gradually (except for 2015 and 2016), and in 2019 it reached 90.5 tons (see figure 23). The fluctuations in manufacture in recent years may be attributable to stricter control measures introduced in some countries where the risk of overdose deaths and abuse of oxycodone is significant. In 2019, the United States accounted for 55.6 per cent of total global manufacture or 50.3 tons,

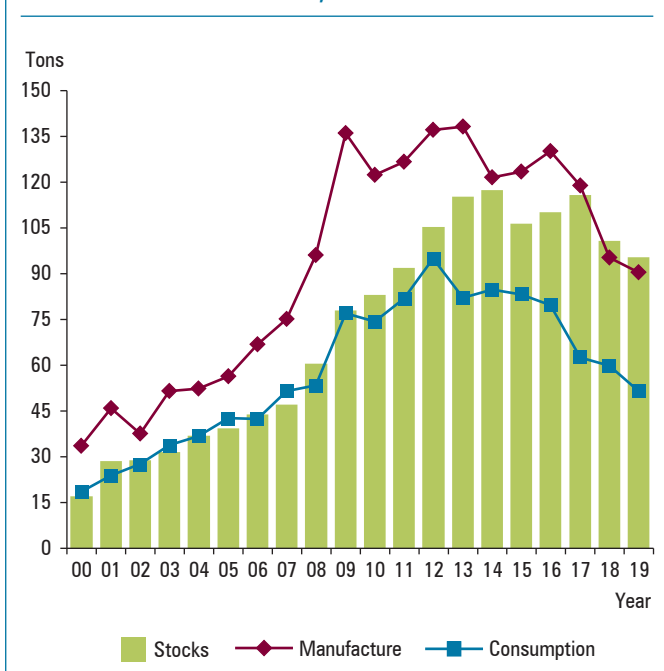
followed by France (23.1 tons, or 25.6 per cent), the United Kingdom (12 tons, or 13.3 per cent), Hungary (2.6 tons, or 2.9 per cent) and Slovakia (1.7 tons, or 1.9 per cent). After reaching a record high of 41.1 tons exported globally in 2018, in 2019 exports decreased to 38.9 tons. The United Kingdom continued to be the main exporting country in 2019 (16.8 tons, or 43.2 per cent of global exports), followed by the United States (6 tons, or 15.5 per cent), Switzerland (4.8 tons, or 12.3 per cent), France (2.8 tons, or 7.1 per cent), Germany (2.1 tons, or 5.3 per cent), Bulgaria (1.9 tons, or 4.8 per cent), the Netherlands (1.5 tons, or 3.7 per cent) and Austria (1.3 tons, or 3.4 per cent). The 10 most significant importing countries were the United Kingdom (11.5 tons, or 25.5 per cent), Germany (6.7 tons, or 15 per cent), Switzerland (4 tons, or 8.8 per cent), Canada (2.7 tons, or 6 per cent), the Netherlands (2.6 tons, or 5.8 per cent), France (2.4 tons, or 5.3 per cent), Austria (2.1 tons, or 4.7 per cent), Australia (1.9 tons, or 4.2 per cent), Bulgaria (1.6 tons, or 3.6 per cent) and Italy (1.5 tons, or 3.5 per cent). Further details on exports and imports of oxycodone are contained in annex IV, tables 3 and 4.

89. In line with the decrease in manufacture in 2019, global consumption of oxycodone also decreased, from 59.9 tons in 2018 to 51.6 tons in 2019. Consumption of oxycodone was concentrated in the United States (31.2 tons, or 60.5 per cent of the global total). Other major consumer countries in 2019, in descending order of the amounts consumed, were Australia³⁵ (3 tons, or 5.8 per cent), Germany (2.6 tons, or 5 per cent, Canada (2.4 tons, or 4.7 per cent), the United Kingdom (1.8 tons, or 3.5 per cent), France (1.6 tons, or 3.1 per cent) and China (1.2 tons, or 2.4 per cent). Global stocks of oxycodone decreased again, to 95.5 tons, with the United States holding 54.7 tons, or 57.3 per cent of the world total, followed by the United Kingdom (8 tons, or 8.4 per cent) and France (7.6 tons, or 8 per cent).

Pholcodine

90. During the 20-year period 2000–2019, pholcodine global manufacture and consumption was characterized by a volatile trend. Manufacture dropped from its peak of 13 tons in 2012 to 4 tons in 2018, and increased again to 9 tons in 2019 (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

Figure 23. Oxycodone: global manufacture, consumption and stocks,^{a,b} 2000–2019



^aStocks as at 31 December of each year.

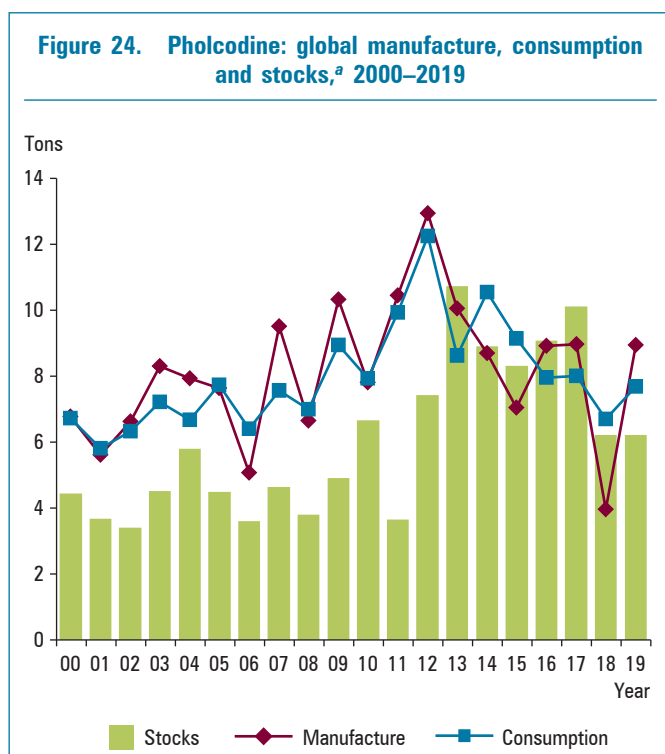
^bConsiderable losses occur in the manufacturing process of this substance. This explains some gaps between the figures for manufacture and those for consumption/stocks.

³⁵This figure was calculated by INCB using available data series. It is being followed up with the Government.

medicines containing pholcodine should be maintained throughout the European Union. In 2015, renewed concerns were raised by anaesthetists in Australia and New Zealand, which campaigned for cough medicines containing pholcodine to become prescription-only products. The main manufacturing countries in 2019 were France (4 tons, or 44 per cent), Slovakia (1.7 tons, or 18.7 per cent) and Norway (1.6 tons, or 18.2 per cent). Other countries that manufactured less than 1 ton were Hungary, China, the United Kingdom, Spain, North Macedonia and South Africa. Total exports of pholcodine increased from 7 tons in 2018 to 7.3 tons in 2019. Exports originated mostly in France (2 tons, or 27 per cent of the global total), Slovakia (1.4 tons, or 19.6 per cent), Norway (1.4 tons, or 19.3 per cent) and the United Kingdom (1 ton, or 14.2 per cent). The main destinations were Hong Kong, China (1.9 tons, or 28.9 per cent), China (1.2 tons, or 17.8 per cent), Australia (1.1 tons, or 16.4 per cent) and Italy (0.9 tons, or 14.5 per cent). Other importing countries imported less than 10 per cent of the global total. Further details on exports and imports of pholcodine are provided in annex IV, tables 3 and 4.

91. In 2019, global consumption (consumption and utilization for manufacture of preparations in Schedule III) of pholcodine increased to 7.7 tons, from 6.7 tons in 2018. The main consumer countries were Hong Kong, China (2.3 tons, or 29.9 per cent), China (1.3 tons, or 17.3 per cent), Australia³⁶ (1.1 tons, or 14.3 per cent) and Italy (0.9 tons, or 11.7 per cent). Only nine countries reported direct consumption of pholcodine in 2019, and the main

³⁶This figure was calculated by INCB using available data series. It is being followed up with the Government.



direct consumers were New Zealand (40 kg or 74.9 per cent of global total) and Belgium (12.1 kg, or 22.4 per cent). In 2019, global stocks of pholcodine increased to 8.2 tons, from 6.2 tons in 2018. Major stocks were held by France (1.5 tons, or 18.8 per cent of global total), Hong Kong, China (1.2 tons, or 14.5 per cent) and the United Kingdom and Slovakia with 0.9 tons, or 11 per cent, each.

Synthetic opioids

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

Dextropropoxyphene

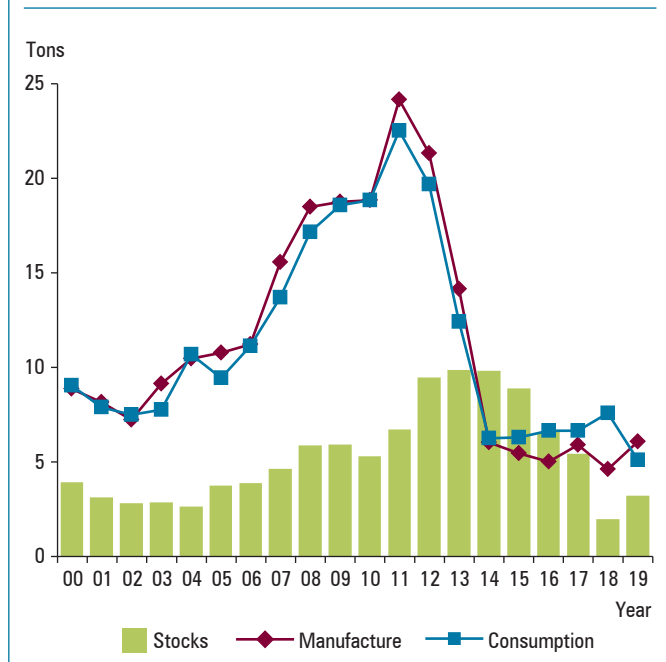
93. Global manufacture of dextropropoxyphene followed a strong downward trend from 2005, when 314 tons were manufactured, to 2014, when there was no reported manufacture of that substance. Since then, global manufacture has continued to be nil or negligible, and this trend continued in 2019, with 20 grams reported having been manufactured in the United States. The decline is attributable to the fact that the drug has been withdrawn from the market in several countries owing to concerns over serious side effects, including the risk of death from overdose.

Diphenoxylate

94. Diphenoxylate is used mostly as an antidiarrhoeal agent. It works by decreasing bowel activity. Global manufacture of diphenoxylate trended upward after 2003, reaching a peak of 24.2 tons in 2011, dropping significantly from then until 2014 and then staying at an annual manufacture level of about 5 tons. In 2019, global manufacture increased again, reaching 6.1 tons in 2018 (see figure 25). Most of the drop in the manufacture over the period 2011–2018 may be attributable to a regulatory measure introduced in India following concerns related to potential abuse. In 2019, global manufacture rose to 6.1 tons, most of it reported by India (3.1 tons, or 50.6 per cent), China (2.2 tons, or 36.7 per cent) and the United States (0.7 tons, or 11.3 per cent). India remained the leading exporter of diphenoxylate (0.9 tons, or 93.1 per cent of the global total). The main importing country in 2019 was the Islamic Republic of Iran (0.7 tons, or 66.9 per cent of the global total), followed by Pakistan (0.1 tons, or 12 per cent).

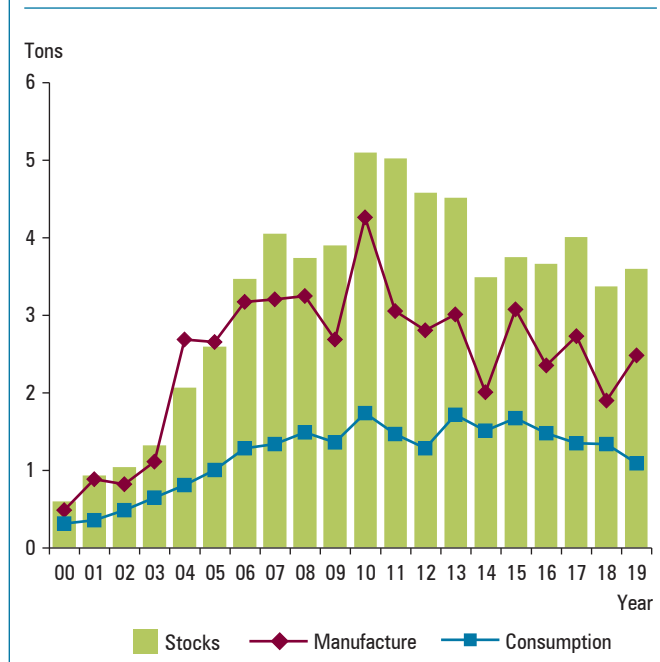
95. Diphenoxylate was consumed in the form of preparations listed in Schedule III of the 1961 Convention

Figure 25. Diphenoxylate: global manufacture, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

Figure 26. Fentanyl: global manufacture, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

as amended. Global use in 2019 reached 5.1 tons, a decline from the 7.6 tons reported for 2018. The countries reporting the highest utilization (consumption and the utilization for the manufacture of preparations in Schedule III) in 2019 were India (2.3 tons, or 44.2 per cent of the global total), China (1.2 tons, or 23.4 per cent), the Islamic Republic of Iran (0.7 tons, or 13.3 per cent) and the United States (0.4 tons, or 8.6 per cent). In 2019, global stocks of diphenoxylate decreased to 3.2 tons, the majority of which were held by China (0.2 tons, or 63.6 per cent), followed by India (0.5 tons, or 17 per cent).

Fentanyl

96. 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.

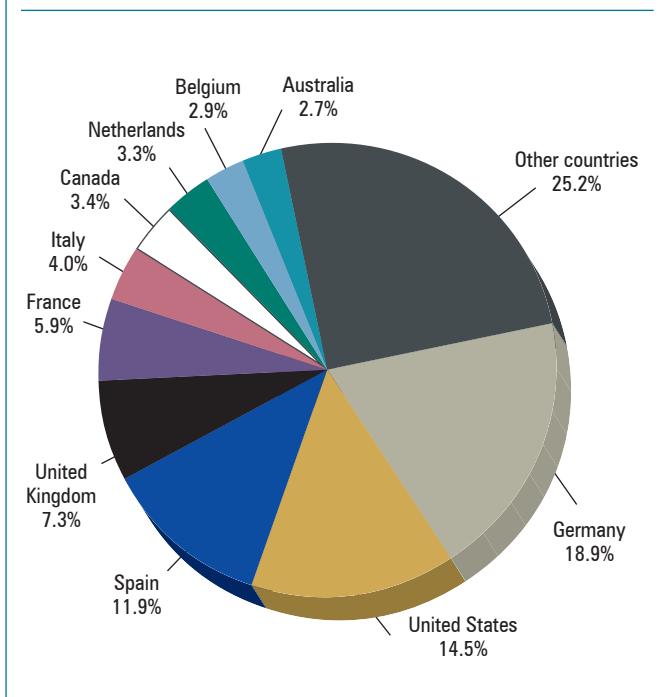
97. Global manufacture of fentanyl increased rapidly in the period 1999–2010, reaching a record level of 4.3 tons in 2010. Since then, manufacture has decreased over the years, to 1.9 tons in 2018, but showed an increase in 2019, when 2.5 tons were reported having been manufactured (see figure 26). Germany was the main manufacturing

country for fentanyl in 2019 (776.1 kg, or 31.3 per cent of the global total), followed by the United States (673.7 kg, or 27.2 per cent of the global total), Belgium (615.6 kg, or 24.8 per cent), South Africa (288 kg, or 11.6 per cent) and the United Kingdom³⁷ (80 kg, or 3.2 per cent). The principal exporting countries were Germany (434.4 kg, or 32 per cent), South Africa (318.5 kg, or 23.5 per cent), Belgium (224.4 kg, or 16.5 per cent), the United States (198.1 kg, or 14.6 per cent) and the United Kingdom (71.4 kg, or 5.3 per cent). Germany was also the principal importing country for fentanyl in 2019 (526.7 kg of the global total, or 38.7 per cent), followed by Spain (135.7 kg, or 10 per cent), Italy (89.4 kg, or 6.6 per cent), the United Kingdom (75.4 kg, or 5.5 per cent) and France (67 kg, or 4.9 per cent). Further details on exports and imports of fentanyl are contained in annex IV, tables 3 and 4.

98. Since 2005, global consumption of fentanyl has fluctuated between 1 ton and 1.7 tons. In 2019, global consumption amounted to 1.1 tons, a decline of 15 per cent compared with 2018. The downward trend since 2013, when global consumption peaked at 1.7 tons, may be associated with continued concerns about the number of overdose deaths attributed to abuse of fentanyl or fentanyl-type substances, mainly in North America. Although, in many cases, the substances causing overdose deaths are illicitly manufactured and trafficked and not necessarily diverted from licitly prescribed medications, national authorities have placed restrictions on the prescription of fentanyl. In

³⁷This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 27. Fentanyl: distribution of consumption, 2019



2019, 10 countries accounted for most of the global consumption of fentanyl (74.3 per cent); they are all high-income countries (see figure 27). The three largest consumers were Germany (205.9 kg, or 18.9 per cent), the United States (157.8 kg, or 14.5 per cent) and Spain (129.7 kg, or 11.9 per cent). Other major consumers of fentanyl were, in descending order of the amount of consumption, the United Kingdom,³⁸ France, Italy, Canada, the Netherlands, Belgium and Australia.

99. In 2019, global stocks of fentanyl stood at 3.6 tons, a slight increase from 2018 (3.4 tons) and significantly lower than the peak reached in 2010 (5.1 tons). The largest stocks were reported by Germany (1.4 tons, or 38.1 per cent), the United States (856.6 tons, or 23.8 per cent) and Belgium (0.6 tons, or 17 per cent).

Fentanyl analogues

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

Alfentanil

101. The manufacture of alfentanil has fluctuated significantly in the last 20 years. In 2012, global manufacture peaked at 78.3 kg; in 2009 it reached its lowest level, when only 5.6 kg were manufactured. Global manufacture of

³⁸This figure was calculated by INCB using available data series. It is being followed up with the Government.

alfentanil more than tripled in 2015 compared with 2014, rising to 51.2 kg from 15.2 kg, but dropped to 17.2 kg in 2016 and stabilized at that level in the following years, reaching 18.2 kg in 2019. Virtually all manufacture in 2019 was reported by Slovakia (18.2 kg – practically 100 per cent of manufacture), with only 4 g being reported manufactured by another country, Canada.

102. In 2019, global consumption of alfentanil (24 kg) showed a slight increase compared with 2018 (22 kg). Greece was the main consumer country (9.3 kg, or 38.8 per cent of global consumption), followed by the United Kingdom³⁹ (7 kg, or 29 per cent) Italy (1.9 kg, or 8 per cent), France (1.2 kg, or 5 per cent) and Germany (0.9 kg, or 3.8 per cent). Detailed information on the consumption of fentanyl analogues is provided in table XIII.1. In the period 2016–2019, global stocks of alfentanil decreased by more than 69 per cent, from 183.2 kg in 2015 to 56.4 kg in 2019. With stocks of 12.1 kg, Germany was the main holder of alfentanil and accounted for 21.6 per cent of global stocks, followed by Italy (11 kg, or 19.6 per cent), Slovakia (9.4 kg, or 16.8 per cent), Belgium (8.9 kg, or 15.8 per cent) and the United Kingdom⁴⁰ (4 kg, or 7.1 per cent).

Remifentanil

103. 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, global manufacture of remifentanil stood at 27.4 kg. The highest level was recorded in 2018, at 141.1 kg. In 2019, 116.5 kg of remifentanil were reported having been manufactured. In 2019, China was the main manufacturing country, with 39.9 kg, or 34.2 per cent of global manufacture, followed by Belgium (26 kg, or 22.2 per cent), the United Kingdom (20 kg, or 17.2 per cent), Spain (19.3 kg, or 16.6 per cent) and Argentina (8.8 kg or 7.6 per cent). United Kingdom,⁴¹ Italy, Spain, Belgium and Germany were the main exporting countries, totalling 69 kg and accounting for more than 75 per cent of global exports. Italy was the main importing country, with 19.7 kg, or 20.1 per cent of global imports, followed by South Africa (9.1 kg, or 9.7 per cent), Serbia (8.3 kg, or 8.8 per cent), Japan (8.3 kg, or 8.8 per cent) and Germany (7.3 kg, or 7.7 per cent). Consumption showed an increase from 79.7 kg in 2018 to 87.1 kg in 2019. The main consumer countries were China (23.6 kg, or 27.1 per cent of global consumption), Spain (9.6 kg, or

³⁹This figure was calculated by INCB using available data series. It is being followed up with the Government.

⁴⁰This figure was calculated by INCB using available data series. It is being followed up with the Government.

⁴¹This figure was calculated by INCB using available data series. It is being followed up with the Government.

11 per cent), Argentina (7.8 kg, or 9 per cent), Japan (7.7 kg, or 8.8 per cent) and Germany (4.8 kg, or 5.5 per cent). In 2019, global stocks of remifentanyl declined to 163.4 kg, from 173.1 kg in 2018. Most global stocks were held by China (64.3 kg, or 39.4 per cent), Belgium (30.7 kg, or 18.8 per cent), the United Kingdom⁴² (12 kg, or 7.3 per cent), Germany (8.1 kg, or 5 per cent) and South Africa (8 kg, or 5 per cent).

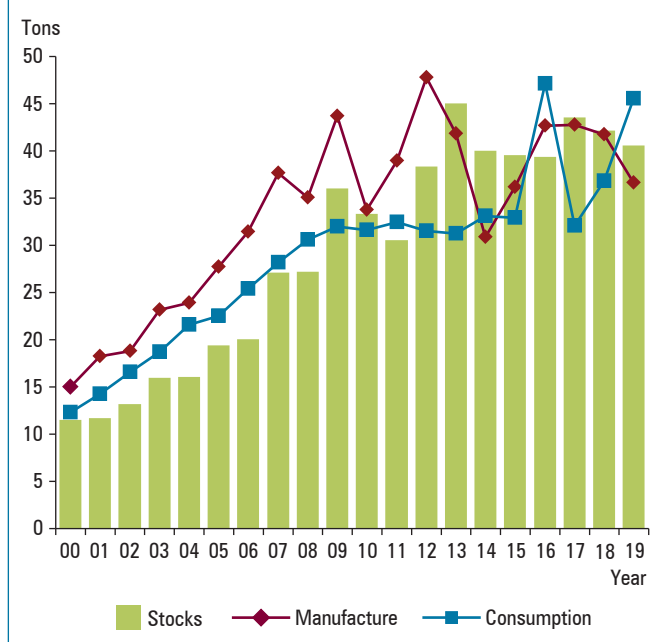
Sufentanil

104. In 2019, global manufacture of sufentanil remained largely stable, at 9.9 kg, compared with 9.7 kg in 2018. The main manufacturing countries were China (4 kg, or 39.8 per cent), Slovakia (2.2 kg, or 21.9 per cent), Belgium (2 kg, or 19.9 per cent), the United Kingdom (0.8 kg, or 8 per cent) and the United States (0.7 kg, or 7 per cent). The main exporting countries were Belgium and Slovakia (2.2 kg, or 34.6 per cent, each) and the United Kingdom (0.8 kg, or 12.7 per cent). In 2019, global consumption of sufentanil slightly increased, to 5.7 kg. The largest consumers of sufentanil were, in descending order of amounts consumed, China, Germany, Greece, France and Spain, which together accounted for 5 kg, or 87.9 per cent of the global total. In 2019, global stocks of sufentanil increased to 16.4 kg, most of which were held by China (5.2 kg, or 32 per cent), the United States (3 kg, or 18.2 per cent), Slovakia (2.4 kg, or 14.5 per cent), Germany (2.3 kg, or 14.2 per cent) and Belgium (0.9 kg, or 5.8 per cent).

Ketobemidone

105. Ketobemidone is a powerful opioid analgesic with an effectiveness against pain similar to morphine. The drug is mostly manufactured and used in a small number of countries, mostly in Northern Europe. It appears to be manufactured only every third year, with manufacture reported in 2015 (365.9 kg) and in 2018 (279.8 kg). No manufacture was reported for 2016, 2017 or 2019, but stocks in 2019 amounted to 218.3 kg, the second highest stock level recorded in the past 10 years. In 2019, 27.3 kg was exported, the lowest level registered in the past 20 years. The drug was exported mainly by Germany (21.1 kg, or 77.4 per cent) and France (5.6 kg, or 20.5 per cent), and smaller amounts were exported by Denmark (0.6 kg, or 2 per cent). Germany held 90.7 per cent (198 kg) of global stocks of ketobemidone.

Figure 28. Methadone: global manufacture, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

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 28, the trends related to its consumption, manufacture and stocks show a steady increase over the 20-year period 2000–2019, albeit with some fluctuations. The manufacture of methadone declined in 2019, reaching 36.6 tons, compared to 42 tons in 2018. The main manufacturing countries were the United States (15.4 tons, or 42.2 per cent) and Switzerland (13.1 tons, or 36 per cent), followed by India (3.2 tons, or 8.8 per cent), Slovakia (1.6 tons, or 4.5 per cent) and Germany (1.3 tons, or 3.4 per cent). Smaller quantities that account for less than 1 per cent were manufactured by Spain, China and the United Kingdom.⁴³ In 2019, Switzerland continued to be the main exporter of methadone (10.8 tons, or 53 per cent), followed by India (2.8 tons, or 13.9 per cent), the United States (1.4 tons, or 6.9 per cent), Slovakia (1.3 tons, or 6.7 per cent) and Italy (1 ton, or 4.8 per cent). The main importing countries were Canada (2.7 tons, or 13.3 per cent of the global total), the United Kingdom (2.2 tons, or 11 per cent), Italy (1.9 tons, or 9.5 per cent), Myanmar (1.3 tons, or 6.6 per cent), Germany and Viet Nam (1.3 tons, or 6.1 per cent, each), France (1.1 tons, or 5.7 per cent), Australia⁴³ (0.9 tons, or 4.5 per cent), the Netherlands (0.7 tons, or 3.5 per cent) and New Zealand (0.6 tons, or 2.7 per cent).

⁴²This figure was calculated by INCB using available data series. It is being followed up with the Government.

⁴³This figure was calculated by INCB using available data series. It is being followed up with the Government.

106. Consumption of methadone was concentrated in a few countries, and there were large differences in global consumption patterns. Global consumption stood at 45.5 tons in 2019, an increase from the level of 36.7 tons in 2018. The largest consuming countries were the United States (24.8 tons, or 54.5 per cent of global consumption), followed by the Islamic Republic of Iran (5.4 tons, or 12 per cent), Canada (1.5 tons, or 3.4 per cent), the United Kingdom (1.5 tons, or 3.3 per cent), Viet Nam⁴⁴ (1.3 tons, or 3 per cent), Italy (1.3 tons, or 2.8 per cent), France (1.2 tons, or 2.6 per cent, each) and Germany (0.9 tons, or 9 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.

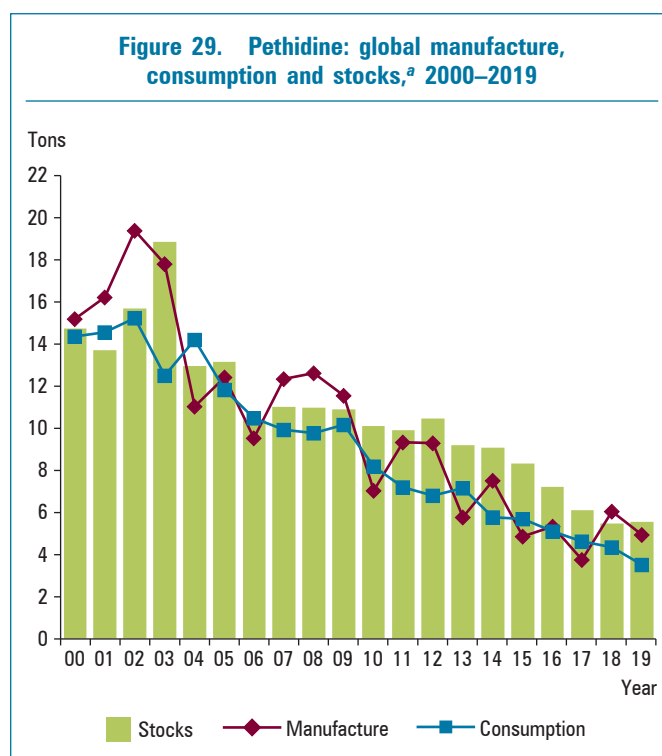
107. Stocks of methadone amounted to 40.6 tons, which were mainly held by the United States (15.5 tons, or 38.2 per cent), Switzerland (8.4 tons, or 20.8 per cent) and Germany (3.5 tons, or 8.8 per cent). Other countries holding stocks of more than 1 ton were, in descending order, Spain, Canada, the United Kingdom, France, Italy, China and Slovakia.

Pethidine

108. The manufacture of pethidine has trended downward over the past 20 years, reaching 5 tons in 2019 (see figure 29). Consumption of pethidine, which stood at its highest level in 2002, 15.3 tons, has been decreasing steadily since then, reaching its lowest level in 2019, at 3.5 tons. 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.

109. In 2019, pethidine was mostly manufactured in Spain (1.9 tons, or 39 per cent), Slovakia (1.5 tons, or 30.2 per cent), the United States (774.4 kg, or 16 per cent) and China (0.7 tons, or 14 per cent): there are only four large manufacturers. The main exporting country was Spain (1.6 tons, or 40.8 per cent), followed by Slovakia (1.3 tons, or 32 per cent), the United Kingdom (353.2 kg, or 8.6 per cent), Germany (215 kg, or 5.2 per cent) and

⁴⁴This figure was calculated by INCB using available data series. It is being followed up with the Government.



South Africa (109 kg, or 2.6 per cent). The main countries importing pethidine were the United Kingdom (767.1 kg, or 18.9 per cent), South Africa (413.3 kg, or 10.2 per cent), Turkey (331.2 kg, or 8.2 per cent), Germany (314 kg, or 7.8 per cent) and Canada (182.7 kg, or 5 per cent). Further details on exports and imports of pethidine are contained in annex IV, tables 3 and 4.

110. Pethidine consumption amounted to 3.5 tons in 2019 (a downward trend as well). The main consumer countries were the United States (0.5 tons, or 14.3 per cent) and China (0.4 tons, or 11.5 per cent). Smaller quantities were reported by South Africa (210 kg, or 5.9 per cent), Turkey (208 kg, or 5.9 per cent) and the Republic of Korea (184 kg, or 5.2 per cent). Global stocks of pethidine also continued to decline, falling to 5.6 tons in 2019. The largest stocks were held by Slovakia and Spain (0.9 tons, or 17 per cent of global stocks, each), Germany (616.9 kg, or 11.4 per cent), the United States (569 kg, or 10.5 per cent), South Africa (352.4 kg, or 6.5 per cent) and Canada (295.5 kg, or 5.4 per cent).

Tilidine

111. Global manufacture of tilidine amounted to 40.5 tons in 2019, compared to just 27 tons in 2018 and closer to previously reported manufacturing levels, at about 50 tons annually. In 2019, Germany accounted for the vast majority of the global manufacture of tilidine (39.9 tons, or 99 per cent), with Slovakia reporting 0.6 tons, or 1 per cent of the

global total. Exports of tilidine decreased to 48.8 tons in 2019, down from 64.2 tons in 2018. The largest exporting countries were Germany and Serbia, which together accounted for 99 per cent of global exports.

112. Consumption of tilidine is subject to fluctuations. It was highest in 2012, at 59.1 tons, dropped to 20 tons in 2013, then rose gradually to 46.4 tons in 2018 and for 2019, and again decreased to 28.5 tons in 2019. Most tilidine is consumed in Germany (26.4 tons, or 93 per cent), followed by Belgium (1.3 tons, or 4.7 per cent). In 2019, most global stocks of tilidine (40.7 tons, or 83.5 per cent of the global total) were held by Germany, followed by Serbia (7.2 tons, or 14.7 per cent).

Trimeperidine

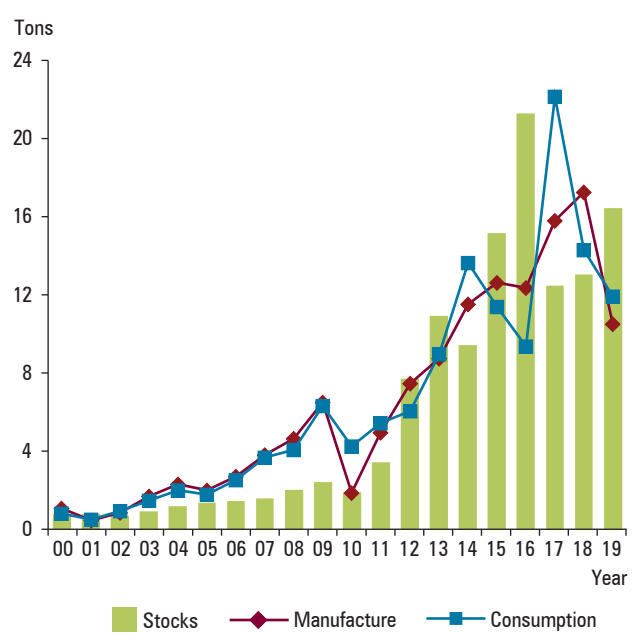
113. Since 2012, the quantity of trimeperidine manufactured has been more or less stable at about 200 kg. Manufacture in 2019 stood at 231 kg. The only manufacturers of trimeperidine were the Russian Federation (121.9 kg, or 52.8 per cent of the global total) and India (108.8 kg, or 47.2 per cent). Trimeperidine was developed around 1945 in the former Union of Soviet Socialist Republics, and historically manufacture and consumption was concentrated there. India has been reporting manufacture of trimeperidine since 2002.

114. In 2019, global consumption of trimeperidine amounted to 266.1 kg, with the Russian Federation reporting 158 kg, or 59.4 per cent, followed by Kazakhstan (82 kg, or 30.8 per cent), Uzbekistan and Belarus (8.9 kg, or 3.3 per cent, each) and Latvia (3 kg, or 1.15 per cent). The main exporting countries of trimeperidine were India (32.6 kg, or 58 per cent of global exports), followed by Ukraine (9.2 kg, or 16.4 per cent), Slovakia (8.3 kg, or 14.9 per cent), Latvia (4.2 kg, or 7.6 per cent) and the Russian Federation (1.8 kg, or 3.1 per cent). The main importing countries in 2019 were Ukraine (40.4 per cent of global imports), Czechia (19.4 per cent), Latvia (15.3 per cent), Uzbekistan (10.4 per cent) and Kyrgyzstan (4.4 per cent). In 2019, global stocks stood at a level of 344 kg; they were mainly held by the Russian Federation (188 kg, or 54.6 per cent), India (81.3 kg, or 23.6 per cent), Slovakia (36.5 kg, or 10.6 per cent), Kazakhstan (23 kg, or 6.6 per cent) and Latvia (9 kg, or 2.6 per cent).

Opioid analgesics controlled under the 1971 Convention

115. 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

Figure 30. Buprenorphine: global calculated consumption,^a reported manufacture and stocks,^b 2000–2019



^a Until 2009, 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 and therefore, in some cases, were recalculated by INCB, using data series.

and pentazocine can be found in the INCB technical report on psychotropic substances.⁴⁵

Buprenorphine

116. Buprenorphine is an opioid agonist used as an analgesic and in detoxification and substitution treatment for opioid dependence. Buprenorphine produces effects similar to other opioids but not as strong as those of heroin. For that reason, buprenorphine is used to produce a sufficient agonist effect to enable opioid-dependent individuals to discontinue the misuse of opioids without experiencing withdrawal symptoms. Since the late 1990s, global manufacture of buprenorphine has increased (with the exception of 2010, when there was a sharp decrease), reaching a peak of 17.2 tons in 2018. In 2019, reported manufacture dropped to 10.5 tons, largely due to the non-submission of statistics of a main manufacturer (see figure 30). The manufacturing countries in 2019 were the United States (4 tons, or 38.2 per cent), Germany (3.4 tons, or 32.5 per cent), Czechia (1.5 tons, or 14.5 per cent), India (0.6 tons or 1.5 per cent), Belgium and Switzerland (0.4 tons, or 4.2 per cent, each). In 2019, the main exporters were, in descending order of the amounts exported, Czechia, Germany, the United States, Switzerland, Belgium,

⁴⁵E/INCB/2020/3.

France and India. The main countries importing buprenorphine in 2019 were, in descending order of the amounts imported, the United States, France, Germany, the United Kingdom, Canada, Austria, Italy and Belgium.

Pentazocine

117. Pentazocine is an opioid analgesic with properties and uses similar to those of morphine. In 2019, global manufacture of pentazocine declined to 1.1 tons,

manufactured almost completely in India (1.1 tons or nearly 100 per cent of global manufacture). Italy which had reported manufacture in previous years, did not report such manufacture for 2019. India was also the world's leading exporter of pentazocine in 2019, with 1.4 tons or 82 per cent of total exports, followed by Italy, with 0.2 tons, or 13 per cent. The main importers were Nigeria (1.1 tons, or 56 per cent of total imports), the United States (0.4 tons, or 20.5 per cent), Pakistan (0.2 tons, or 11.2 per cent), Bangladesh (74 kg, or 3.9 per cent), Japan (60 kg, or 3.1 per cent) and Canada (51 kg, or 2.7 per cent).

Cannabis

118. Until 2010, the United States was the only country reporting the licit use of cannabis for medical and scientific purposes. Since 2011, however, an increasing number of countries have started to use cannabis and cannabis extracts⁴⁶ for medical purposes, as well as for scientific research. In the past 20 years, the global production of cannabis has therefore seen an increase, amounting to 468.3 tons in 2019, an increase compared with the 349.4 tons recorded for 2018 (see table below). However, the manufacturing processes are not standardized, and some data are being clarified in order to ensure consistency. The United Kingdom is a significant manufacturer of pharmaceutical preparations containing cannabis extracts, and as validated data were not available at the time of finalizing the present report, projections made on the basis of available data series indicate that about 320 tons of cannabis were produced in 2019,⁴⁷ largely for pharmaceutical preparations containing cannabis extracts.

The Board calls on the Government of the United Kingdom, in view of its obligations under the international drug control treaties and bearing in mind its importance as a major manufacturing, importing and exporting country, to submit timely and reliable data to the Board.

119. Production was reported by Canada (38.4 tons, or 11 per cent), Spain (37.4 tons, or 10.7 per cent), Israel (26.7 tons, or 7.6 per cent), Jamaica (23.3 tons, or 6.7 per cent) and Uruguay (5.6 tons, or 1.6 per cent). Other countries that reported more than 1 ton of production were, in descending order of the amount produced, the Netherlands, Colombia, Australia and Denmark. The production figures as presented in the table are reported as received, and it should be noted that, in the extraction of cannabinoids from the cannabis plant, there may be large variations in the quantities used, owing to the different processes employed.

⁴⁶In 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").

⁴⁷This figure was calculated by INCB using available data series. It is being followed up with the Government.

Table. Cultivation of cannabis plant and production of cannabis, 2015–2019

Country ^a	Year	Area harvested (ha)	Quantity produced (kg)
Australia	2015	-	-
	2016	-	-
	2017	.. ^b	224
	2018	.. ^b	958
	2019	.. ^b	3 169
Austria	2015	0.04	59
	2016	0.09	116
	2017	1.00	259
	2018	1.00	362
	2019	1.00	362
Canada	2015	..	48 491
	2016	10.74	80 816
	2017	20.20	131 437
	2018	515.01	64 466
	2019	332.01 ^c	38 353
Chile	2015	..	36
	2016	1.00	1 416
	2017	1.00	444
	2018	1.00	621
	2019	0.40	20
Colombia	2015	-	-
	2016	-	-
	2017	0.36 ^d	..
	2018	0.63	887
	2019	1.34	4 018
Czechia ^e	2015	-	-
	2016	..	46
	2017	..	95
	2018	..	5
	2019	..	26
Denmark	2015	-	-
	2016	-	-
	2017	-	-
	2018	-	-
	2019	1.83	2 112
Israel	2015	7.45	7 758
	2016	8.45	9 263
	2017	9.03	10 424
	2018	18.00	20 786
	2019	23.60	26 662
Italy	2015	-	-
	2016	..	315
	2017	..	60
	2018	..	..
	2019	0.06	775
Jamaica	2015	..	..
	2016	..	..
	2017	..	..
	2018	..	..
	2019	21.45	23 315
Japan	2015	0.57	..
	2016	0.58	..
	2017	0.05	..
	2018	0.02	..
	2019	1.30	..
Lesotho	2015	?	?
	2016	?	?
	2017	9.00	16
	2018	18.50	30 738
	2019	?	?
Netherlands	2015	0.50	1 100
	2016	..	1 460
	2017	..	2 385
	2018	..	5 105
	2019	..	5 426

Country ^a	Year	Area harvested (ha)	Quantity produced (kg)
New Zealand	2015	-	-
	2016	-	-
	2017	-	-
	2018	0.01	5
	2019	0.02	21
North Macedonia ^f	2015	-	-
	2016	-	-
	2017	-	-
	2018	2.51	4 041
	2019	-	-
Portugal	2015	15.00	169
	2016	7.00	21 000
	2017	..	..
	2018	..	..
	2019	..	..
Spain	2015	-	-
	2016	-	-
	2017	0.66	2 079 ^g
	2018	2.95	3 920
	2019	16.58	37 389
Switzerland	2015	..	315
	2016	..	453
	2017	..	230
	2018	..	106
	2019	..	187
Thailand	2015	-	-
	2016	-	-
	2017	-	-
	2018	-	-
	2019	0.09	315
United Kingdom	2015	..	41 706
	2016	117.00	95 000
	2017	37.90	258 378
	2018	21.00	217 197
	2019	40.00 ^h	320 000 ^h
United States	2015	..	566 ⁱ
	2016	..	..
	2017	..	74 ⁱ
	2018	1.00	246 ⁱ
	2019	..	642 ⁱ
Uruguay	2015	-	-
	2016	-	-
	2017	-	-
	2018	2.50	..
	2019	2.10	5 552
Total	2015	23.56	100 200
	2016	145.35	209 884
	2017	68.84	406 088
	2018	585.13	349 443
	2019	478.58	468 343

Notes: Two dots (..) signify that statistical information was furnished but data were not submitted for that specific item; a dash (—) indicates that the amount is nil; and a hyphen (-) indicates that the item is not applicable, as there was no reported licit cultivation of cannabis in the year in question. A question mark (?) signifies that the statistical data were not provided.

^aIn addition to the 22 countries listed in this table, six countries (Germany, Malawi, Malta, Saint Vincent and the Grenadines, South Africa and Uganda) furnished estimates for 2020 and/or 2021 on the cultivation of cannabis plant and the production of cannabis.

^bOnly the number of cannabis plants harvested was reported; data on the area sown and harvested were not provided.

^cArea sown; data for the area harvested were not provided.

^dData reported are for the area sown for scientific purposes only.

^eSince 17 May 2016, “Czechia” has replaced “Czech Republic” as the short name used in the United Nations.

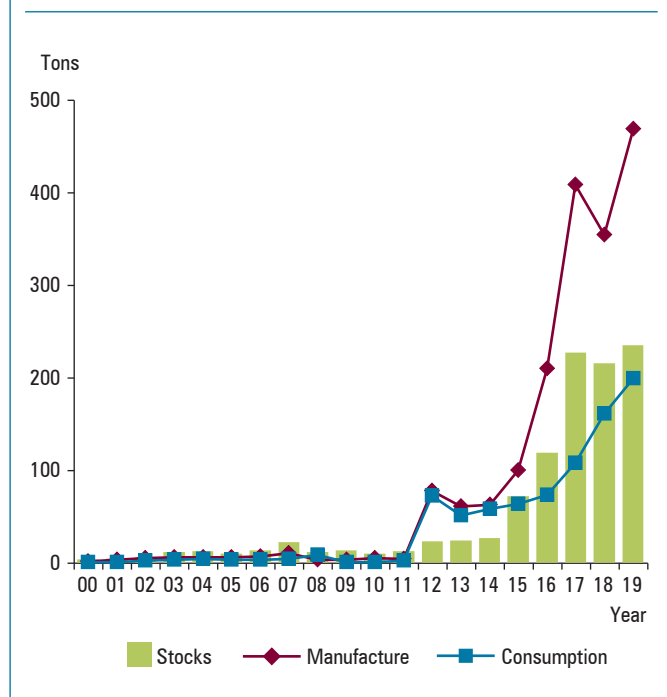
^fSince 14 February 2019, “North Macedonia” has replaced “The former Yugoslav Republic of Macedonia” as the short name used in the United Nations.

^gThe manufactured quantity is being used exclusively for research purposes.

^hThis figure was calculated by INCB and is based on estimates submitted by the Government. It is being followed up with the authorities.

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

Figure 31. Cannabis: global production, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

120. In 2019, Canada emerged as the main exporter of cannabis (11.7 tons, or 45.4 per cent of the global total). It was followed by the United Kingdom (6.6 tons, or 25.8 per cent), which is the main source for cannabis-based preparations that have undergone market authorization processes. Exports were also reported from the Netherlands (4.3 tons, or 16.7 per cent), Uruguay and Portugal (1 ton, or 3.9 per cent, each). Countries exporting between 300 kg and less than 1 ton each were, in descending order, Germany, Austria, Denmark, the United States, Italy and Australia. In 2019, Germany imported 16.3 tons (60.9 per cent of the global total), followed by Uruguay (2.5 tons, or 9 per cent), Australia (1.2 tons, or 4.4 per cent), Italy (1.1 tons, or 4.4 per cent), France (1.1 tons or 4.1 per cent) and Portugal (1 ton, or 3.8 per cent). Countries importing amounts of more than 300 kg and less than 1 ton each were, in descending order, Denmark, Spain, the United States, Finland and the Republic of Korea. Most of the stocks were held by the United Kingdom (189.3 tons, or 92.2 per cent), followed North Macedonia (3.5 tons, or 1.7 per cent), the Netherlands (3.2 tons, or 1.6 per cent), Israel (2.4 tons, or 1.2 per cent) and Chile (2.3 tons, or 1.1 per cent). Countries keeping stocks of less than 1 per cent of the global total each were, in descending order, the United States, France, Australia, Germany, Uruguay, Switzerland, Czechia, Denmark and Belgium.

Coca leaf and cocaine

Coca leaf

121. Peru has been the only country exporting coca leaf for the global market since 2000. Most of the quantities are exported to the United States, with smaller quantities exported to the Netherlands (100 kg) and France (2 kg). The United States utilizes coca leaf for the extraction of flavouring agents and the manufacture of cocaine is a by-product. In 2019, exports from Peru amounted to 280 tons, according to information submitted by importing countries to the Board. Data from the Government of Peru was not available at the time of the finalization of this report. For 2019, the United States reported the utilization of 127.9 tons of coca leaf, a slight increase from the 123.4 tons reported in 2018. Data were not available for Peru, which in 2018 reported the utilization of 63.4 tons of coca leaf, and for the United Kingdom, which in 2018 reported the utilization of 0.3 tons. Traditionally, the largest stocks of coca leaf are held in the United States and Peru, and for 2019, the United States reported stocks of 647.7 tons, a slight increase over the 632 tons held in 2018. Stocks of less than 1 ton were reported by Italy (309 kg) and the Netherlands (85.4 kg). Data from Peru for 2019 were not received at the time of the finalization of this report.

122. The cultivation of coca bush in the Plurinational State of Bolivia for the chewing of coca leaf and the consumption and use of coca leaf in its natural state for cultural and medicinal purposes, such as preparing infusions, is allowed in accordance with the reservation made by the country in 2013, when it re-acceded to the 1961 Convention as amended by the 1972 Protocol. **The Board calls on the Governments of the Plurinational State of Bolivia and Peru to provide annual statistical data for 2019, including data on the cultivation and production of coca leaf.**

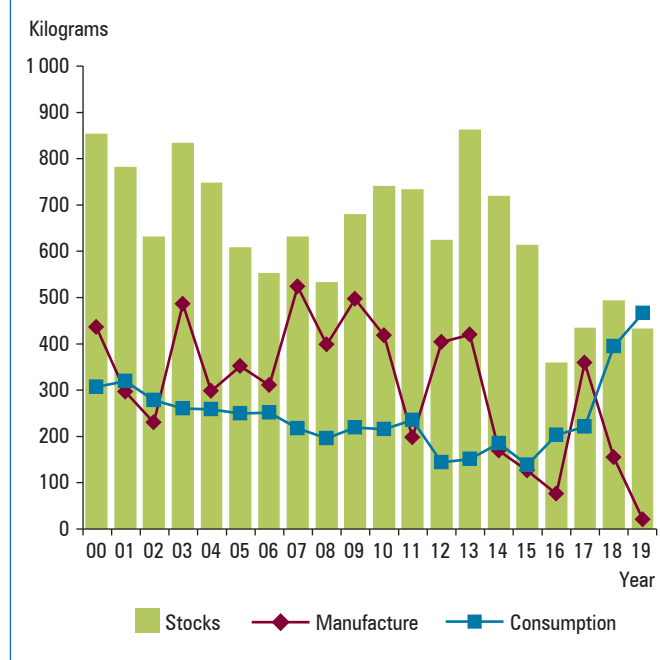
Cocaine

123. The global licit manufacture of cocaine continued to fluctuate, as it has for more than 20 years. For 2019, the United States reported manufacturing 20.2 kg (see figure 32). Manufacturing data from the United Kingdom was not received at the time of finalizing this report. The main exporting country in 2019 was Peru (304 kg, or 74 per cent of global exports), followed by the United Kingdom (76 kg, or 19 per cent), the Netherlands (22 kg, or 5 per cent) and Switzerland (2 kg, or 0.5 per cent). The United Kingdom was the main importing country (330 kg), accounting for

79 per cent of the total global imports of cocaine in 2018, followed by the Netherlands (31 kg, or 7.4 per cent), Belgium (10.4 kg, or 2.5 per cent), Australia⁴⁸ (10 kg, or 2.4 per cent) and Germany (7.1 kg, or 1.7 per cent). The licit consumption of cocaine, which had been stable for the last 20 years, on average between 100 kg and 300 kg, peaked in 2018 at 724.1 kg and declined sharply in 2019 to 466 kg. The main consumer country was the United States (240.4 kg, or 52 per cent), followed by the United Kingdom⁴⁸ (165 kg, or 35.4 per cent) and the Netherlands (12 kg, or 2.6 per cent). Stocks were held by the United States (189 kg, or 43.7 per cent), the United Kingdom⁴⁸ (110 kg, or 25.5 per cent), the Russian Federation (46.4 kg, or 10.7 per cent), the Netherlands (20.1 kg, or 4.6 per cent), Canada (13.8 kg, or 3.2 per cent) and Belgium (7 kg, or 1.6 per cent). No information was received from Peru or the United Kingdom, which have reported significant stocks in recent years.

⁴⁸This figure was calculated by INCB using available data series. It is being followed up with the Government.

Figure 32. Cocaine: global manufacture, consumption and stocks,^a 2000–2019



^aStocks as at 31 December of each year.

Comparative trends in the consumption of opioid analgesics

124. The previous section highlighted the most salient trends in the manufacturing, export, import and consumption of the individual drugs. To gain an overview of the trends of the various substances and to analyse how and why the consumption of some drugs is increasing or decreasing, it is important to look at them together, particularly in the case of opioid analgesics that are needed for pain management. The following analysis is based on the consumption of the main opioid analgesics (codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone), expressed in defined daily doses for statistical purposes (S-DDD).⁴⁹

125. An analysis of the main trends in the manufacturing, export, import and consumption of the main opioid analgesics (codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone), expressed in S-DDD per million inhabitants per day, shows that the highest consumption of these drugs is in developed countries in Europe and North America. Countries reporting the highest average consumption of opioids for pain management in the period 2017–2019 were the United States (25,368 S-DDD), Germany (22,517 S-DDD), Austria

⁴⁹The 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.

(18,489 S-DDD),⁵⁰ Belgium (15,487 S-DDD) and Canada (14,073 S-DDD).

126. The regional analysis confirms the persistence of a global disparity in the consumption of opioid analgesics. Regional S-DDD is calculated on the basis of the total population of the countries reporting consumption and the overall amounts of opioid analgesics reported as consumed. Opioid analgesics are defined as codeine, dextropropoxyphene, dihydrocodeine, fentanyl, hydrocodone, hydromorphone, ketobemidone, morphine, oxycodone, pethidine, tilidine and trimeperidine. The reported consumption of some countries in North America, Oceania and Western Europe resulted in regional averages of over 9,000 S-DDD (26,151 S-DDD for North America, 9,984 S-DDD for Oceania and 9,200 S-DDD for Western Europe). In North America, a sharp decrease in 2017 and 2018 has been followed by an increase in 2019, and overall, North America remains the region with the highest consumption of opioids for pain management in the world. Declining

⁵⁰The Government of Austria has reported data to the Board containing the breakdown of the country's morphine consumption for opioid substitution treatment, which corresponds to 93 per cent of consumption in 2019. When taking this information into consideration, the consumption of opioids for pain management in Austria decreases to 14,532 S-DDD. According to the information available to the Board, this is a unique situation and should not impact the S-DDD of other high-consuming countries.

consumption had been reported in Oceania since 2012, but, in 2019, it increased to 9,984 S-DDD. A general upward trend in consumption was evident in South-Eastern Europe until 2018, when it reached 1,415 S-DDD, but it decreased to 1,192 S-DDD in 2019. In Western and Central Europe, consumption has been relatively stable, but in 2019 it decreased to 9,200 S-DDD, from the 11,021 S-DDD of 2018.

127. Consumption well below those values was reported for other regions. Among them, South-Eastern Europe reported the highest consumption (1,192 S-DDD), followed by South America (603 S-DDD) and Eastern Europe (601 S-DDD), where there was a significant increase in consumption from 269 S-DDD in 2018. This increase can be largely attributed to rising consumption in the Russian Federation, which almost doubled from 2018 (321 S-DDD) to 2019 (608 S-DDD). An overall increasing trend in consumption has also been observed in West Asia over the 20-year period, albeit with a decrease from 564 S-DDD in 2018 to 479 S-DDD in 2019. The relatively high average consumption in the region is driven mainly by consumption in Israel (13,066 S-DDD in 2019) and Turkey (606 S-DDD).

128. A comparison of the consumption of individual substances (see figure 35) shows the prominence of fentanyl over the past two decades. However, after peaking in 2018 at 285,959 S-DDD, the global use of fentanyl decreased to 224,805 in 2019. The consumption of oxycodone has also been increasing, at a lower level, and, since 2009, has replaced morphine as the second most-consumed opioid (after fentanyl), reaching an all-time high of 45,726 S-DDD in 2018 and decreasing to 42,592 S-DDD in 2019. The trend for the use of morphine, on the other hand, has remained relatively stable between 2004 (25,644 S-DDD) and 2019 (27,746 S-DDD). After decreasing steadily since 2014, hydrocodone consumption increased from 14,161 S-DDD in 2018 to 20,415 S-DDD in 2019, levels last seen in 2015. Hydromorphone consumption decreased from 11,834 in 2018 to 7,713 in 2019, the lowest level since 2008. The United States accounted for almost all global hydrocodone use (99.3 per cent), whereas the consumption of the other drugs shown in the figure was reported from more than one country. Although the consumption of fentanyl decreased globally in 2019, especially in North America, there were significant increases in various countries in all other regions.

Figure 33. Consumption of opioids for pain management in all regions, in S-DDD per million inhabitants per day, 2000–2019

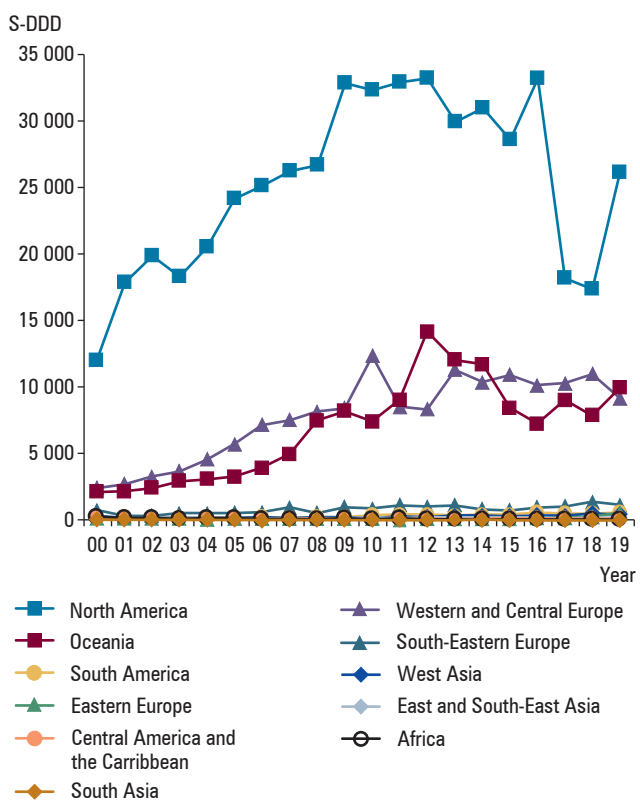
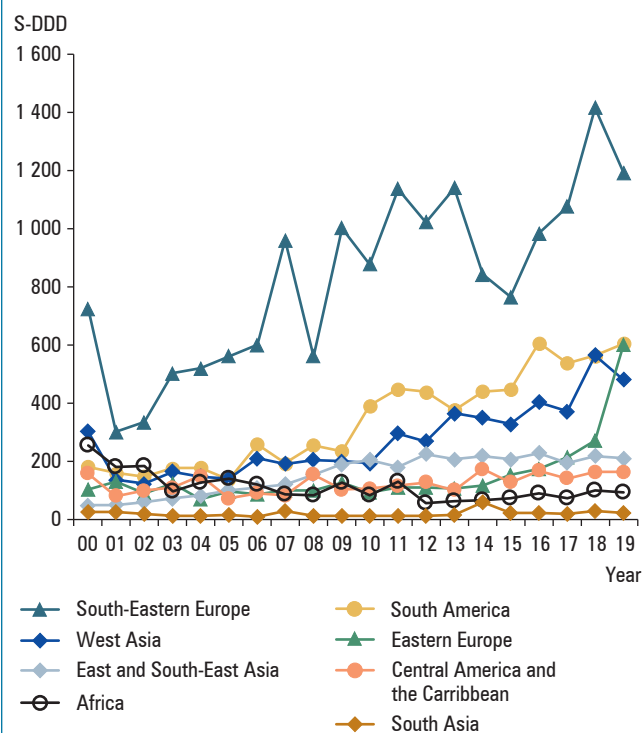


Figure 34. Consumption of opioids for pain management in the regions with the lowest consumption, in S-DDD per million inhabitants per day, 2000–2019



129. Figures 36 and 37 show the sum of S-DDD by substance and by region. This analysis highlights once again the importance of fentanyl in most regions of the world. Oxycodone consumption is highest in North America, Oceania, Western and Central Europe and West Asia, although it is also consumed in other regions. Hydrocodone consumption is significant in the Americas. The share of morphine is less pronounced in most regions, except for Africa and South America.

130. The Board considers levels of consumption of opioid analgesics in quantities between 100 and 200 S-DDD to be inadequate, and in quantities of less than 100 S-DDD to be very inadequate. In this context, the average levels of consumption reported in 2019 in East and South-East Asia (207 S-DDD), Central America and the Caribbean (160 S-DDD), Africa (90 S-DDD) and South Asia (20 S-DDD) are of particular concern. **The Board reiterates that the urgent need to increase levels of consumption of opioid analgesics in all countries reporting inadequate and very inadequate S-DDD calls for targeted public policies and support from Governments, civil society, the pharmaceutical industry and the international community to that end.**

Figure 36. Consumption of codeine, fentanyl, hydrocodone, morphine, oxycodone and pethidine, by region, expressed in S-DDD, 2019

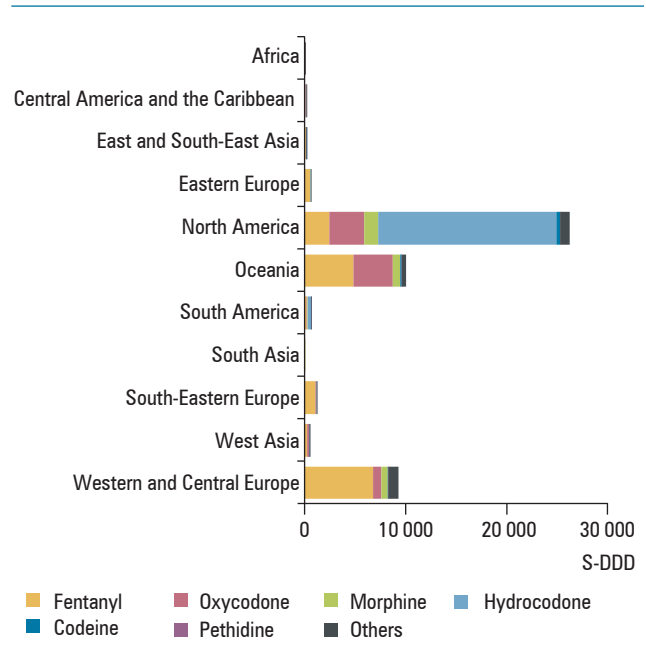
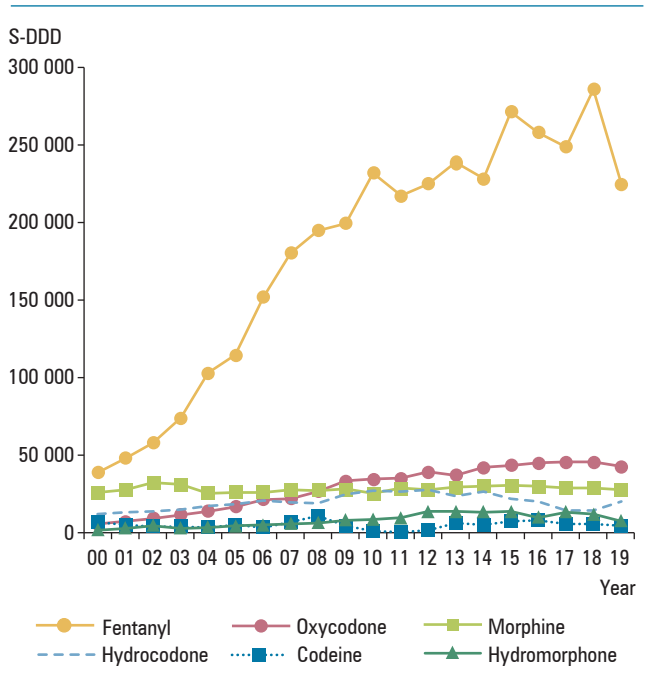


Figure 35. Consumption of codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone, total^a S-DDD, 2000–2019



^aTotal consumption of a drug is the sum of S-DDD of all individual countries reporting consumption.

Figure 37. Consumption of codeine, fentanyl, hydrocodone, morphine, oxycodone and pethidine, in selected regions, expressed in S-DDD, 2019

