

# COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

## Summary

In 2021, the impact of the coronavirus disease (COVID-19) pandemic on the international trade in controlled substances continued to be felt, as countries tried to stock quantities of some substances because of concerns related to the functioning of the global supply chain of medicines. The consolidated statistics on narcotic drugs for some countries in 2021 confirm that there has been an increase in the consumption, manufacture and stocks of some substances (specifically fentanyl analogues), largely driven by significant increases in the need to provide pain relief and sedation for patients with COVID-19 admitted into intensive care units.

Regional analysis of the overall consumption of opioid analgesics for the treatment of pain confirms the persistence of disparities among regions in the consumption of those drugs. Almost all consumption is concentrated in developed countries in Europe and North America, while the level of consumption in other regions is often insufficient for the medical needs of the population.

The regional imbalance is not due to the lack of opiate raw materials. Apart from opium, the production of which has been declining for a number of years, overall utilization of poppy straw and concentrate of poppy straw derived from both the morphine-rich and the thebaine-rich varieties remained high in 2021, and stocks increased, indicating that the supply is more than sufficient to satisfy demand, even though the demand expressed by a number of countries might not reflect the actual medical needs of the population.

A major problem in many low-income countries is the limited access to affordable opioid analgesics, such as morphine. In 2021, the total quantity of morphine available, including quantities manufactured and opening stocks, was 369.9 tons. Of that total quantity available, about 190 tons were utilized, of which 36.5 tons, or 9.9 per cent, were consumed directly for pain relief or as preparations included in Schedule III of the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol and 153.5 tons (41.5 per cent) were utilized for the manufacture of other drugs (mostly codeine), or substances not covered by the 1961 Convention as amended. The remaining amount, 135.8 tons, was reported as remaining in stock at the end of the year. In 2021, 81.1 per cent of the world population, mainly in low- and middle-income countries, consumed only 14.3 per cent of the total amount of morphine used for the management of pain and suffering. Consumption of the remaining 85.7 per cent of the morphine used for those purposes, excluding Schedule III preparations, continued to be concentrated in a small number of countries, located mainly in Europe and North America. Global manufacture of oxycodone increased after 2002, reaching a record high of 138.1 tons in 2013. Since then, manufacture of the substance has decreased gradually, dropping to 80.3 tons in 2021. The substance's association with overdose deaths in relation to prescription drug misuse, in particular in North America, led to the introduction of stricter control measures and consequently a reduction in consumption.

While the manufacture of hydromorphone, another potent opioid, decreased, consumption of the substance remained stable, with the United States of America and Canada accounting for the highest levels of consumption. Global consumption of heroin decreased slightly, from 658.5 kg in 2020 to 633 kg in 2021. Switzerland, where heroin is prescribed for individuals with long-term opiate dependency, remained the major consumer country in 2021, accounting for the consumption of 376.7 kg of the substance (55 per cent of global consumption). Other

countries reporting significant consumption of heroin for medical purposes in 2021 were Canada, Germany, the Netherlands and the United Kingdom of Great Britain and Northern Ireland.

Among synthetic opioids, fentanyl is, after oxycodone, the other substance most associated with overdose deaths in recent years. Global manufacture of fentanyl increased rapidly in the period 1999–2010, reaching a record level of 4.3 tons in 2010. Since then, manufacture of fentanyl has followed a decreasing trend, with some fluctuations, and 2 tons of the substance were reported to have been manufactured in 2021. The downward trend may be associated with continued concerns about overdose deaths attributed to the misuse of fentanyl or fentanyl-type substances.

The manufacture, consumption and use of the fentanyl analogues alfentanil, remifentanil and sufentanil, which are used mainly as anaesthetics, increased in 2021 because of the continuing COVID-19 pandemic. They are used for analgesia and the suppression of respiratory activity in mechanically ventilated patients in intensive care and to provide analgesic cover for painful manoeuvres.

The licit cultivation, production and use of cannabis have been increasing considerably since 2000, when more countries from all regions started to use cannabis and cannabis extracts 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 764.3 tons in 2021, a further increase from the 650.8 tons recorded in 2020. Since the licit cultivation of cannabis plant for medical and scientific purposes has increased considerably in recent years and the yield and manufacturing processes are not standardized, some data are being clarified with the relevant Governments in order to ensure consistency.

For 2021, the Plurinational State of Bolivia reported the production of 24,575 tons of coca leaf obtained from the licit cultivation of coca bush, while Peru reported the production of 1,170 tons. Peru is the only country to have exported coca leaf for the global market since 2000. In 2021, most of the exports were to the United States, which reported imports totalling 90.1 tons. The level of global licit manufacture of cocaine continued to fluctuate, as it has for more than 20 years. In 2021, manufacture increased to 420.7 kg, and was accounted for almost exclusively by Peru (95.8 per cent of global licit manufacture).

## Introduction to the comments on the reported statistics on narcotic drugs

1. The present comments are intended to facilitate the use of the statistical information on the licit production, manufacture, consumption,<sup>1</sup> utilization<sup>2</sup> 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 2002–2021.

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

<sup>2</sup>Pursuant 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.

2. The tables of reported statistics in part four and annexes IV and V of the present report contain data furnished by Governments to the International Narcotics Control Board (INCB) in accordance with article 20 of the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol.<sup>3</sup> The most recent statistical data reflected in the comments are those relating to 2021. 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.<sup>4</sup> The most pertinent conclusions and recommendations of INCB based on the analysis of statistical data are included in chapter II of its annual report.<sup>5</sup>

<sup>3</sup>United Nations, *Treaty Series*, vol. 976, No. 14152.

<sup>4</sup>Details on the submission of statistical reports by individual Governments are contained in annex I to the present publication.

<sup>5</sup>E/INCB/2022/1.

## Opiate raw materials

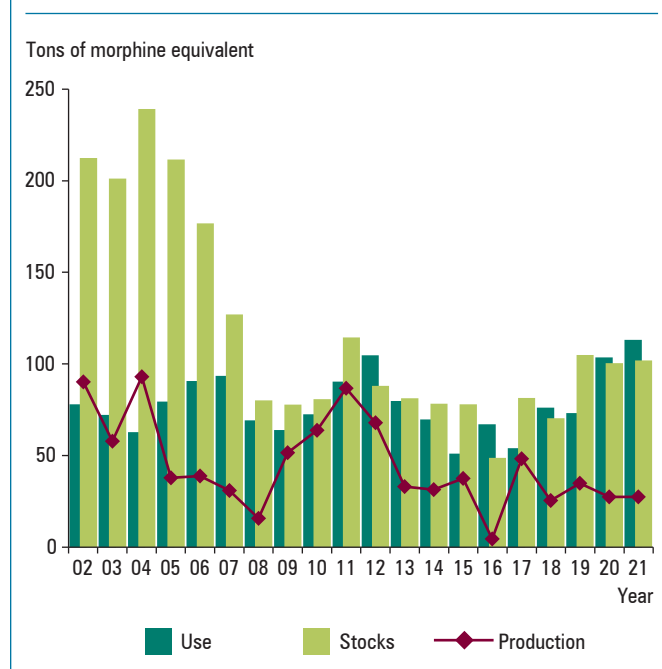
3. Opium and poppy straw are the raw materials obtained from the opium poppy plant (*Papaver somniferum*), from which alkaloids such as morphine, thebaine, codeine and oripavine are extracted. Concentrate of poppy straw is a product obtained in the process of extracting alkaloids from poppy straw. It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

### Opium

4. Opium (also called “raw opium”) is the latex obtained by making incisions on the green capsules of opium poppy plants. For statistical and comparison purposes, data on the production of and trade in opium are reported at 10 per cent moisture content. When appropriate, the data on opium are also expressed in morphine equivalent,<sup>6</sup> in order to enable comparison between opium and poppy straw. Figure 1 shows the levels of licit production, stocks and use (consumption and utilization) of opium during the period 2002–2021, expressed in morphine equivalent.

<sup>6</sup>The morphine or thebaine equivalent is calculated by INCB on the basis of the industrial yield of each alkaloid obtained from opium or poppy straw. Lesser alkaloids contained in opium or poppy straw that are convertible into morphine or thebaine have also been included, adjusted using the appropriate conversion rates, whenever the Board has been informed of their extraction in commercially significant quantities.

**Figure 1. Opium: global production, stocks,<sup>a</sup> and use (consumption and utilization),<sup>b</sup> in morphine equivalent, 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

<sup>b</sup>Including the use of seized opium in Iran (Islamic Republic of) and Myanmar.

5. Opium production amounted to more than 1,300 tons in 2000 (147.6 tons in morphine equivalent), but since then, production has followed a strong overall downward trend, decreasing to 143.7 tons in 2008 (15.8 tons in morphine equivalent). There was a steady increase until 2011, when

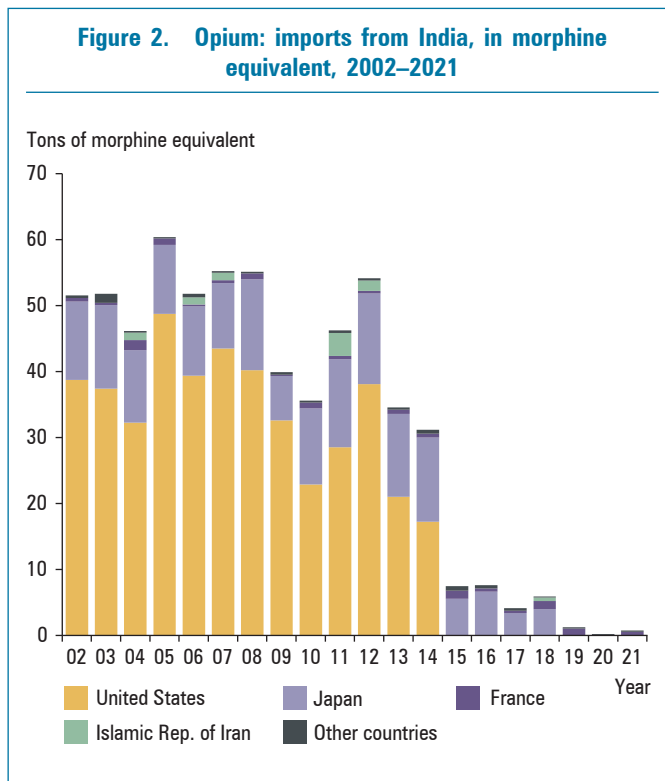
it reached 789.1 tons in gross weight (86.8 tons in morphine equivalent), but subsequently production continued to decrease, falling to its lowest level in 20 years, 42.3 tons (4.6 tons in morphine equivalent), in 2016. Production increased again in 2017, to 439.3 tons (48.3 tons in morphine equivalent), but then decreased again, dropping to 250.8 tons (27.5 tons in morphine equivalent) in 2021. India was the main producer, and the only licit exporter, of raw opium in 2021, accounting for 245 tons of the total amount produced globally (26.9 tons in morphine equivalent), or 97.7 per cent. It was followed by China, which produced 5.3 tons (0.5 tons in morphine equivalent), representing 2.1 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 in the Democratic People's Republic of Korea and Japan, together accounting for 0.1 per cent of the global total.

6. Imports of opium from India (see figure 2) have continued the sharp downward trend that started in 2015. Imports amounted to 6.5 tons (0.7 in morphine equivalent) in 2021, representing a very low level of imports compared with 2002 (467.9 tons, or 51.5 tons in morphine equivalent). The country importing the most significant amount of opium in 2021 was France (4.7 tons, or 71.8 per cent of all imports), followed by Spain (0.9 tons, or 14.8 per cent), Germany (0.4 tons, or 5.8 per cent) and the United States

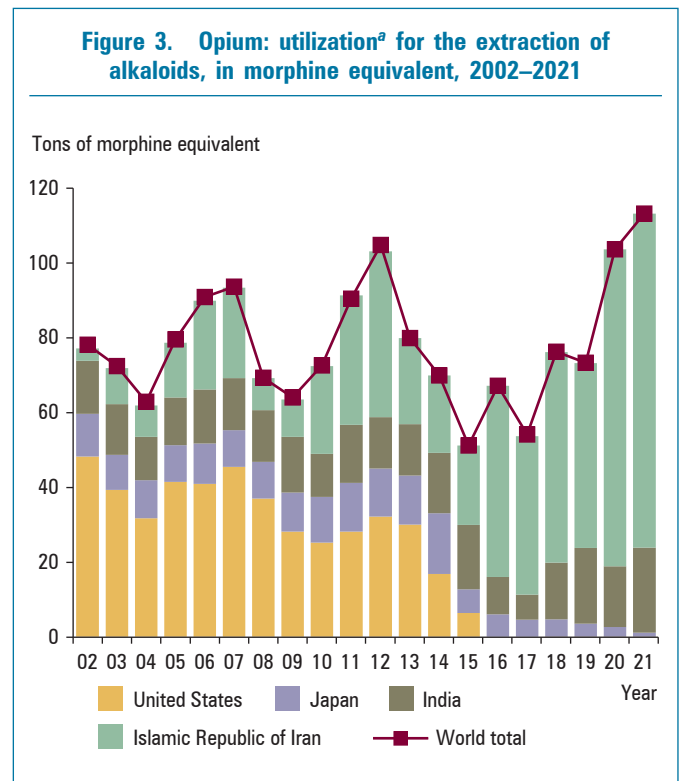
of America (0.2 tons, or 3.1 per cent). A number of other countries imported quantities of less than 0.1 tons each. It should be noted that in 2019 Japan ceased importing opium altogether and switched to importing concentrate of poppy straw. That, in turn, had an impact on the decreases in both imports and exports, as well on the increase in stocks held by India.

7. As in previous years, in 2021, most of the opium produced was used for the extraction of alkaloids, with only a small amount (20.6 tons, or 2.3 tons in morphine equivalent) being used for the manufacture of preparations included in Schedule III of the 1961 Convention as amended. Utilization (including the utilization of seized opium in Iran (Islamic Republic of) and Myanmar) increased to 1,049.8 tons (115.5 tons in morphine equivalent) in 2021, from 961.5 tons (105.8 tons in morphine equivalent) in 2020. In 2021, similar to 2020, the main countries reporting utilization of opium for the extraction of alkaloids were the Islamic Republic of Iran (812.2 tons, or 89.3 tons in morphine equivalent) and India (206.8 tons, or 22.7 tons in morphine equivalent) (see figure 3). The origin of opium reported as utilized by the Islamic Republic of Iran was seized material. The Democratic People's Republic of Korea reported the utilization of opium in the amount of 0.4 tons (0.1 tons in morphine equivalent). Details on the utilization of opium for the extraction of alkaloids and on the alkaloids obtained are provided in table III of part four of the present publication.

**Figure 2. Opium: imports from India, in morphine equivalent, 2002–2021**



**Figure 3. Opium: utilization<sup>a</sup> for the extraction of alkaloids, in morphine equivalent, 2002–2021**



<sup>a</sup>Including the utilization of seized opium in Iran (Islamic Republic of) and Myanmar.

8. While most of the opium produced is used for the extraction of alkaloids, opium is also consumed in some countries in the form of preparations, mainly for the treatment of diarrhoea and coughs. Most of those preparations are included in Schedule III of the 1961 Convention as amended.<sup>7</sup> Global consumption of opium for those purposes has fluctuated since 2001. In 2021, the consumption of opium and its utilization for the manufacture of preparations in Schedule III amounted to 20.7 tons (2.3 tons in morphine equivalent), including 7 tons (0.8 tons in morphine equivalent) in China, 6.8 tons (0.7 tons in morphine equivalent) in France and 6 tons (0.7 tons in morphine equivalent) in India.

9. 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 tons in morphine equivalent). However, in 2019, the stocks increased significantly and reached a level of 954.7 tons (105.5 tons in morphine equivalent), subsequently decreasing slightly in 2020, to 879.6 tons (100.6 tons in morphine equivalent), and then increasing again in 2021, to 927.9 tons (102.1 tons in morphine equivalent) (see figure 1). India continued to maintain the largest stocks of opium, at 824.4 tons (90.7 tons in morphine equivalent), constituting 88.9 per cent of the global total. The second largest amount of stocks was held by the Islamic Republic of Iran, at 67.8 tons (7.5 tons); Japan is continuing to gradually reduce its stocks of opium as it switches to the use of concentrate of poppy straw for the manufacture of opiates but nevertheless held stocks in the amount of 22.6 tons (2.5 tons in morphine equivalent), or 2.4 per cent of the global total. France held 7.3 tons (0.8 tons in morphine equivalent). The last among the four main holders of opium stocks was China, accounting for 3.8 tons (0.4 tons in morphine equivalent).<sup>8</sup>

## Poppy straw

10. Poppy straw consists of all parts of the opium poppy plant after mowing except the seeds. Morphine is the predominant alkaloid found in the varieties of opium poppy plant cultivated in most producing countries. Commercial cultivation of the opium poppy plant with high thebaine content started in the second half of the 1990s. In the present publication, poppy straw produced from varieties of opium poppy plant rich in morphine is referred to as “poppy straw (M)”, poppy straw produced from varieties of opium poppy plant rich in thebaine is referred to as

“poppy straw (T)”, poppy straw produced from varieties of opium poppy plant rich in codeine is referred to as “poppy straw (C)”, 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.

11. 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 varieties of opium poppy containing a high codeine content started in Australia in 2009 and in France in 2013.

### Poppy straw produced mainly from opium poppy rich in morphine<sup>9</sup>

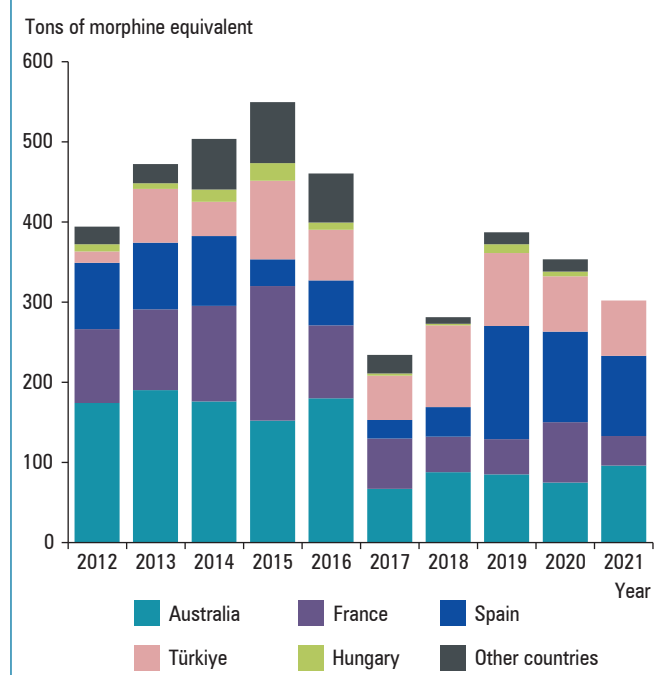
12. Although the submission of statistics on the production of poppy straw is voluntary, most countries cultivating opium poppy plants for the extraction of alkaloids provided such statistics in 2021. Global production of poppy straw (M), expressed in morphine equivalent, followed an increasing trend in the two decades prior to 2021. 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 473 tons in 2015, before decreasing again, to 281 tons in 2018. In 2019, it rose once again, to 387 tons, but then decreased again, to 353 tons, in 2020 and further, to 302 tons, in 2021. Throughout the two decades prior to 2021, Australia, France, Spain and Türkiye had been the main producer countries. In 2021, the leading producer was Spain (100 tons in morphine equivalent), followed by Australia (96 tons), Türkiye (69 tons) and France (37 tons) (see figure 4). 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.

<sup>7</sup>Preparations 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.

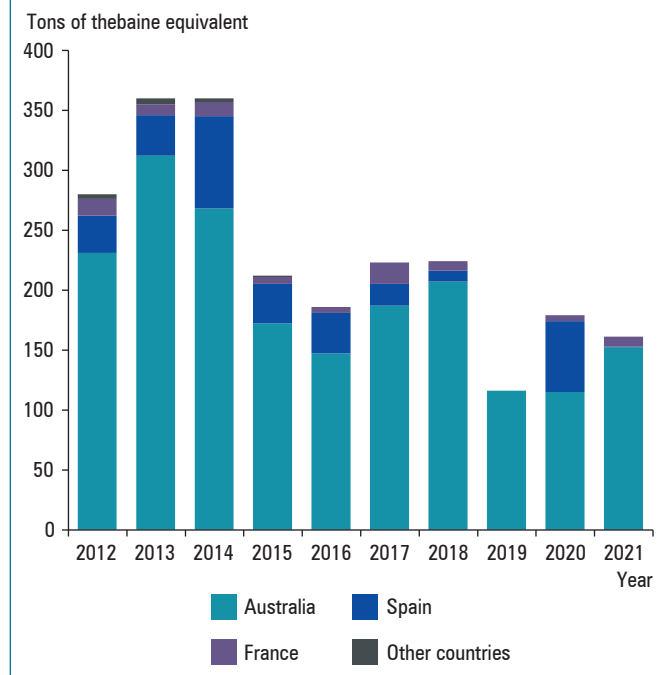
<sup>8</sup>For further information on the production and stocks of and demand for opium, see part three of the present publication.

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

**Figure 4. Total anhydrous morphine alkaloid contained in all poppy straw varieties: production in the main producing countries, in morphine equivalent, 2012–2021**



**Figure 5. Total anhydrous thebaine alkaloid contained in all poppy straw varieties: production in the main producing countries, in thebaine equivalent, 2012–2021**



13. International trade in poppy straw (M) as a raw material continued to be limited. In 2021, France was the main exporter of poppy straw (M) for the extraction of alkaloids (58.6 per cent of global exports), followed by Slovakia (33.9 per cent) and Hungary, Austria and Slovenia, which exported very small amounts (see annex IV, table 1).

14. The utilization of poppy straw (M) remained relatively stable in 2021 (6,872.9 tons in gross weight). The main countries utilizing poppy straw (M) in 2021 were Türkiye (15,148 tons in gross weight), Spain (4,252.5 tons), France (3,292.2 tons), China (1,877.6 tons), Australia (1,301 tons), Slovakia (924.4 tons) and North Macedonia (76 tons). Further details on the utilization of poppy straw (M) for the extraction of alkaloids and the yields obtained are contained in table IV.

15. Global stocks of poppy straw (M) in 2021 amounted to 1,114.1 tons in gross weight, of which 64.6 per cent were held by Spain, 30.9 per cent by Australia, 4.5 per cent by Belgium and less than 1 per cent by Hungary.

### Poppy straw produced mainly from opium poppy rich in thebaine<sup>10</sup>

16. Australia and France started to report the production of poppy straw (T) to INCB in 1999. Spain reported the

<sup>10</sup>The quantities in thebaine equivalent of the thebaine and oripavine alkaloids contained in other varieties of poppy straw, such as poppy straw (M) and poppy straw (C), are also included in the total production figures in this subsection, where applicable.

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 of part four.

17. Production of poppy straw (T) in the main producing countries during the period 2012–2021, expressed in thebaine equivalent, is shown in figure 5. Total production decreased by about half from 2018 (224 tons) to 2019 (116 tons), increasing again in 2020, to 179 tons, then decreasing again in 2021, to 161 tons, expressed in thebaine equivalent. In 2021, Australia was the main producer, accounting for 152 tons in thebaine equivalent, representing an increase from 115 tons in 2020 but nevertheless a considerably lower level than in 2018 (207 tons). France reported 8 tons and Spain 1 ton (see figure 5).

18. All poppy straw (T) is used in the producing and manufacturing countries for the extraction of alkaloids. The quantities of poppy straw (T) used, the alkaloids obtained from it and the yields are shown in table V of part four. Stocks of poppy straw (T) stood at 5,936 tons in 2021, with Spain holding 51.6 per cent of the global total and Australia holding 48.4 per cent.

### Poppy straw produced from opium poppy rich in codeine

19. Australia reported the cultivation of poppy straw (C), rich in codeine, for commercial purposes for the first time



in 2009, and France did so in 2013. This 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 6,705.9 tons in 2015, but dropped considerably, to 1,313.2 tons, in 2016, subsequently increasing year-on-year to 8,337.7 tons in 2021. Spain accounted for 92.4 per cent of the poppy straw (C) produced, while Australia accounted for the remaining 7.6 per cent. Spain also accounted for most of its utilization (79.1 per cent), while Australia accounted for the remaining 20.9 per cent. Stocks of poppy straw (C) were held by Spain (6,494.1 tons, or 70.8 per cent of global stocks) and Australia (2,677.5 tons, or 29.2 per cent).

### Poppy straw produced from opium poppy rich in noscapine

20. In recent years, an increase in the cultivation of poppy straw (N) had been reported in some countries. Noscapine is not under international control, but opium poppy rich in noscapine also contains opiates under international control, and it needs to be monitored in accordance with the requirements of the 1961 Convention as amended. In 2021, the only countries that reported production of poppy straw (N) were Spain, accounting for a total of 501.3 tons (expressed in gross weight), Australia (367 tons) and France (1 ton). Australia held the largest stocks of poppy straw (N) (881.3 tons), followed by Spain (808.7 tons) and Hungary (47.4 tons).

### Poppy straw used for decorative purposes

21. 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 2021, the countries that reported such use of poppy straw were Austria, Czechia, Germany and Hungary.

### Concentrate of poppy straw

22. Most countries using poppy straw for the extraction of alkaloids first manufacture an intermediate product called “concentrate of poppy straw”, although in some countries morphine or thebaine is manufactured directly from poppy straw in a continuous process, which may involve a number of other intermediate products (for details, see tables IV and V). Until the second half of the 1990s, only concentrate of poppy straw containing morphine as the main alkaloid was manufactured. Since then, concentrate of poppy straw containing mainly thebaine, oripavine or codeine has started to be manufactured. Concentrate of poppy straw may contain a mixture of alkaloids, and in addition to the main alkaloid,

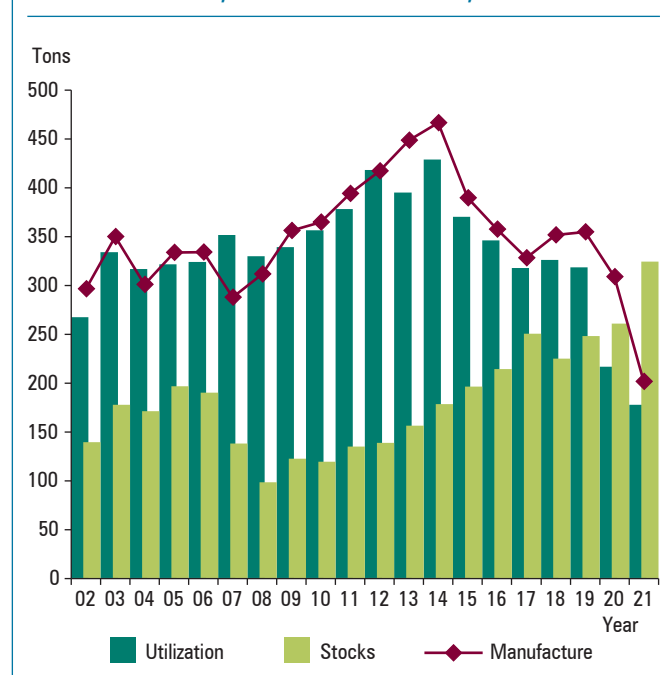
other alkaloids may be extracted in industrial processes. The different types of concentrate of poppy straw are distinguished by the main alkaloid contained in them.<sup>11</sup>

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

### Anhydrous morphine alkaloid contained in concentrate of poppy straw

24. AMA (CPS) continues to be the most important and most widely used of the alkaloids contained in concentrate of poppy straw. Figure 6 shows the trends in its manufacture, stocks and utilization during the period 2002–2021.

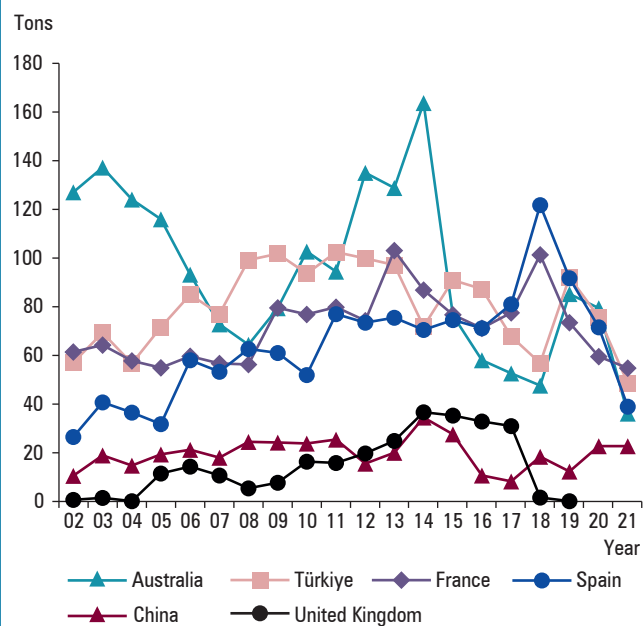
**Figure 6. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: global manufacture, stocks<sup>a</sup> and utilization, 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

<sup>11</sup>Currently, the following types are traded: (a) concentrate of poppy straw containing morphine as the main alkaloid; (b) concentrate of poppy straw containing thebaine as the main alkaloid; (c) concentrate of poppy straw containing oripavine as the main alkaloid; and (d) concentrate of poppy straw containing codeine as the main alkaloid.

**Figure 7. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: manufacture in the main manufacturing countries, 2002–2021**



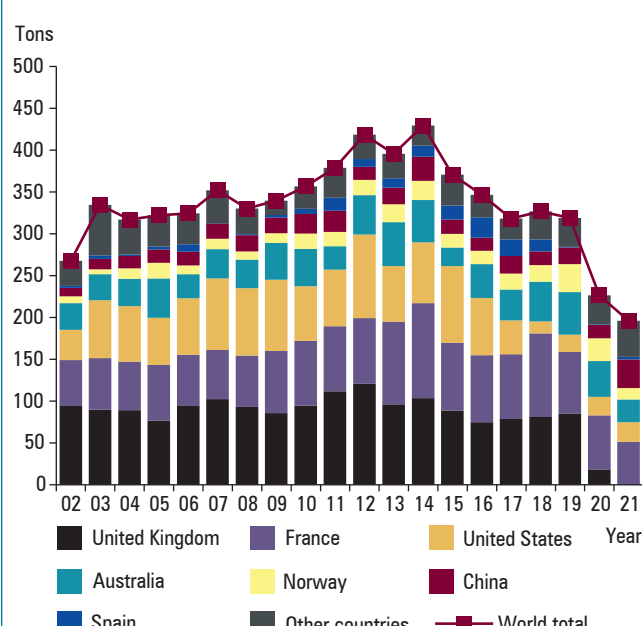
25. Global manufacture of AMA (CPS) increased steadily after 2001, reaching its highest level ever in 2014 (466 tons). Since then, manufacture of AMA (CPS) has decreased gradually, falling to 201.2 tons in 2021 (see figure 6). Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 2002–2021 are presented in figure 7.

26. France was the leading manufacturer of AMA (CPS) in 2021, reporting 54.7 tons (27.2 per cent of global manufacture), followed closely by Türkiye, accounting for 48.4 tons (24 per cent), Spain, for 38.8 tons (19.3 per cent), Australia, for 35.9 tons (17.9 per cent) and China, for 22.5 tons (11.2 per cent) (see figure 7).

27. After reaching a record high of 239 tons in 2012, global exports of AMA (CPS) have decreased, standing at 47 tons in 2021. Spain exported the largest quantity of AMA (CPS) in 2021 (31.1 tons, or 66.2 per cent), followed by Australia (10.3 tons, or 22 per cent), Türkiye (5 tons, or 10.8 per cent) and the United Kingdom (0.4 tons, or 0.9 per cent). The United Kingdom was the main importer of AMA (CPS), accounting for 29.9 per cent of global imports, followed by Japan (21.3 per cent), South Africa (16.3 per cent), Norway (14.6 per cent), Italy (5.8 per cent), Switzerland (5.3 per cent) and Slovakia (4.9 per cent). Further details on international trade in AMA (CPS) can be found in annex IV, tables 1 and 2.

28. AMA (CPS) is an intermediate product for the manufacture of morphine. It is also used in continuous

**Figure 8. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: utilization for the manufacture of opiates, 2002–2021**

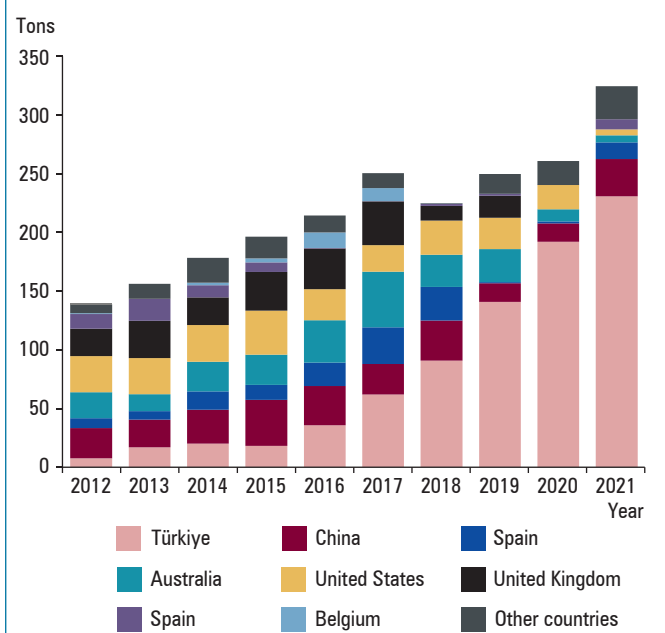


manufacturing processes for the manufacture of codeine. Utilization of AMA (CPS) continued an increasing trend until 2014 but has decreased since then (see figure 6). In 2021, total global utilization amounted to 195.6 tons, a significant decrease from 226.1 tons in 2020. In 2021, France was the country with the largest utilization of AMA (CPS), accounting for 51.1 tons, or 26.1 per cent of the global total. China was second, with 34.2 tons, or 17.5 per cent, followed by Australia, with 27.2 tons (13.9 per cent), the United States, with 23.2 tons (11.9 per cent), Japan, with 16.3 tons (8.3 per cent), Norway, with 13.6 tons (7 per cent), Türkiye, with 11 tons (5.7 per cent), South Africa, with 8.6 tons (4.4 per cent) and Spain, with 3.2 tons (1.6 per cent) (see figure 8). Switzerland, Italy, North Macedonia and Slovakia, in descending order of the amounts utilized, reported the utilization of less than 3 tons of AMA (CPS).

29. Global stocks of AMA (CPS) have increased in the past 10 years, and in 2021 they stood at 324.4, up from 260.6 tons in 2020. Türkiye held the largest stocks (230.6 tons, or 71.1 per cent of the global total), followed by China (31.7 tons, or 9.8 per cent), Japan (22.4 tons, or 7 per cent), Spain (14.2 tons, or 4.4 per cent), France (8.7 tons, or 2.7 per cent), Australia (6 tons, or 1.9 per cent), the United States (5 tons, or 1.5 per cent) and Slovakia (3.4 tons, or 1 per cent) (see figure 9). The other countries holding stocks of AMA (CPS), together accounting for less than 1 per cent of the global total, were, in descending order of the amounts held, Italy and North Macedonia.

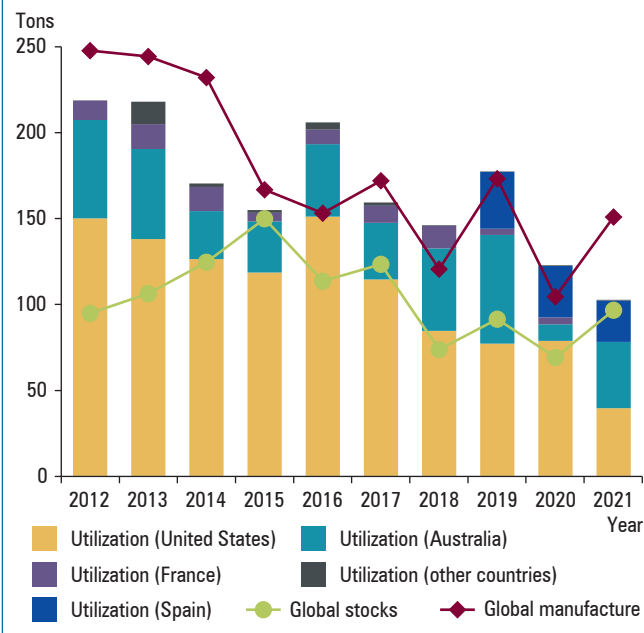


**Figure 9. Total anhydrous morphine alkaloid contained in all varieties of concentrate of poppy straw: stocks,<sup>a</sup> 2012–2021**



<sup>a</sup>Stocks 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,<sup>a</sup> 2012–2021**



<sup>a</sup>Stocks as at 31 December of each year.

### Anhydrous thebaine alkaloid contained in concentrate of poppy straw

30. Figure 10 provides an overview of the manufacture, stocks and utilization of ATA (CPS) during the period 2012–2021. Industrial manufacture of ATA (CPS), which started in 1998, increased rapidly until 2012, when it reached 248 tons. In the following years, it decreased and then stabilized at more than 100 tons, standing at 150.9 tons in 2021. The only countries manufacturing ATA (CPS) in 2021 were Australia (127.5 tons, or 84.5 per cent of global manufacture) and Spain (23.4 tons, or 15.5 per cent). Australia held 42.2 tons in stock, or 43.7 per cent of the global total, followed by the United States (35.1 tons, or 36.3 per cent), Spain (10.3 tons, or 10.7 per cent), France (7 tons, or 7.2 per cent) and Italy (1.1 tons, or 1.2 per cent). Slovakia and Japan held stocks of less than 1 ton each. Australia was the main exporter, accounting for 73.4 tons, or 99.3 per cent of the global total. Spain was the only other exporter, accounting for 0.5 tons, or less than 1 per cent. The United States has been the leading importer of ATA (CPS) for many years; in 2021, the country imported 71.5 tons, or 97.7 per cent of global imports, while Italy imported 1.5 tons, or 2 per cent. Japan, importing a small amount, accounted for the remainder.

31. ATA (CPS) is an intermediate product for the manufacture of thebaine. Global utilization of ATA (CPS) increased sharply from 2001 to 2011, when it peaked at

225.9 tons. After that, it decreased steadily, dropping to 102.7 tons in 2021. 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. However, despite this reduction, in 2021, the United States continued to be the main user of thebaine (accounting for 38.4 per cent of global utilization, or 39.4 tons). It was followed by Australia (37.6 per cent, or 38.6 tons) and Spain (23.6 per cent, or 24.2 tons). Global stocks of ATA (CPS) increased from 76.3 tons in 2020 to 96.7 tons in 2021, held primarily by Australia (42.2 tons, or 43.7 per cent of the global total), the United States (35.1 tons, or 36.3 per cent), Spain (10.3 tons, or 10.7 per cent), France (6.9 tons, or 7.2 per cent), Italy (1.1 tons, or 1.2 per cent), Slovakia (0.7 tons, or 0.8 per cent) and Japan (0.2 tons, or 0.2 per cent) (see figure 10).

### Anhydrous oripavine alkaloid contained in concentrate of poppy straw

32. Manufacture of AOA (CPS) in commercially usable quantities started in 2001. Australia was the main manufacturing country in 2021, accounting for 38.4 tons (73.3 per cent of global manufacture), followed by Spain (14 tons, or 26.7 per cent). Total utilization of AOA (CPS) in 2021 reached 62.3 tons, a considerable increase from the 29 tons utilized in the previous year. Global stocks of AOA

(CPS) have been fluctuating since 2001. In 2021, stocks increased to 34.7 tons, from 24.5 tons in 2020. The stocks were held mainly by Australia (24.7 tons, or 71.3 per cent of the global total), Spain (7.8 tons, or 22.6 per cent) and the United States (1.8 tons, or 5.3 per cent). Italy and Switzerland held smaller amounts in stock.

### Anhydrous codeine alkaloid contained in concentrate of poppy straw

33. Manufacture of ACA (CPS) increased from 2001 until 2015, when it reached a record 108.9 tons, which was nearly double the amount manufactured in 2014 (57.7 tons). After decreasing to 56.1 tons in 2016, it increased again, reaching 85.6 tons in 2019, a notable increase over the 69.9 tons reported in 2018. In 2021, the amount manufactured decreased to 45.7 tons. ACA (CPS) is used for the extraction of codeine. The only countries that reported the manufacture of ACA (CPS) in 2021 were Australia (92.4 per cent of global manufacture), Türkiye (4.3 per cent) and

Spain (3.3 per cent). It is worth noting that France, which accounted for 14.3 per cent of production of ACA (CPS) in 2018, reported no such production in 2021. 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, and then almost doubled again in 2020, reaching 120 tons. In 2021, it decreased again, to 61.4 tons. China was the country reporting the largest utilization of ACA (CPS) in 2021 (57.4 per cent of the global total, or 35.2 tons), followed by Australia (16.4 per cent, or 10 tons), the United States (13.5 per cent, or 8.3 tons), Norway (10.7 per cent, or 6.5 tons), Türkiye (1.3 per cent, or 0.7 tons) and Spain (0.7 per cent, or 0.4 tons). Global stocks of ACA (CPS) increased to the highest level ever recorded (36.4 tons) in 2021. The stocks were held by the United States (11.9 tons, or 33 per cent of the global total), Türkiye (11.8 tons, or 32.5 per cent), Australia (10.3 tons, or 28.4 per cent), Norway (0.8 tons, or 2.4 per cent) and Japan (0.7 per cent, or 2.1 per cent), with Italy, Spain and the United Kingdom holding only small amounts.

## Opiates and opioids

34. “Opiate” is the term generally used to designate drugs derived from opium and their chemically related derivatives, such as semi-synthetic alkaloids, while “opioid” is a more general term for both natural and synthetic drugs with morphine-like properties, although the chemical structure may differ from that of morphine.<sup>12</sup>

35. Opioids are used mostly for their analgesic properties to treat severe pain (fentanyl, hydromorphone, methadone, morphine and pethidine), moderate to severe pain (buprenorphine<sup>13</sup> and oxycodone) and mild to moderate pain (codeine, dihydrocodeine and dextropropoxyphene), as well as to induce or supplement anaesthesia (fentanyl and fentanyl analogues such as alfentanil and remifentanil). They are also used as cough suppressants (codeine, dihydrocodeine and, to a lesser extent, pholcodine and ethylmorphine), to treat gastrointestinal disorders, mainly diarrhoea (codeine and diphenoxylate), and to treat opioid dependence (buprenorphine and methadone).

### Natural alkaloids

36. Morphine, codeine, thebaine, noscapine, oripavine, papaverine and narceine are alkaloids contained in opium

or poppy straw. Morphine and codeine are under international control because of their potential for misuse, while thebaine and oripavine are under such control because they can be converted into opioids that are subject to misuse. 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, is used as a reference parameter for comparative purposes.

### Morphine

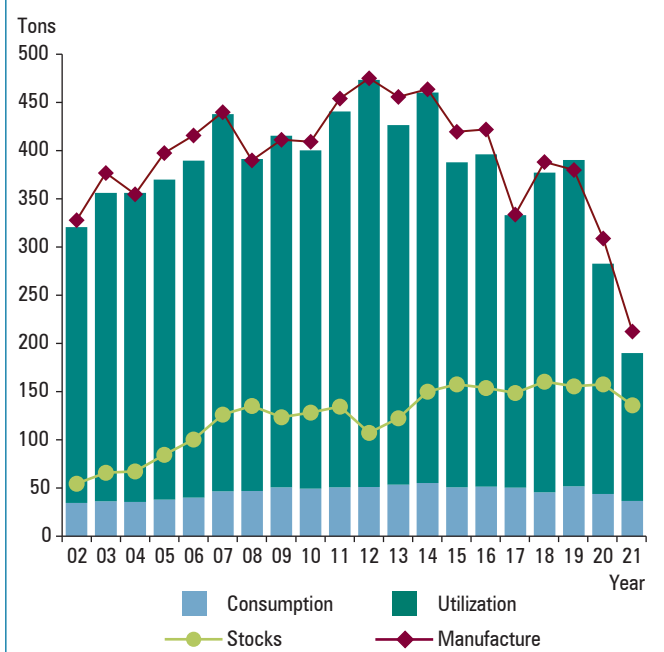
37. In the 20-year period 2002–2021, the global manufacture<sup>14</sup> of morphine initially increased, from 327.8 tons manufactured in 2002 to 475.3 tons in 2012, when global morphine manufacture reached its peak. After 2012, global manufacture decreased, falling to 212.4 tons in 2021, a considerable decrease from the 308.7 tons manufactured in 2020 (see figure 11). Stocks available at the beginning of 2021 stood at 157.5 tons, a level that has remained relatively stable since 2015. The total quantity of morphine available, including quantities manufactured and opening stocks, amounted to 369.9 tons. During the year, of that

<sup>12</sup>From a clinical point of view, opioids may be classified according to their actions compared with those of morphine: similar affinity (agonist), competitive (antagonist) or mixed (agonist/antagonist) for the same receptor sites (the so-called “opioid receptors”) in the central and peripheral nervous systems.

<sup>13</sup>Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971.

<sup>14</sup>In Australia, China, Italy, Norway, Türkiye 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,<sup>a</sup> consumption and utilization, 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

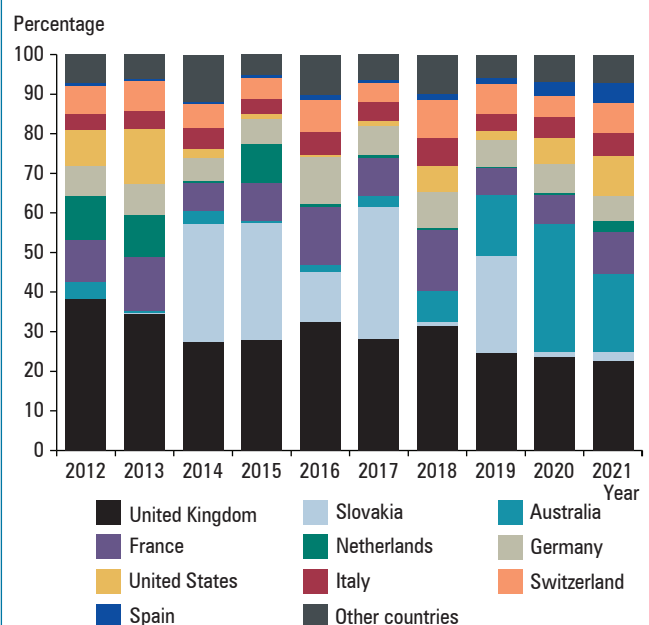
total quantity available, about 190 tons were utilized, of which 36.5 tons, or 9.9 per cent, were consumed directly for pain relief or as Schedule III preparations and 153.5 tons (41.5 per cent) were utilized for the manufacture of other drugs (mostly codeine), or substances not covered by the 1961 Convention as amended. The remaining amount, 135.8 tons, was reported as remaining in stock at the end of the year.

38. Of the total quantity of morphine manufactured globally in 2021 (212.4 tons), the majority (153.5 tons, or 72.2 per cent) was converted into other narcotic drugs or into substances not covered by the 1961 Convention as amended. Another 36.5 tons (or 17.2 per cent) was used for direct consumption or in the manufacture of preparations listed in Schedule III, mainly for palliative care.

39. In 2021, the leading morphine manufacturing countries were France (51.9 tons of morphine, or 24.5 per cent of global manufacture), Australia (35.1 tons, or 16.6 per cent) and the Islamic Republic of Iran (33.6 tons, or 15.9 per cent), followed by India (20.1 tons, or 9.5 per cent), Japan (19.6 tons, or 9.2 per cent) and the United Kingdom (17.3 tons, or 8.1 per cent). China, the United States, Slovakia, Switzerland, Italy, Türkiye, Spain and North Macedonia, in descending order of the quantities manufactured, all reported the manufacture of quantities of less than 17 tons but more than 1 ton.

40. Following the decrease in manufacture of morphine, exports of the substance decreased, from the all-time high level of 39.7 tons in 2019 to 28.6 tons in 2021, not much

**Figure 12. Morphine: percentage share of total exports, by country, 2012–2021**



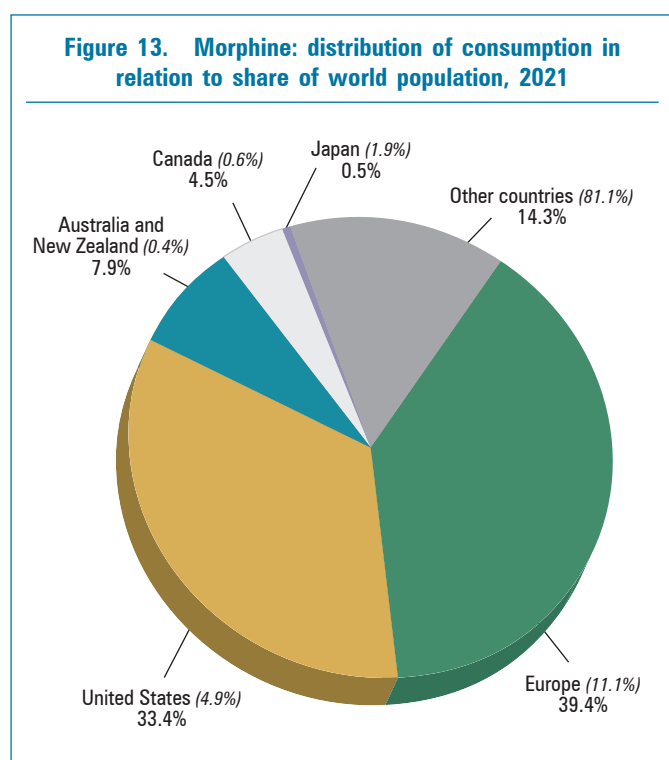
higher than the average of 27.3 tons recorded in the period 2002–2021. The main exporting countries in 2021 were the United Kingdom (6.5 tons, or 22.8 per cent of the global total), Australia (5.7 tons, or 20 per cent), France (2.9 tons, or 10.5 per cent), the United States (2.9 tons, or 10.1 per cent), Switzerland (2.2 tons, or 7.6 per cent), Germany (1.8 tons, or 6.2 per cent), Italy (1.7 tons, or 5.9 per cent) and Spain (1.4 tons, or 5 per cent). Other countries exported less than 1 ton each (see figure 12).

41. The main importing countries in 2021 were Hungary (5.2 tons, or 19.3 per cent of the global total), Germany (3.6 tons, or 13.5 per cent), the United Kingdom (2.9 tons, or 10.9 per cent), Australia (2.6 tons, or 9.9 per cent), Austria (2.4 tons, or 8.7 per cent), Canada (1.7 tons, or 6.4 per cent) and Switzerland (1.3 tons, or 4.7 per cent). Other countries imported less than 1 ton each. Further details on exports and imports of morphine can be found in annex IV, tables 3 and 4.

42. In 2002, the amount of morphine used for direct consumption and Schedule III preparations had totalled 34.5 tons, or 10.5 per cent of the amount of morphine manufactured globally. In 2021, it totalled almost 36.5 tons, but represented a notably larger share of the total amount available, 17.2 per cent, since the amount manufactured globally in 2021 was less than in 2002. Many countries continue to report having difficulties in procuring medications containing morphine, despite the fact that opiate raw materials are reported to be available in sufficient quantities, and although most countries and territories reported consumption of morphine in 2021, many people

still had limited access to it. The differences in consumption levels between countries continues to be significant (see figure 13, and table XIV of part four). Various factors, such as economic and commercial interests, knowledge and training, as well as regulatory frameworks, are influencing the ability of countries to procure and administer morphine for the treatment of pain.

43. In 2021, 81.1 per cent of the world population, mainly in low- and middle-income countries, consumed only 14.3 per cent of the total amount of morphine used for the management of pain and suffering. The remaining 85.7 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 share of morphine used for direct consumption has increased in the past 20 years, from 10.5 per cent in 2002 to 17.2 per cent in 2021. However, the disparity in the consumption of narcotic drugs for palliative care continues to be a matter of concern, particularly in relation to access to and availability of affordable opioid analgesics such as morphine. In 2021, eight countries alone accounted for 79.1 per cent of the morphine used for the management of pain and suffering worldwide: those countries reported consumption amounting to between 1.5 tons and 11.2 tons. The United States continued to be the country reporting the highest level of consumption, accounting for 11.2 tons, followed by the United Kingdom (3.8 tons), Australia (2.3 tons), Austria (2.2 tons) and China (2 tons). All other countries reported consumption of less than 2 tons each in 2021.



Note: Percentages in parentheses refer to share of the total population of all reporting countries worldwide.

44. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention as amended. In 2021, 3 tons of morphine were used for that purpose, mostly by China (1.6 tons, or 53.5 per cent of the global total) and Italy (1.4 tons, or 46 per cent).

45. The largest share of morphine is used for conversion into other opiates, such as codeine, ethylmorphine and pholcodine (see table VI of part four), although it is important to note that codeine is increasingly obtained directly from opium poppy rich in codeine. The total amount utilized globally for conversion into other opiates stood at 266.7 tons in 2002 but increased over subsequent years, peaking at 419.8 tons in 2012, then started to decrease, dropping to 151.9 tons in 2021. 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 in the period 2002–2021, decreasing in recent years to 1.6 tons, the lowest level in the last 20 years. In 2021, France was the only country utilizing morphine for that purpose.

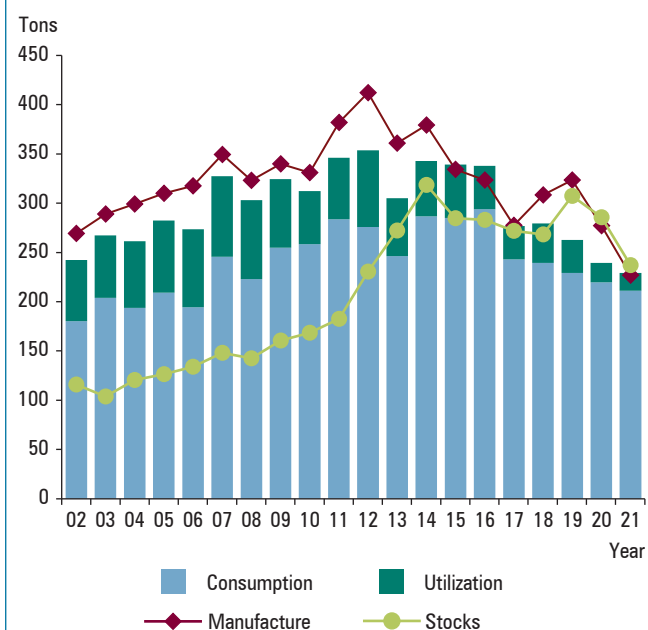
46. Global stocks of morphine stood at 135.8 tons in 2021, a slight decrease from 157.6 tons in 2020 and still in line with the average (123.3 tons) of the last 20 years. The largest stocks were held by France (40.8 tons, or 30 per cent of global stocks), followed by the United States (19.8 tons, or 14.6 per cent), Japan (14.4 tons, or 10.7 per cent), the United Kingdom (13.3 tons, or 6.2 per cent), Slovakia (6.2 tons, or 3.9 per cent), Hungary (4.9 tons, or 3.1 per cent) and Switzerland (4.3 tons, or 2.7 per cent). Other countries held stocks in quantities representing less than 2 per cent each.

## Codeine

47. Codeine is a natural alkaloid of the opium poppy plant, but most of the codeine currently being manufactured is obtained from morphine through a semi-synthetic process. As reported above, there has been an increase in the cultivation of the opium poppy variety that is rich in codeine, and in the manufacture of ACA (CPS), which is used for the extraction of codeine. Codeine is used almost entirely for the 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 2002–2021 are shown in figure 14.

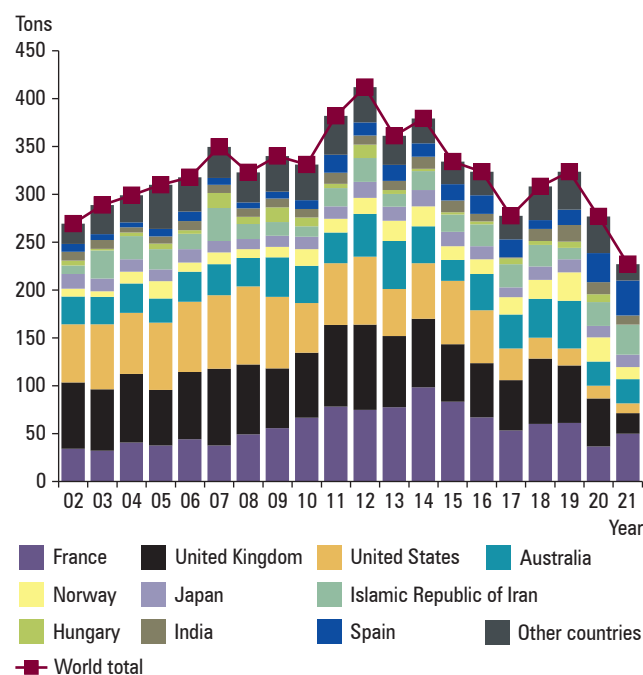
48. Global manufacture of codeine increased from 2001 until 2012, when it reached a peak of 411.9 tons. Since

**Figure 14. Codeine: global manufacture, stocks,<sup>a</sup> consumption and utilization, 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

**Figure 15. Codeine: manufacture, 2002–2021**

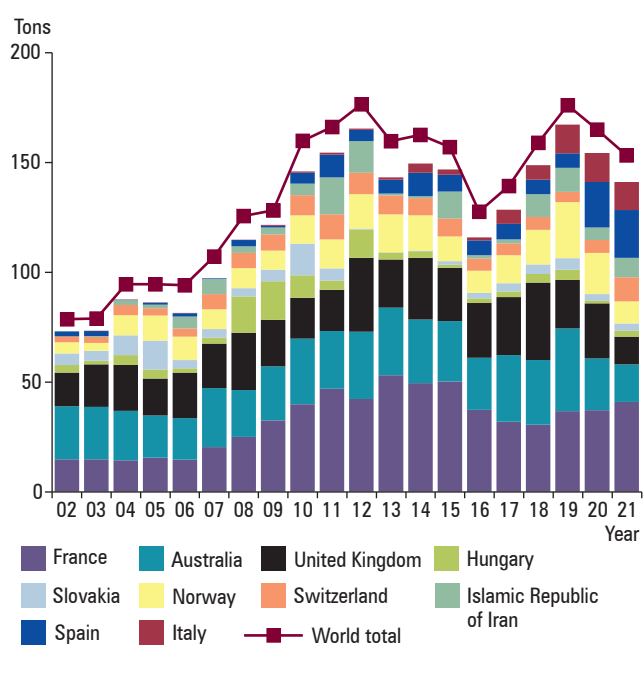


then, global manufacture has decreased, dropping to 226.9 tons in 2021. In 2021, the main manufacturing countries were France (50 tons, or 22 per cent of global manufacture), Spain (36.4 tons, or 16 per cent), the Islamic Republic of Iran (31.4 tons, or 13.9 per cent), Australia (25.1 tons, or 11.1 per cent), the United Kingdom (21.5 tons, or 9.4 per cent), Japan (12.8 tons, or 5.7 per cent), Norway (12.7 tons, or 5.6 per cent) and the United States (10.3 tons, or 4.5 per cent). Smaller quantities (less than 10 tons) were manufactured in India, Italy, Türkiye, North Macedonia, Slovakia, Argentina, the Democratic Republic of Korea and Myanmar, in descending order of the quantities manufactured (see figure 15).

49. The trend of codeine stocks follows that of manufacture. After having increased since 2002, global stocks of codeine peaked in 2014 and have been decreasing since then, amounting to 237 tons in 2021. Global stocks were mostly concentrated in the United Kingdom (65.1 tons, or 22.9 per cent of the global total), France (53 tons, or 18.7 per cent), the United States (23.2 tons, or 8.2 per cent) and Spain (20.4 tons, or 7.2 per cent). Other countries reported stocks of less than 20 tons each.

50. In 2021, global exports of codeine continued to decrease, dropping to 153.2 tons, from an all-time high level of 176.1 tons in 2019 (see figure 16). The leading exporting country for codeine in 2021 was France (40.8 tons, or 26.7 per cent of the global total), followed by Spain (21.7 tons, or 14.2 per cent), Australia (17.2 tons, or 11.2 per cent), Italy (12.8 tons, or 8.4 per cent), the

**Figure 16. Codeine: exports, 2002–2021**



United Kingdom (12.6 tons, or 8.2 per cent), Switzerland (10.9 tons, or 7.1 per cent) and Norway (10.1 tons, or 6.6 per cent). The other exporting countries accounted for less than 10 tons each of all reported exports of codeine.

51. The 11 countries importing the largest amounts of codeine in 2021 were India (39.1 tons, or 31.6 per cent of

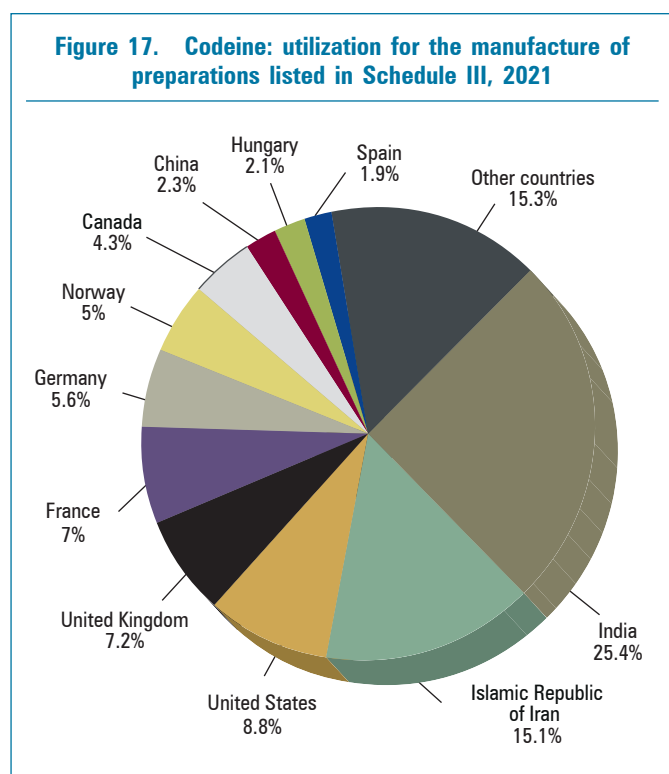


the global total), Italy (11 tons, or 10.9 per cent), Germany (11.5 tons, or 9.3 per cent), Canada (8.8 tons, or 7.1 per cent), the United Kingdom (8 tons, or 6.4 per cent), Switzerland (7.5 tons, or 6.1 per cent), Hungary (4 tons, or 3.2 per cent), Brazil and Norway (3 tons, or 2.4 per cent, each), Ireland (1.9 tons, or 1.5 per cent), Denmark (1.5 tons, or 1.2 per cent), Tunisia and Colombia (1.5 tons, or 1.2 per cent, each), Poland (1.4 tons, or 1.1 per cent), Portugal and Morocco (1.2 tons, or 1 per cent, each). Another four countries and territories (Hong Kong, China; Sri Lanka; Romania; and Oman) imported less than 1 per cent. More details on the international trade in codeine can be found in annex IV, tables 3 and 4.

52. In 2021, codeine used for the manufacture of preparations listed in Schedule III accounted for 90.8 per cent of the global consumption of codeine.<sup>15</sup> The use of codeine for that purpose grew from 174.8 tons in 2002 to 207.9 tons in 2021. Countries reporting the utilization of codeine for the manufacture of such preparations are not necessarily the countries in which the preparations are consumed. The countries manufacturing such preparations in larger quantities for subsequent export are shown in figure 17.

53. Global consumption of codeine, including in the form of Schedule III preparations, has been decreasing

<sup>15</sup>“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.



since it peaked in 2016 at 293.7 tons, and in 2021 it stood at 211 tons (see figure 14). The main countries reporting data in that respect were India (52.8 tons, or 25.4 per cent of the global total), the Islamic Republic of Iran (31.4 tons, or 15.1 per cent), the United States (18.3 tons, or 8.8 per cent), the United Kingdom (14.9 tons, or 7.2 per cent), France (14.7 tons, or 7 per cent), Germany (11.7 tons, or 5.6 per cent), Norway (10.5 tons, or 5 per cent) and Canada (10.1 tons, or 4.3 per cent) (see figure 17). Other countries with a level of codeine consumption below 10 tons, in descending order of the amounts consumed, were China, Hungary, Spain, Morocco, Romania, Italy, Türkiye, Brazil, Colombia, Tunisia, New Zealand and Portugal.

54. Utilization of codeine for the manufacture of other narcotic drugs, mainly dihydrocodeine and hydrocodone, increased steadily until reaching its highest level in 2007 (81.8 tons). Since then, utilization has gradually declined and stood at 17.9 tons in 2021. Only five countries reported the utilization of codeine for the manufacture of other narcotic drugs; among them were Japan (10.6 tons, or 59 per cent of the global total), Italy (6 tons, or 33.3 per cent), North Macedonia (0.9 tons, or 5.3 per cent) and Slovakia (0.4 tons, or 2.43 per cent). The United States reported the utilization of only 19 kg, or 0.1 per cent of the global total.

## Thebaine

55. Until the 1990s, thebaine was manufactured mainly from opium; since 1999, it has been obtained primarily from poppy straw. Thebaine may also be obtained through the conversion of oripavine or from semi-synthetic opioids, such as hydrocodone. Thebaine itself is not used in therapy, but it is an important starting material for the manufacture of a number of opioids, mainly codeine, dihydrocodeine, etorphine, hydrocodone, oxycodone and oxymorphone (all of which are substances controlled under the 1961 Convention as amended) and buprenorphine (which is a substance controlled under the Convention on Psychotropic Substances of 1971<sup>16</sup>), as well as of substances not under international control, such as the derivatives naloxone, naltrexone, nalorphine and nalbuphine.

56. Global manufacture of thebaine has increased sharply since the late 1990s because of the growing demand for oxycodone and other drugs and substances that may be derived from it. In 2021, after some fluctuations in the preceding years, global manufacture of thebaine increased again, to 139 tons, a considerable increase from 92.7 tons in 2020, but still below the record level of 156 tons in 2016 (see figure 18). The demand for medicines derived from thebaine has been fluctuating in past years owing to the

<sup>16</sup>United Nations, *Treaty Series*, vol. 1019, No. 14956.

restrictions on prescription drugs derived from thebaine imposed in the main market (the United States) in response to their misuse and the related high number of overdose deaths. Australia was the main manufacturing country in 2021 (77.9 tons, or 56 per cent of the global total), followed by the United States (33.9 tons, or 24.4 per cent), Spain (25 tons, or 18 per cent), India (0.7 tons, or 0.5 per cent) and China (0.4 tons, or 0.3 per cent). In 2021, exports of thebaine decreased slightly, to 91.4 tons. The main exporting countries in 2021 were Australia (68 tons, or 74.4 per cent of total exports) and Spain (23.3 tons, or 25.6 per cent). Smaller quantities were exported by France, the United Kingdom, the Russian Federation and the United States, in descending order of the quantities exported. The main countries importing thebaine were France (30 tons, or 32.3 per cent of the global total), Germany (21 tons, or 22.6 per cent), the United Kingdom (16.5 tons, or 17.8 per cent), Hungary (13.6 tons, or 14.6 per cent), Slovakia (3.3 tons, or 3.6 per cent), and Switzerland, Czechia and India (2.6 tons, or 2.8 per cent, each). Other countries imported less than 2 tons each.

57. The utilization of thebaine for the manufacture of other narcotic drugs decreased slightly, from 95.8 tons in 2019, to 78.7 tons in 2020, then further, to 71 tons, in 2021 (see figure 19 and table VII of part four). In 2021, The United States accounted for 40.4 per cent of the global utilization of thebaine for that purpose, or 27.9 tons, followed by France (24.3 tons, or 34.3 per cent), Hungary (14 tons, or 19.7 per cent), Switzerland (2.5 tons, or 3.5 per cent) and Slovakia (1.2 tons, or 1.7 per cent). Other countries reported the utilization of much smaller quantities.

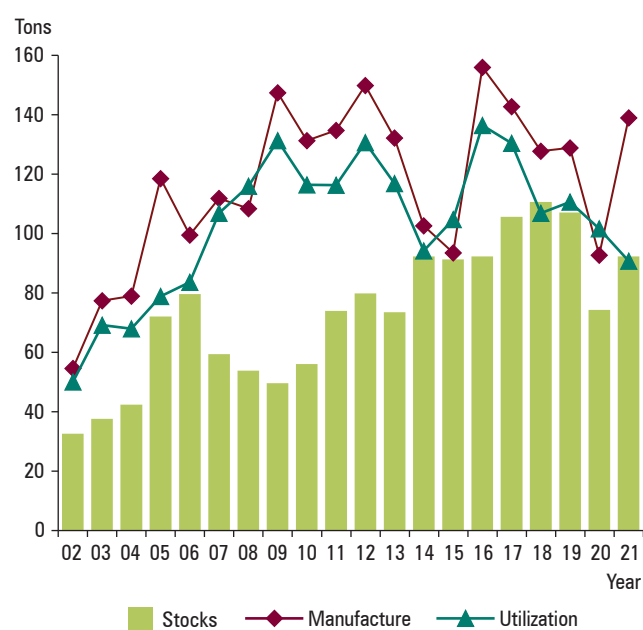
The quantity of thebaine reported to have been used for the manufacture of substances not covered under the 1961 Convention as amended (mainly buprenorphine) fluctuated during the period 2002–2021: from the peak of 24.9 tons in 2016, it decreased to 19.8 tons in 2021, with Germany, Czechia, India, Hungary and the United States, in descending order of the amounts utilized, together accounting for 100 per cent of the world total in 2021.

58. After an overall fluctuating upward trend in the period since 2000, in 2021 global stocks of thebaine stood at 92.2 tons, after reaching a record level of 110.6 tons in 2018. Major stocks were held in Australia (21.4 tons, or 23.2 per cent of the global total), the United Kingdom (14 tons, or 15.3 per cent), the United States (12.8 tons, or 13.9 per cent), Germany (12.6 tons, 13.7 per cent), France (12.2 tons, or 13.2 per cent) and Switzerland (4.7 tons, or 5.1 per cent). Other countries each reported stocks representing less than 5 per cent of the global total.

## Oripavine

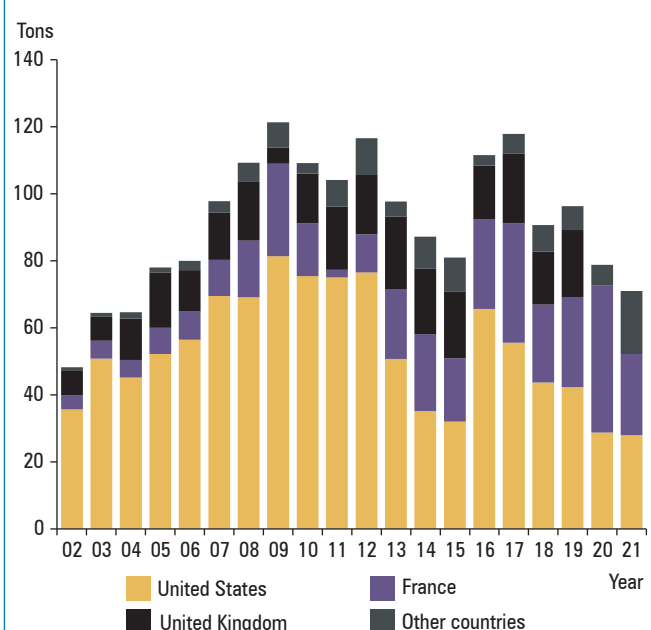
59. In 2007, oripavine was included in Schedule I of the 1961 Convention as amended. The amount of oripavine manufactured globally has been increasing since 2008 and in 2021 reached 57.8 tons, the highest level ever recorded. In 2021, manufacture of the substance was concentrated in a small number of countries: the United States (20 tons, or 34.8 per cent of global manufacture), Spain (19.2 tons, or 33.3 per cent), Australia (12.5 tons, or 21.6 per cent) and Sweden (6 tons, or 10.3 per cent). The use of oripavine in

**Figure 18. Thebaine: global manufacture, utilization and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

**Figure 19. Thebaine: utilization for the manufacture of opioids, 2002–2021**



significant quantities for the manufacture of other drugs was reported in 2021 by the main producer countries, the United States (18.6 tons, or 62.2 per cent of the global total) and Germany (11.3 tons, or 37.8 per cent); the oripavine had been used mainly to manufacture oxymorphone. In 2021, global stocks of oripavine reached 17.7 tons, close to the highest level ever registered, in 2016 (18.1 tons). Of the global stocks reported held in 2021, Germany held 13 tons, or 73.6 per cent, followed by Spain (1.7 tons, or 9.6 per cent), the United States (1.3 tons, or 7.1 per cent) and India (1 ton, or 5.9 per cent). Quantities smaller than 1 ton were held by Switzerland and Australia, and marginal quantities were held by a number of other countries.

## Semi-synthetic opioids

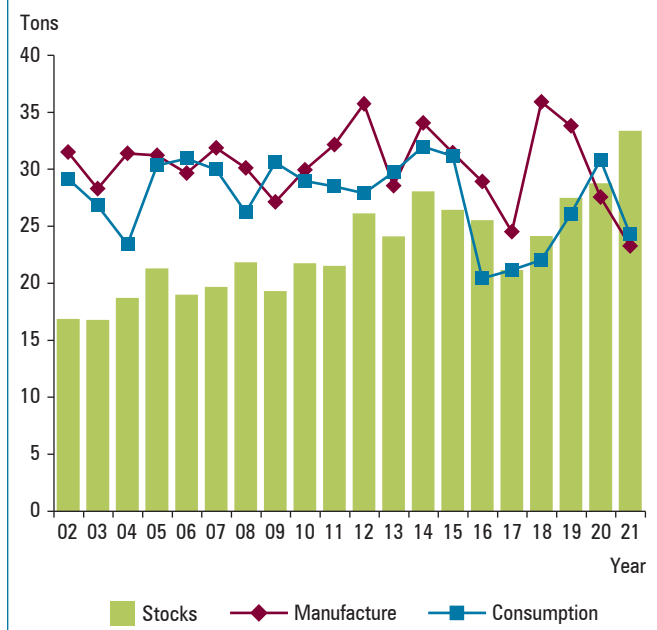
60. Semi-synthetic opioids are made by means of relatively simple chemical modifications of natural opiates such as morphine, codeine and thebaine. Some examples of semi-synthetic opioids are dihydrocodeine, ethylmorphine, heroin, hydrocodone, oxycodone and pholcodine. Some of the main manufacturing countries have reported that large losses occur during the processing of some semi-synthetic opioids.<sup>17</sup> 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, respectively.

### Dihydrocodeine

61. The level of global manufacture of dihydrocodeine has remained relatively stable for the last 20 years, averaging about 30 tons per year, and peaked in 2018 at 35.9 tons. In 2021, the quantity manufactured worldwide decreased to 23.2 tons (see figure 20). The countries manufacturing the most significant quantities continued to be Japan (10 tons, or 43.1 per cent of the global total), the United Kingdom (7.4 tons, or 31.9 per cent), Italy (5.1 tons, or 22.1 per cent), Slovakia (0.3 tons, or 1.7 per cent) and China (0.2 tons, or 1.1 per cent). Global exports of dihydrocodeine amounted to 7.4 tons in 2021. The main exporting country was Italy (4.4 tons, or 59.2 per cent of global exports), followed by the United Kingdom (1.6 tons, or 21.1 per cent), Switzerland (0.8 tons, or 11.4 per cent), Slovakia (0.4 tons, or 4.8 per cent) and the Netherlands (0.2 tons, or 2.6 per cent). Other countries exported less than 2 per cent of the global total. In 2021, the United

<sup>17</sup>Manufacturing losses are those occurring: (a) during the process of refining a drug; (b) during the process of transformation of a drug into its salts, isomers, esters and ethers, as applicable according to the schedules; and (c) during the manufacture of preparations other than those included in Schedule III of the 1961 Convention as amended. They may also be due to the chemical decomposition of a drug, leakage, evaporation, quality requirements or accidents.

Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021



<sup>a</sup>Stocks as at 31 December of each year.

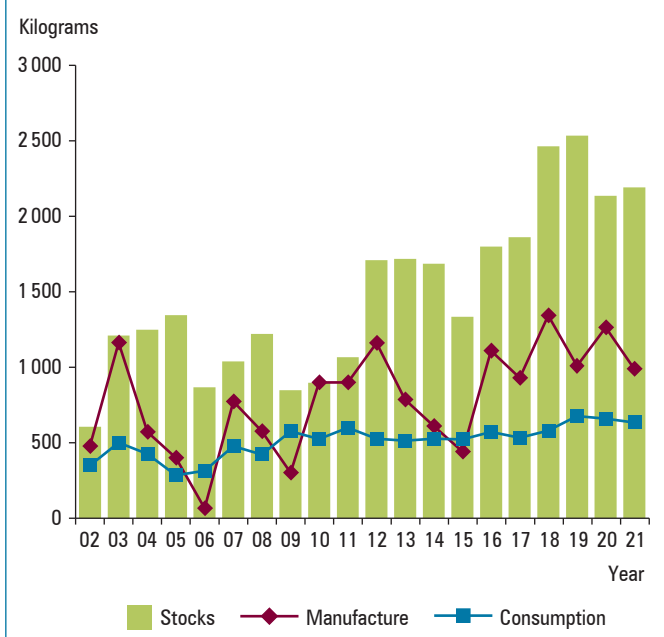
Kingdom continued to be the leading importing country for dihydrocodeine (3.5 tons, or 48.5 per cent of global imports), followed by Colombia (1 ton, or 14.5 per cent), Switzerland (0.9 tons, or 13.6 per cent), Austria and the Republic of Korea (0.3 tons, or 4 per cent, each). Other countries each imported less than 4 per cent of the global total.

62. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention as amended, which accounted for 85.2 per cent of the total consumption of dihydrocodeine in 2021. The main user countries for this purpose, in descending order of the amounts used, were the United Kingdom, Japan, the Republic of Korea and China. Those four countries together accounted for 98.3 per cent of the global total. In 2021, the amount of dihydrocodeine used for direct consumption totalled 3.6 tons, or 14.7 per cent of the total consumption of the substance. Global stocks of dihydrocodeine amounted to 33.4 tons, the highest level since 2002. Major stocks were held in Japan (10 tons, or 43.1 per cent of the global total), the United Kingdom (7.4 tons, or 31.9 per cent), Italy (5.1 tons, or 22.1 per cent), Slovakia (0.4 tons, or 1.6 per cent) and China (0.2 tons, or 1.2 per cent).

### Ethylmorphine

63. The manufacture of ethylmorphine fluctuated over the 20-year period 2002–2021, with a global yearly average of 1.4 tons. In 2021, global manufacture of the substance

**Figure 21. Heroin: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

continued to decrease, dropping to 0.1 tons, from 0.4 tons in 2020. The only country manufacturing the substance was Hungary. Both exports (0.3 tons) and imports (0.4 tons) were limited. The countries exporting ethylmorphine were, in descending order of the amounts exported, France, Türkiye, Hungary, Switzerland and the Netherlands. The importing countries and territories were, in descending order of the amounts imported, Tunisia; Bulgaria; Hong Kong, China; the Netherlands; Czechia; Switzerland; Uruguay; Poland; Belgium; Sweden; and Luxembourg. About 80.7 per cent of the total amount of ethylmorphine consumed was in the form of preparations listed in Schedule III of the 1961 Convention as amended. Global consumption also decreased, to 0.2 tons, in 2021. The main consumer countries in 2021 were France (47.6 kg, or 26.2 per cent of global consumption) and Sweden (40 kg, or 21.5 per cent), followed by Hungary, India, Tunisia and Türkiye, in descending order of the amounts consumed, all of which reported consumption of less than 30 kg but more than 10 kg. In 2021, global stocks of ethylmorphine totalled 2.1 tons; the largest holder of stocks was France (1 ton). India, Hungary, Sweden and Türkiye, in descending order of the amounts held in stock, held more than 70 kg.

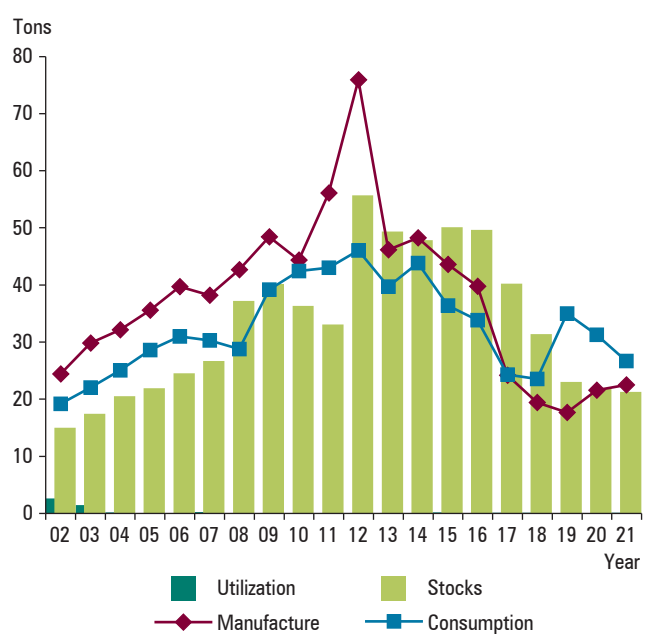
## Heroin

64. Over the past 20 years, the global quantity of licitly manufactured heroin averaged 788 kg per year, amounting to more than 1,000 kg in some years. In 2021, a total of 989.2 kg of heroin was licitly manufactured, mostly in

Switzerland (550.4 kg, or 55.6 per cent of the global total), the United Kingdom (376.8 kg, or 38.4 per cent) and Spain (62 kg, or 6.3 per cent) (see figure 21). Exports of heroin in 2021 were from Switzerland (1.3 tons, or 58.6 per cent of total exports), the United Kingdom (570.2 kg, or 26.1 per cent) and Spain (62 kg, or 6.3 per cent). In 2021, the main importing country was the Netherlands (1.1 tons, or 53.2 per cent of total imports), followed by Switzerland (780 kg, or 36.2 per cent), Germany (117.2 kg, or 5.4 per cent), Canada (51.7 kg, or 2.4 per cent), Denmark (41.3 kg, or 2 per cent) and the United Kingdom (17.7 kg, or 0.7 per cent).

65. Global consumption of heroin decreased slightly, from 658.5 kg in 2020 to 633 kg in 2021. Switzerland, where heroin is prescribed for individuals with long-term opiate dependency, reported the consumption of 376.7 kg of heroin in 2021 (59.5 per cent of global consumption). Other countries reporting significant heroin consumption for medical purposes in 2021 were Germany (123.4 kg, or 19.5 per cent of the global total), the Netherlands (87.8 kg, or 13.9 per cent), Canada (27.5 kg, or 4.3 per cent) and the United Kingdom (15 kg, or 2.4 per cent). Global stocks of heroin remained stable at 2.2 tons in 2021. The countries holding significant stocks in 2021 were the Netherlands (952 kg, or 43.4 per cent of the global total), Switzerland (843.1 kg, or 38.5 per cent), the United Kingdom (154 kg, or 7 per cent), Germany and Canada (80 kg, or 3.6 per cent, each) and Denmark (28.3 kg, or 1.3 per cent). Other countries each held stocks amounting to less than 1 per cent of the global total.

**Figure 22. Hydrocodone: global manufacture, consumption, utilization<sup>a</sup> and stocks,<sup>b,c</sup> 2002–2021**



<sup>a</sup>Utilization for the manufacture of other drugs.

<sup>b</sup>Stocks as at 31 December of each year.

<sup>c</sup>Considerable losses occur in the manufacturing process of this substance. This explains some gaps between the figures for manufacture and those for consumption/stocks.



## Hydrocodone

66. In 2021, global manufacture of hydrocodone increased to 22.5 tons, a slight increase from 21.5 tons in the previous year but still well below the peak of 75.9 tons manufactured in 2012 (see figure 22). The United States accounted for almost all (99.9 per cent) of global manufacture. China and the United Kingdom manufactured considerably smaller quantities.

67. In 2021, global consumption of hydrocodone decreased to 26.6 tons, from 31.2 tons in 2020. The United States accounted for almost all (98.9 per cent) of the global consumption of the substance. Colombia reported the consumption of 251.6 kg, or 0.9 per cent of the global total,

followed by Canada (13 kg, or 0.1 per cent). Several other countries reported consumption in minimal amounts.

68. 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 has been reported since 2003, as direct extraction of thebaine from poppy straw has been gradually replacing the use of hydrocodone in the manufacture of thebaine since the late 1990s. While most consumption of hydrocodone took place in the United States, some quantities of the substance were exported by the United States (167.1 kg, or 80.2 per cent of global exports), the Islamic Republic of Iran (33.7 kg, or 16.2 per cent) and Slovakia (4.5 kg, or 2.1 per cent). The United States held 98.9 per cent of global stocks.

**Table 1. Consumption of heroin for medical purposes in assisted treatment programmes, 2011–2021**

	<i>Canada<sup>a</sup></i>	<i>Denmark</i>	<i>Germany</i>	<i>Luxembourg<sup>b</sup></i>	<i>Netherlands</i>	<i>Spain</i>	<i>Switzerland</i>	<i>United Kingdom<sup>c</sup></i>
Year of establishment of programme	2003	2009	2000	2017	1998	2002	1994	1920s
Number of persons enrolled in programme (in year given)	110 (2016)	450 (2015)	628 (2016)	n/a	668 (2019)	n/a	1 644 (2015)	n/a
Form of dosage	Injection, tablet	Injection	Injection, tablet	Tablet, inhalation	Tablet, inhalation	Injection	Injection, tablet	Injection, tablet
Maximum daily dosage	n/a	110–600 mg	1 000 mg	n/a	1 000 mg	600 mg	450 mg	n/a
<i>Amount of heroin consumed in assisted treatment programmes (kg)</i>								
2011	..	29.755	29.028	n/a	134.684	1.745	237.872	160.000
2012	4.742	26.101	52.835	n/a	138.019	2.181	250.459	47.511
2013	10.661	30.998	75.311	n/a	137.129	8.391	242.002	7.821
2014	5.468	31.190	71.840	n/a	134.344	1.746	240.554	39.585
2015	14.030	30.216	78.850	n/a	91.561	1.819	263.631	40.346
2016	13.664	41.699	60.732	n/a	159.865	2.467	255.712	36.792
2017	14.533	20.904	90.183	1.292	114.537	0.873	256.884	32.432
2018	6.640	28.261	110.930	4.605	111.314	1.061	281.848	34.258
2019	25.419	28.895	124.140	5.915	135.717	1.747	318.484	35.000 <sup>d</sup>
2020	25.842	..	120.079	9.555	121.668	1.751	361.851	16.616
2021	27.500	..	123.412	..	87.843	1.790	376.705	15.026

*Note:* The annotation “n/a” signifies that information for this item was not available. Two dots (..) signify that statistical information was furnished but data were not submitted for this specific item.

<sup>a</sup>After the trials of the North American Opiate Medication Initiative (NAOMI) and the Study to Assess Longer-term Opioid Medication Effectiveness (SALOME), patients applied for diacetylmorphine through the Canadian special access scheme.

<sup>b</sup>Heroin-assisted treatment is conducted in the framework of the “Traitement assisté à la diacétylmorphine” (TADIAM) pilot project, for which the first activity report has not yet been published.

<sup>c</sup>In 2017, the United Kingdom launched new heroin-assisted programmes at the demand of the Advisory Council on the Misuse of Drugs and as a decision of the Glasgow City Integration Joint Board. In the United Kingdom, heroin is also used to relieve the severe acute pain caused by injuries, in cases of myocardial infarction and pulmonary oedema and in palliative care.

<sup>d</sup>This figure was calculated by INCB using the available data series. It is being followed up with the Government.



## Hydromorphone

69. Global manufacture of hydromorphone decreased sharply in 2021, to 3.6 tons, from 7.9 tons in 2020. The leading manufacturing countries in 2021 were the United Kingdom (1.2 tons, or 33.5 per cent of global manufacture), the United States (1.1 tons, or 32 per cent), Denmark (0.7 tons, or 19.5 per cent), Slovakia (0.4 tons, or 11.2 per cent) and Japan (0.1 tons, or 2.9 per cent). Total exports of hydromorphone remained stable at 2.8 tons in 2021. The leading exporting countries were the United Kingdom (1.1 ton, or 40.1 per cent of global exports), the United States (435.4 kg tons, or 15.6 per cent), Slovakia (405.7 kg, or 14.6 per cent) and Switzerland (366.8 kg, or 13.2 per cent). A number of countries exported quantities amounting to less than 10 per cent each. In 2021, Canada was the main importing country (939.7 kg, or 33.1 per cent of global imports), followed by Germany (706.9 kg, or 24.9 per cent) and Switzerland (435 kg, or 15.3 per cent). Other countries imported less than 10 per cent each.

70. In 2021, consumption of hydromorphone remained relatively stable at 3.3 tons, compared with 3.4 tons in 2020. The United States continued to be the main consumer country in 2021 (1.3 tons, or 40.1 per cent of global consumption), followed by Canada (0.9 tons, or 27.2 per cent), Germany (0.7 tons, or 22.2 per cent) and Austria (0.1 tons, or 3.7 per cent). Global stocks of hydromorphone in 2021 stood at 6.4 tons, of which 1.8 tons (29.4 per cent) were held in the United States, 0.9 tons (15 per cent) in Germany, 0.8 tons (12.6 per cent) in Canada and 0.7 tons (11.9 per cent) in the United Kingdom. Other countries held stocks amounting to less than 10 per cent each.

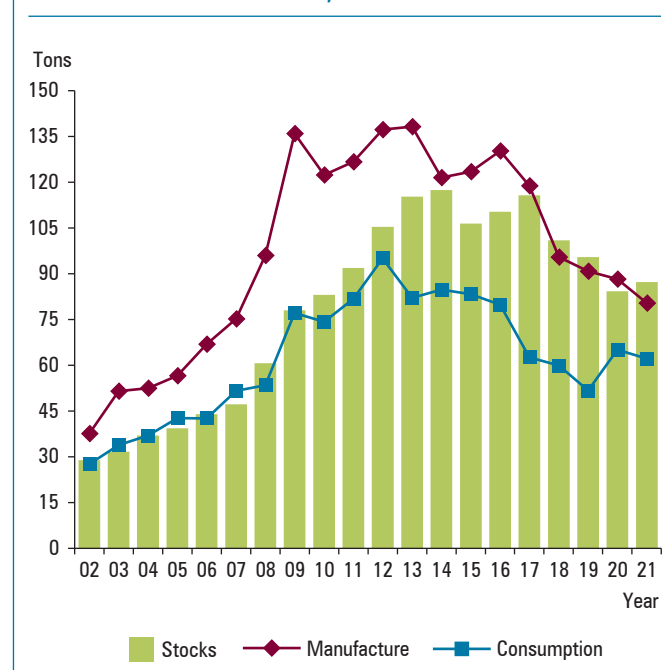
## Oxycodone

71. Oxycodone has, over the last 20 years, been one of the drugs commonly associated with overdose deaths in relation to prescription drug misuse, in particular in North America. Global manufacture of oxycodone increased after 2002, reaching a record high of 138.1 tons in 2013. Since then, manufacture has decreased gradually, dropping to 80.3 tons in 2021 (see figure 23). The decreasing trend in manufacture may be attributable to stricter control measures introduced in some countries where the risk of overdose deaths and misuse of oxycodone is significant. In 2021, the United States accounted for 40.3 per cent of global manufacture, or 32.3 tons, followed by France (21 tons, or 26.3 per cent), Hungary (11.8 tons, or 14.7 per cent), the United Kingdom (10.4 tons, or 13 per cent), Switzerland (2.5 tons, or 3.2 per cent) and Slovakia (1.2 tons, or 1.5 per cent). After reaching a record high level of 41.1 tons in 2018, global exports decreased to 37.7 tons in 2020, then increased slightly, to 42.6 tons, in 2021. The United Kingdom continued to be the main

exporting country in 2021 (14.6 tons, or 34.2 per cent of global exports), followed by the United States (11.7 tons, or 27.4 per cent), the Netherlands (3.2 tons, or 7.5 per cent), Switzerland (3 tons, or 7.2 per cent), France (2.2 tons, or 5 per cent), Germany (2 tons, or 4.7 per cent), Austria (1.5 tons, or 3.5 per cent) and Bulgaria (1.2 tons, or 2.8 per cent). The countries importing the most significant quantities were the United Kingdom (10.4 tons, or 24.7 per cent of the global total), Germany (5 tons, or 12 per cent), Switzerland (4.6 tons, or 11 per cent), the Netherlands (4.1 tons, or 9.8 per cent), Austria (2.4 tons, or 5.7 per cent), Canada (2.2 tons, or 5.3 per cent), France (1.7 tons, or 4 per cent), Australia (1.4 tons, or 3.3 per cent), Bulgaria (1.2 tons, or 3 per cent) and Italy (1 ton, or 2.5 per cent). Further details on exports and imports of oxycodone are contained in annex IV, tables 3 and 4.

72. Despite the decrease in manufacture in recent years, global consumption of oxycodone remained relatively stable, at 62 tons, in 2021. Consumption of oxycodone was concentrated in the United States (42.3 tons, or 68.2 per cent of the global total). Other major consumer countries in 2021, in descending order of the amounts consumed, were Germany (2.8 tons, or 4.5 per cent), Canada (2.2 tons, or 3.5 per cent), the United Kingdom (2 tons, or 3.3 per cent), France (1.6 tons, or 2.6 per cent) and Australia (1.4 tons, or 2.3 per cent). Global stocks of oxycodone also remained relatively stable, at 87.2 tons, with the United

**Figure 23. Oxycodone: global manufacture, consumption and stocks,<sup>a,b</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

<sup>b</sup>Considerable losses occur in the manufacturing process of this substance, which explains some of the gaps between the figures for manufacture and those for consumption and stocks.

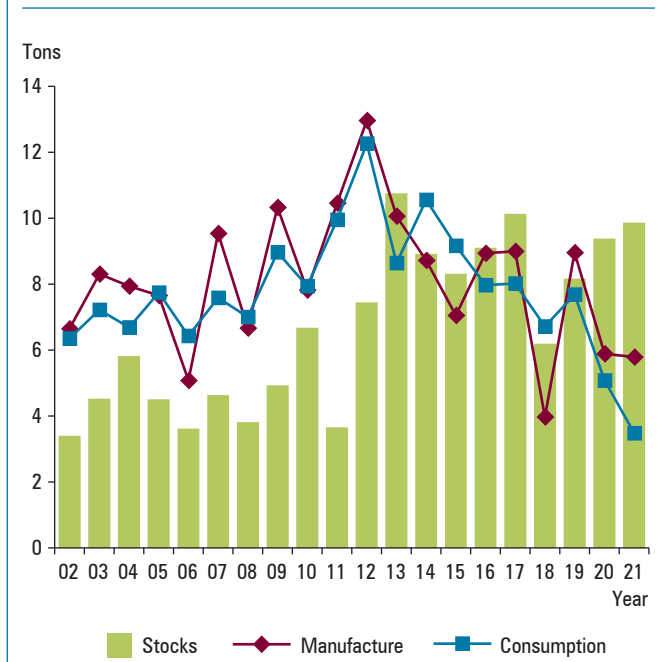
States holding 37.9 tons, or 43.4 per cent of the world total, followed by France (14.3 tons, or 16.4 per cent), the United Kingdom (7.2 tons, or 8.3 per cent), and other countries holding stocks of less than 6 tons each.

## Pholcodine

73. During the 20-year period 2002–2021, global manufacture and consumption of pholcodine were characterized by volatile trends. Manufacture dropped from its peak of 13 tons in 2012 to 3.9 tons in 2018, increased again to 8.9 tons in 2019, then dropped again, to 5.8 tons, in 2021 (see figure 24). The fluctuations may be related to health concerns about the use of pholcodine that were not confirmed by a review carried out in 2012 by the European Medicines Agency. The main manufacturing countries in 2021 were France (3.1 tons, or 53 per cent of the global total), Hungary (1.2 tons, or 21.6 per cent), Norway (0.6 tons, or 10.3 per cent) and Slovakia (0.5 tons, or 8.2 per cent). Other countries that each manufactured quantities amounting to less than 10 per cent of the global total were, in descending order of the quantities manufactured, Slovakia, China, India and North Macedonia. Total exports of pholcodine decreased from 7.3 tons in 2019 to 4.5 tons in 2021. The exports were mostly from France (1.7 tons, or 37.3 per cent of global exports), Hungary (1.1 tons, or 25 per cent), Norway (0.6 tons, or 13 per cent) and Slovakia (0.5 tons, or 11.5 per cent). The United Kingdom, North Macedonia, Slovenia and the Netherlands, in descending order of the quantities exported, exported smaller quantities. The main destinations were Hong Kong, China (1 ton, or 44.4 per cent of global imports), Italy (0.3 tons, or 14.1 per cent) and South Africa (0.2 tons, or 10.4 per cent). The other importing countries each 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.

74. In 2021, global consumption of pholcodine (the total of the amount directly consumed and the amount utilized for the manufacture of preparations in Schedule III of the 1961 Convention as amended) decreased to 3.5 tons, from 5 tons in 2020. The main consumer countries and territories were Hong Kong, China (1.1 tons, or 31.3 per cent of the global total), China (0.9 tons, or 25.6 per cent), Italy (0.4 tons, or 10.4 per cent), Egypt and France (0.2 tons, or 6.5 per cent, each) and Australia (0.2 tons, or 5.6 per cent). The countries reporting the largest share of direct consumption of pholcodine in 2021 were Australia (0.2 tons, or 54.3 per cent of the global total), New Zealand (0.05 tons, or 15.2 per cent) and Croatia (0.04 tons, or 13.3 per cent). In 2021, global stocks of pholcodine remained stable at 9.9 tons. Major stocks were held by France, Hungary, Norway Slovakia, China, India and North Macedonia, in descending order of the amounts held.

**Figure 24. Pholcodine: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

## Synthetic opioids

75. 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.

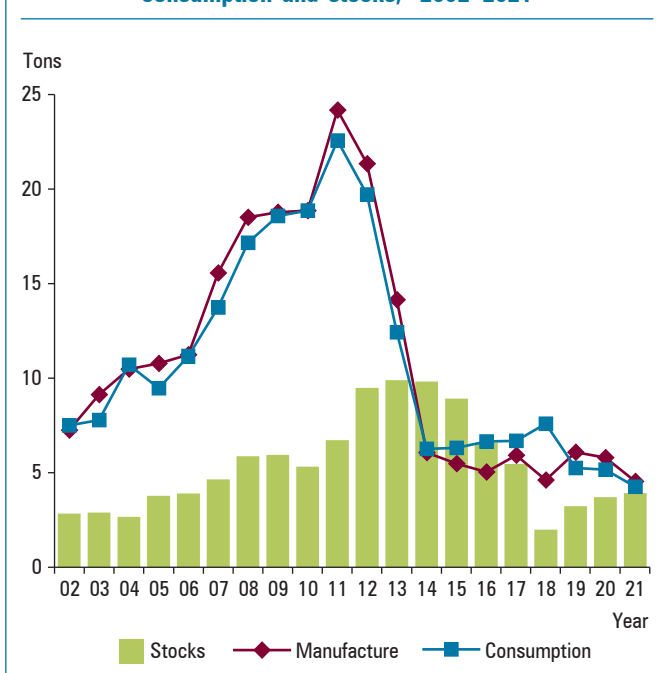
### Dextropropoxyphene

76. 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 the substance. Since then, global manufacture has continued to be nil or negligible, and this trend continued in 2020 and 2021, when no manufacture of the substance was reported. The trend 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. Consequently, little or no consumption, exports or imports have been reported, while 15.9 tons were held in stock, mostly in India (92.6 per cent).

### Diphenoxylate

77. Diphenoxylate is used mostly as an antidiarrhoeal agent. Global manufacture of diphenoxylate trended upward after 2003, reaching a peak of 24.2 tons in 2011,

**Figure 25. Diphenoxylate: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

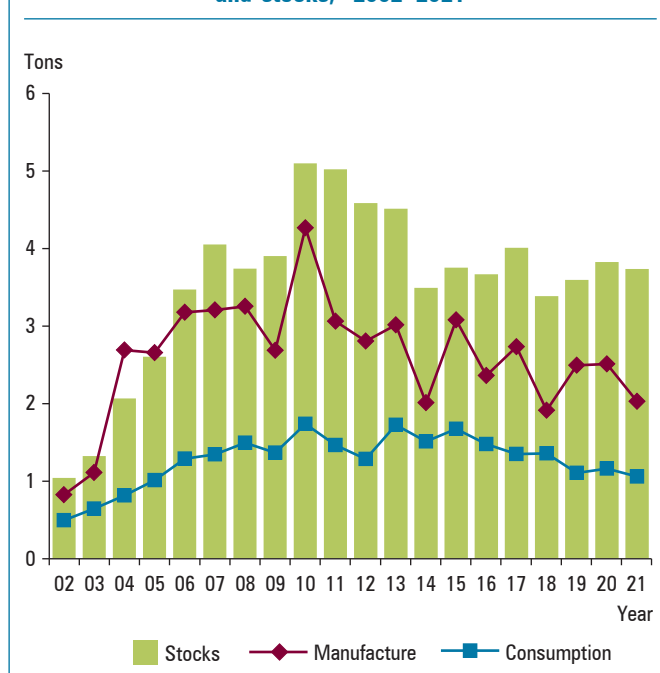
dropping significantly in 2014 and then remaining at an annual level of manufacture of about 5 tons. In 2021, global manufacture stood at 4.5 tons (see figure 25). Most of the drop in the manufacture over the period 2012–2021 may be attributable to a regulatory measure introduced in India following the raising of concerns related to potential misuse. In 2021, most of the global amount manufactured was reported by India (3.5 tons, or 78.4 per cent), China (0.6 tons, or 14.3 per cent) and the United States (0.3 tons, or 7.3 per cent). India remained the leading exporter of diphenoxylate (0.7 tons, or 92.1 per cent of the global total). The main importing countries in 2021 were the Islamic Republic of Iran (0.4 tons, or 45.4 per cent of global imports) and Pakistan (0.3 tons, or 39.6 per cent).

78. Diphenoxylate was consumed in the form of preparations listed in Schedule III of the 1961 Convention as amended. Global consumption decreased to 4.2 tons in 2021, from 5.1 tons in 2020. The countries reporting the highest consumption (the total of the amount directly consumed and the amount utilized for the manufacture of preparations in Schedule III) in 2021 were India (1.9 tons, or 44.4 per cent of the global total) and China (1.3 tons, or 31.6 per cent). In 2021, global stocks of diphenoxylate increased to 3.9 tons, most of which were held by India (1.7 tons, or 44 per cent of the global total), China (1.4 tons, or 36 per cent) and Pakistan (0.3 tons, or 8.9 per cent).

## Fentanyl

79. Fentanyl, when used as an analgesic, is about 100 times more potent than morphine and is therefore used

**Figure 26. Fentanyl: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

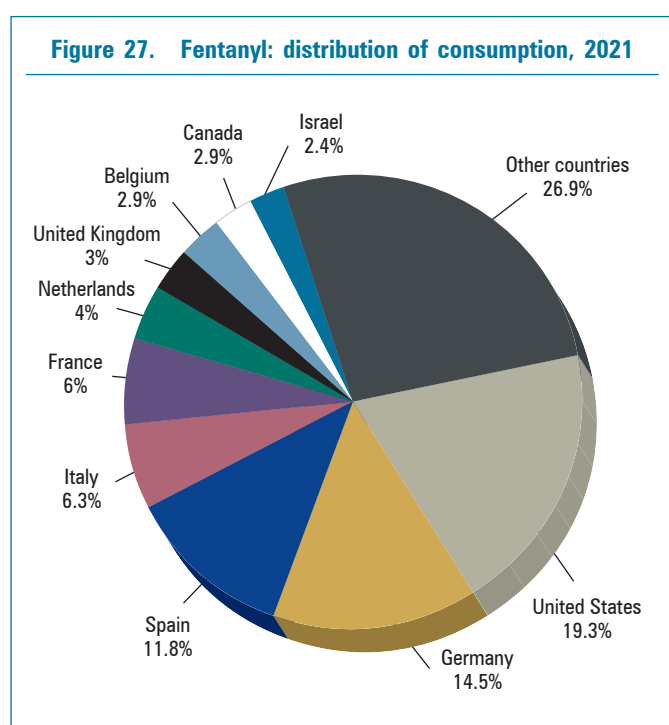
only in very small doses (for example, 0.005–0.1 mg in injectable form). Until the 1980s, fentanyl was used mainly for the induction of anaesthesia and, in combination with other substances, for balanced anaesthesia in short-term surgical interventions. Since the early 1990s, however, controlled-release 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.

80. Global manufacture of fentanyl increased rapidly in the period 2000–2010, reaching a record level of 4.3 tons in 2010. After that, manufacture decreased for several years, dropping to 1.9 tons in 2018, but increased again in 2019 and 2020, stabilizing in 2021, when 2 tons were reported as having been manufactured (see figure 26). The United States was the country reporting the highest level of fentanyl manufacture in 2021 (756.8 kg, or 37.4 per cent of the global total), and was followed by Germany (567.8 kg, or 28 per cent), Belgium (376.8 kg, or 18.6 per cent) and the United Kingdom (236.3 kg, or 11.7 per cent). The principal exporting countries were Germany (426.9 kg, or 39.5 per cent of global exports), Belgium (218.8 kg, or 20.2 per cent) and the United States (192 kg, or 17.8 per cent). Other countries exported quantities of less than 100 kg each. Germany was also the principal importing country for fentanyl in 2021 (465.9 kg, or 33.7 per cent of the global total), followed by Spain (130.5 kg, or 9.5 per cent), Italy (82 kg, or 6 per cent), Greece (63.5 kg, or 4.6 per cent), France (61.7 kg, or 4.5 per cent), Brazil (53.4 kg, or 3.9 per cent), the United Kingdom (49.8 kg, or 3.6 per cent) and the Netherlands (45.8 kg, or

3.3 per cent). Some other countries imported quantities of less than 40 kg each. Further details on exports and imports of fentanyl are contained in annex IV, tables 3 and 4.

81. Since 2005, global consumption of fentanyl has fluctuated between 1 ton and 1.7 tons, with an average annual consumption of 1.3 tons in the period 2002–2021. In 2021, global consumption amounted to 1 ton. The downward trend observed since 2010, when global consumption peaked at 1.73 tons, may be associated with continued concerns about the number of overdose deaths attributed to the misuse 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 are not necessarily licitly prescribed medications that are diverted, national authorities have placed restrictions on the prescription of fentanyl. In 2021, 10 countries accounted for most of the global consumption of fentanyl (73.2 per cent); they are all high-income countries (see figure 27). The three countries reporting the highest level of consumption were the United States (203.3 kg, or 19.3 per cent of the global total), Germany (152.2 kg, or 14.5 per cent), and Spain (124.6 kg, or 11.8 per cent). Other countries reporting significant consumption of fentanyl were, in descending order of the amounts reported consumed, Italy, France, the Netherlands, the United Kingdom, Belgium, Canada and Israel.

82. In 2021, global stocks of fentanyl stood at 3.7 tons, approximately the same level as in 2020 and significantly lower than the peak reached in 2010 (5.1 tons). The largest stocks were reported by Germany (1.8 tons, or 47.7 per cent of the global total), the United States (0.5 tons, or 15.2 per cent) and Belgium (0.4 tons, or 10.8 per cent).



## Fentanyl analogues

83. The fentanyl analogues alfentanil, remifentanil and sufentanil are used mainly as anaesthetics. Their use increased in some countries during the coronavirus disease (COVID-19) pandemic, as reported below.

### Alfentanil

84. Alfentanil is a potent opioid analgesic indicated for analgesia and suppression of respiratory activity in mechanically ventilated patients in intensive care and to provide analgesic cover for painful manoeuvres.

85. The manufacture of alfentanil has fluctuated significantly in the last 20 years. In 2012, global manufacture reached 78.3 kg, after having reached its lowest level in 2009, when only 5.6 kg of the substance were manufactured. Global manufacture of alfentanil increased again in 2021, reaching 92.7 kg, the highest level in the last 20 years. The increase may have been due to the increasing demand related to the use of alfentanil for the treatment of people affected by COVID-19 in intensive care. Most of the global amount manufactured in 2021 was reported by Belgium (59.6 kg, or 64.3 per cent), Slovakia (25 kg, or 27.1 per cent) and China (4.3 kg, or 4.6 per cent).

86. In 2021, global consumption of alfentanil stood at 32 kg, a slight increase compared with 28.7 kg in 2020. The United Kingdom was the main consumer country, accounting for 21.5 kg, or 32 per cent of the global total, followed by China (2.8 kg, or 8.7 per cent). Brazil, France, Germany, Denmark, Australia, Italy and Portugal, in descending order of the amounts reported consumed, were the other countries reporting levels of consumption of the substance above 1 per cent. Detailed information on the consumption of fentanyl analogues is provided in table XIII.1 of part four. In 2021, global stocks of alfentanil increased to 108.3 kg, another sign of the increasing demand related to the COVID-19 pandemic. With stocks of 33.7 kg, or 31.1 per cent of the global total, Belgium continued to be the main holder of global stocks of alfentanil, followed by the United Kingdom (25.6 kg, or 23.6 per cent), Greece (14.5 kg, or 13.4 per cent), Slovakia (10.6 kg, or 9.8 per cent), Germany (8.3 kg, or 7.6 per cent) and the Netherlands (3.6 kg, or 3.3 per cent). Other countries held in stock quantities of less than 3 kg each.

### Remifentanil

87. 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 more potent than



morphine. Like alfentanil, there were increases in the manufacture, consumption and stocks of remifentanil, probably related to increasing demand created by COVID-19-related health needs. In 2002, global manufacture of remifentanil stood at 27.4 kg. The highest level in the last two decades, 211.8 kg, was recorded in 2021, representing an increase from 139 kg in 2020. In 2021, China continued to be the main manufacturing country, accounting for 66.3 kg, or 31.3 per cent of total manufacture. It was followed by Belgium (35.8 kg, or 16.9 per cent), Argentina and Germany (28 kg, or 13.2 per cent, each) and Spain (23.5 kg, or 11 per cent). The main exporting countries in 2021 were, in descending order of the amounts exported, Germany, Italy, Spain, China, Slovakia and Serbia, together accounting for a total of 81.3 kg, or 77 per cent of global exports. Türkiye was the main importing country, accounting for 14.5 kg, or 13.8 per cent of global imports, followed by Serbia (12.4 kg, or 11.8 per cent), Germany (10 kg, or 9.5 per cent), Japan (8.9 kg, or 8.5 per cent), Greece (7.2 kg, or 6.9 per cent) and the Republic of Korea (6.2 kg, or 6 per cent).

88. In 2021, global consumption of remifentanil increased to 162.3 kg, the highest level recorded since 2002. The countries reporting the highest level of consumption of the substance were China (48.3 kg, or 29.8 per cent of global consumption), Argentina (29 kg, or 17.9 per cent), Germany (17.9 kg, or 11 per cent), Türkiye (10.8 kg, or 6.7 per cent), Brazil (9 kg, or 5.6 per cent), Japan (7.9 kg, or 4.9 per cent), the Republic of Korea (4.8 kg, or 3 per cent), Spain (3.8 kg, or 2.3 per cent) and Colombia (3.1 kg, or 1.9 per cent). A number of other countries reported consumption in quantities of less than 3 kg each. As mentioned above, likely because of the demand for remifentanil related to the COVID-19 pandemic, stocks increased in 2021, reaching 257.4 kg, up from 206.7 kg in 2020. Most of the global stocks were held by China (101.9 kg, or 39.6 per cent), Belgium (40.3 kg, or 15.7 per cent), Italy (19.5, or 7.6 per cent), the United Kingdom (15 kg, or 5.8 per cent) and Germany (14.5 kg, or 5.6 per cent).

### Sufentanil

89. The manufacture of sufentanil increased in 2021 but not as much as that of the other fentanyl analogues. Global manufacture of the substance increased slightly, to 12 kg, from 10.2 kg in 2020. The main manufacturing countries were China (4.9 kg, or 40.5 per cent of the global total), Belgium (4.4 kg, or 36.8 per cent), the United Kingdom (1.5 kg, or 12.3 per cent) and Slovakia (1 kg, or 8.9 per cent). The main exporting countries were Slovakia (3 kg, or 34.8 per cent of global exports), Belgium (2.8 kg, or 33.4 per cent), Serbia (0.6 kg, or 7.4 per cent), Germany (0.5 kg, or 6.5 per cent), and the United States (0.4 kg, or 4.4 per cent). Other countries exported less than 0.3 kg each. In 2021, global consumption of sufentanil increased

to 6.6 kg. The countries reporting the highest level of consumption of sufentanil were, in descending order of the amounts consumed, China, Germany, France, the United States and Italy, which together accounted for 5.9 kg, or 90 per cent of the global total. In 2021, global stocks of sufentanil increased to 26.5 kg, most of which were held by China (13.6 kg, or 51.4 per cent), Belgium (2.3 kg, or 8.7 per cent), Slovakia and Greece (1.9 kg, or 7 per cent, each), Germany (1.8 kg, or 6.7 per cent), the United Kingdom (1.5 kg, or 5.7 per cent) and the United States (1 kg, or 3.9 per cent).

### Ketobemidone

90. Ketobemidone is a powerful opioid analgesic with an effectiveness against pain similar to that of 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 in 2016, 2017, 2019 or 2020. In 2021, only 0.6 kg were reported as having been manufactured. Global stocks of ketobemidone amounted to 89.6 kg in 2021, down from 170.2 kg in 2020. In 2021, a total of 75.2 kg of the substance were exported, mainly by Germany (54.9 kg, or 73 per cent of global exports) and France (18.3 kg, or 26 per cent), with smaller amounts being exported by Denmark and Norway. Sweden held 21 kg, or 33.8 per cent of global stocks, followed by Germany (14.2 kg, or 24 per cent), Norway (12.2 kg, or 20.6 per cent) and Denmark (11.8 kg, or 20 per cent).

### Methadone

91. Methadone, together with buprenorphine (which is controlled under the 1971 Convention), is sometimes used for pain management, but is primarily used in the treatment of opioid dependence. As shown in figure 28, the trends related to its consumption, manufacture and stocks show an overall gradual increase over the 20-year period 2002–2021, albeit with some fluctuations. The manufacture of methadone increased again in 2021, reaching 46 tons, compared with 42.4 tons in 2020. The main manufacturing countries were the United States (18.9 tons, or 41 per cent of global manufacture) and Switzerland (14.8 tons, or 32.2 per cent), followed by the Islamic Republic of Iran (5.2 tons, or 11.3 per cent), India (3.7 tons, or 8 per cent), Slovakia (1.4 tons, or 3 per cent), Spain (0.9 tons, or 2 per cent), China (0.7 tons, or 1.4 per cent) and the United Kingdom (0.4 tons, or 0.9 per cent). In 2021, Switzerland continued to be the main exporter of methadone (9.7 tons, or 54.8 per cent of global exports), followed by India (1.9 tons, or 10.7 per cent), Slovakia (1.7 tons, or 9.7 per cent) and the United States (1 ton, or 5.8 per cent). The



Netherlands, Germany, Italy, North Macedonia and Poland, in descending order of the amounts exported, as well as other countries, exported less than 1 ton each. The main importing countries were Germany (1.9 tons, or 11.1 per cent of global imports), Canada (1.8 tons, or 10.5 per cent), the United Kingdom (1.5 tons, or 8.8 per cent), Italy (1.4 tons, or 8 per cent), the Netherlands (1.2 tons, or 7.1 per cent), France (1.2 tons, or 6.8 per cent) and Ukraine (1.1 tons, or 6.7 per cent). A number of other countries imported less than 1 ton each.

92. Consumption of methadone was concentrated in a few countries, and there were large differences in global consumption patterns. Global consumption of the substance decreased slightly in 2021, to 45 tons, from 48.8 tons in 2020, returning to the level recorded in 2019. The country reporting the highest level of consumption was the United States (23.4 tons, or 52 per cent of global consumption), followed by the Islamic Republic of Iran (5.2 tons, or 11.6 per cent), the United Kingdom (1.9 tons, or 4.2 per cent), Spain (1.6 tons, or 3.6 per cent), Canada (1.5 tons, or 3.3 per cent), France (1.3 tons, or 3 per cent), Germany and Italy (1.2 tons, or 2.8 per cent, each) and Ukraine (1.1 tons, or 2.4 per cent). A number of countries reported consumption of less than 1 ton of methadone each. In most cases, the countries reporting the highest consumption were those with a high number of people who inject drugs. In other cases, even though there was a significant number of people who inject drugs, little or no methadone consumption was reported, indicating that opiate-assisted therapy services for drug-dependent persons were not available.

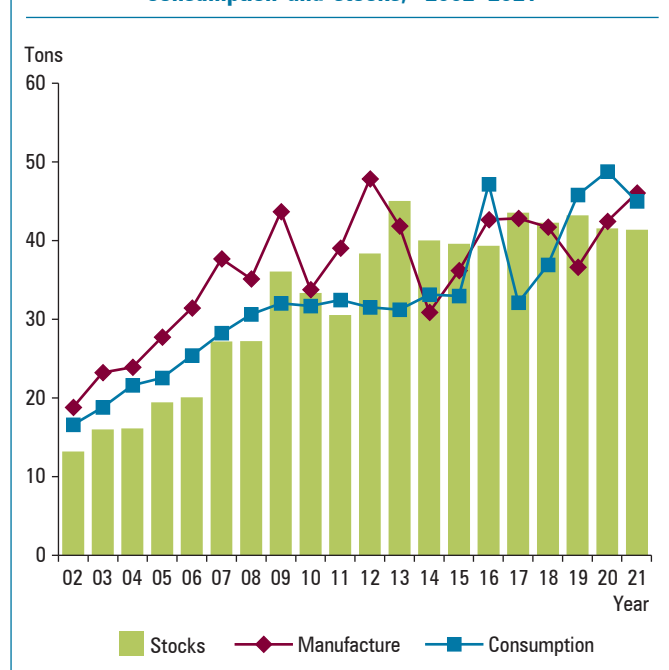
93. In 2021, stocks of methadone amounted to 41.4 tons, almost the same level as in 2020. They were mainly held by the United States (13.6 tons, or 33 per cent of global stocks), Switzerland (8.2 tons, or 19.9 per cent), India (2.5 tons, or 6.1 per cent), Germany (2.4 tons, or 5.9 per cent), Spain (2.2 tons, or 5.3 per cent) and Canada (2 tons, or 4.8 per cent). Countries holding stocks of less than 2 tons were, in descending order of the amounts held, China, France, Slovakia, the United Kingdom, the Netherlands, Austria, Myanmar, North Macedonia, Belgium, Denmark, Poland, Ireland, New Zealand and Hungary.

## Pethidine

94. The manufacture of pethidine has trended downward over the past 20 years, falling to 4 tons in 2021 (see figure 29). 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 (symptoms of which include seizures, delirium and other neuropsychological effects) compared with other available opioid analgesics. It is considered an effective analgesic for acute pain but not useful for chronic pain. For these reasons, several countries have placed strict limits on its use, but some physicians continue to use it as a strong first-line opioid.

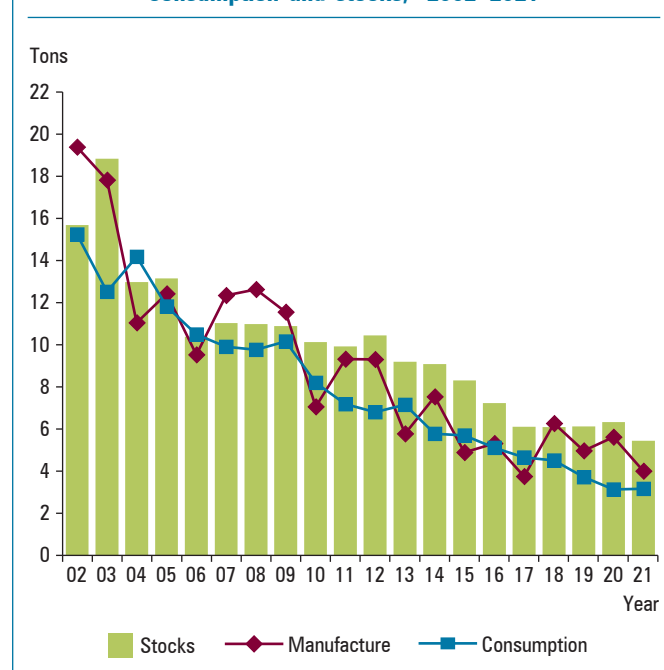
95. In 2021, pethidine was mostly manufactured in Slovakia (2.7 tons, or 66.4 per cent of global manufacture), China (0.6 tons, or 16.3 per cent), Spain (0.4 tons, or 10.8 per cent) and the United States (0.1 tons, or 4.4 per cent).

**Figure 28. Methadone: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

**Figure 29. Pethidine: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

cent). The main exporting countries were Slovakia (2.1 tons, or 54.6 per cent of global exports), Spain (0.7 per cent, or 18.9 per cent), the United Kingdom (0.3 ton, or 9.3 per cent) and Germany (0.2 tons, or 4.7 per cent). Further details on exports and imports of pethidine are contained in annex IV, tables 3 and 4.

96. Global consumption of pethidine, which stood at its highest level, 15.3 tons, in 2002, has been decreasing steadily since then and stood at 3.2 tons in 2021, the same level as in 2020. The countries reporting the highest consumption were Türkiye (0.5 tons, or 16.8 per cent of the global total), China (0.4 per cent, or 10.6 per cent) and Brazil (0.3 tons, or 9.6 per cent). Consumption in smaller quantities was reported by the Islamic Republic of Iran, the United States, Bangladesh and the Republic of Korea, in descending order of the amounts consumed. Global stocks of pethidine decreased to 5.4 tons in 2021. The largest stocks were held by China (1.1 tons, or 21 per cent of global stocks), Slovakia (1 ton, or 19.5 per cent), the United States (0.7 tons, or 12.1 per cent), Brazil (0.4 tons, or 7.5 per cent) and Germany (0.3 tons, or 6.4 per cent). A number of other countries held quantities of less than 0.3 tons each.

## Tilidine

97. Global manufacture of tilidine increased to 52.2 tons in 2021, after declining to 27.4 tons in 2020, continuing the volatile pattern of the past 20 years. In 2021, Germany accounted for the vast majority of the tilidine manufactured globally (51.5 tons, or 98.7 per cent of global manufacture), while Slovakia reported the manufacture of 0.7 tons, or 1.3 per cent. Exports of tilidine decreased to 60.1 tons in 2021, from 65.5 tons in 2020. The main exporting countries were Germany (30 tons, or 49.3 per cent of global exports), Serbia (29.7 tons, or 48.8 per cent) and Slovakia (0.7 tons, or 1.2 per cent), which together accounted for almost 99.2 per cent of global exports.

98. Consumption of tilidine has fluctuated in the last 20 years. It was highest in 2012, at 59.1 tons, dropped to 20 tons in 2013, then rose gradually to 46.4 tons in 2018. It dropped again, to 28.5 tons, in 2019, then rose to 45.7 tons in 2020, dropping once again, to 34.9 tons, in 2021. Germany reported the highest consumption of tilidine (33.7 tons, or 96.5 per cent of global consumption), followed by Belgium (1.2 tons, or 3.5 per cent). In 2021, most of the global stocks of tilidine (34.9 tons, or 89.7 per cent of the global total) were held by Germany, followed by Serbia (3.6 tons, or 9.3 per cent). The remaining 1 per cent were held by other countries.

## Trimeperidine

99. Since 2012, the quantity of trimeperidine manufactured has been more or less stable at about 200 kg. In 2021, manufacture decreased to 151.5 kg. The only country reporting the manufacture of trimeperidine was India. Trimeperidine was developed around 1945 in the former Union of Soviet Socialist Republics, and historically, manufacture and consumption were concentrated there. India has been reporting the manufacture of trimeperidine since 2002.

100. In 2021, global consumption of trimeperidine amounted to 94.2 kg, with the Russian Federation reporting consumption of 59.2 kg, or 62.8 per cent of the global total, followed by Uzbekistan and Kazakhstan (9 kg, or 10 per cent, each), Belarus (6.4 kg, or 6.8 per cent), Ukraine (2.8 kg, or 3 per cent), Latvia (2.6 kg, or 2.8 per cent), Azerbaijan (2.3 kg, or 2.4 per cent) and Kyrgyzstan (1.2 kg, or 1.3 per cent). Imports and exports of trimeperidine decreased considerably in 2021 as compared with 2020. In 2021, imports fell to 63 kg, from 510.5 kg in 2020. Exports also decreased in 2021, to 77.4 kg, from 510 kg in 2020. In 2021, the country exporting the largest quantity of trimeperidine was India (37.8 kg, or 48.9 per cent of global exports), followed by Czechia (18 kg, or 23.3 per cent), the Russian Federation (10.9 kg, or 14.2 per cent), Latvia (5.9 kg, or 7.6 per cent) and Ukraine (4.7 kg, or 6.1 per cent). The main importing countries in 2021 were Ukraine (23.9 kg, or 37.9 per cent of global imports), Kazakhstan (18.6 kg, or 29.5 per cent), Latvia (8.3 kg, or 13.1 per cent) and Ukraine (4.7 kg, or 6.1 per cent). In 2021, global stocks of trimeperidine stood at 513.2 kg; they were mainly held by the Russian Federation (300.6 kg, or 58.9 per cent of the global total), India (118.3 kg, or 23 per cent), Ukraine and Kazakhstan (31.7 kg, or 6.1 per cent, each) and Slovakia (11 kg, or 2.1 per cent). A number of other countries reported stocks of less than 10 kg each.

## Opioid analgesics controlled under the 1971 Convention

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

<sup>18</sup>E/INCB/2022/3.

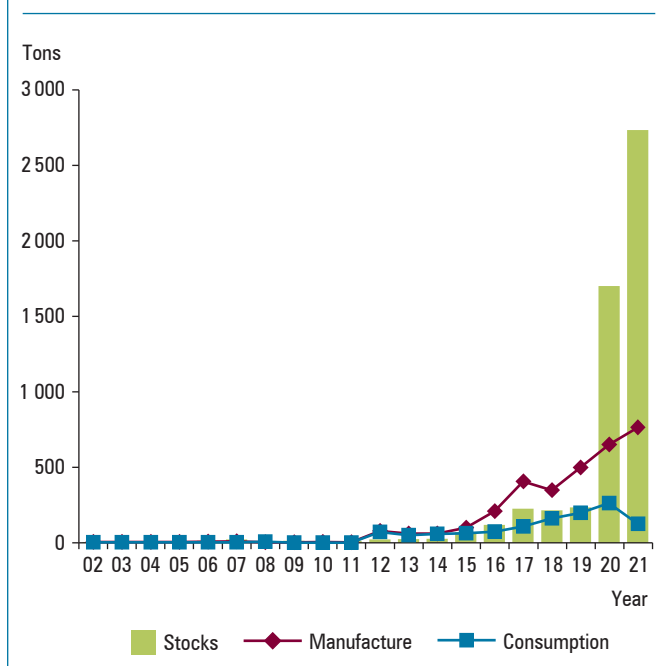
## Cannabis

102. 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 extracts<sup>19</sup> 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 764.3 tons in 2021, a further increase compared with the 650.8 tons recorded for 2020 (see table 2). The data need to be considered with caution, since manufacturing processes for cannabis are not standardized, and some data are being clarified in order to ensure consistency.

103. Production of cannabis in 2021 was reported by the United Kingdom (329.1 tons, or 43 per cent of global production), Italy (150 tons, or 19.7 per cent), Israel (89.4 tons, or 11.7 per cent), Colombia (45.3 tons, or 5.9 per cent), Jamaica (34.9 tons, or 4.6 per cent), Denmark (32.4 tons, or 4.2 per cent), Spain (20.6 tons, or 2.7 per cent), Australia (16.8 tons, or 2.2 per cent), North Macedonia (15 tons, or 1.9 per cent), Uruguay and New Zealand (7.1 tons, or 0.9 per cent, each), the Netherlands (6 tons, or 0.8 per cent), Uganda (4.4 tons, or 0.6 per cent) and Thailand (2.6 tons, or 0.3 per cent). Countries that reported the production of less than 2 tons of cannabis were, in descending order of the amounts produced, Saint Vincent and the Grenadines, Germany, Switzerland, Austria, Czechia and the United States. The production figures presented in

<sup>19</sup>In statistical reports to INCB, data on cannabis extracts are expressed in terms of cannabis, using the conversion factors published by INCB in the list of narcotic drugs under international control ("Yellow List").

**Figure 30. Cannabis: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup> Stocks as at 31 December of each year.

table 2 are reported as received, and it should be noted that, in the extraction of cannabinoids from the cannabis plant, there may be large variations in the quantities used, owing to the different processes employed.

**Table 2. Cultivation of cannabis plant and production of cannabis, 2017–2021**

Country <sup>a</sup>	Year	Area harvested (hectares)	Quantity produced (kilograms)	Country <sup>a</sup>	Year	Area harvested (hectares)	Quantity produced (kilograms)
Argentina	2017	n/a	n/a	Netherlands	2017	..	2 385
	2018	n/a	n/a		2018	..	5 105
	2019	n/a	n/a		2019	..	5 426
	2020	0.13	..		2020	1.00	5 910
	2021	n/a	n/a		2021	1.00	6 082
Australia	2017	.. <sup>b</sup>	224	New Zealand	2017	n/a	n/a
	2018	.. <sup>b</sup>	958		2018	0.01	5
	2019	.. <sup>b</sup>	3 169		2019	0.02	21
	2020	.. <sup>b</sup>	18 391		2020	0.90	242
	2021	20.00	16 755		2021	17.24	7 140
Austria	2017	1.00	259	North Macedonia <sup>d</sup>	2017	n/a	n/a
	2018	1.00	362		2018	2.51	4 041
	2019	1.00	362		2019	–	–
	2020	0.16	366		2020	8.19	12 244
	2021	0.16	331		2021	6.21	15 075
Canada	2017	20.20	131 437	Portugal	2017	..	..
	2018	515.01	64 466		2018	..	..
	2019	332.01	38 353		2019	..	..
	2020	806.00	227 750		2020	..	..
	2021	?	?		2021	..	..
Chile	2017	1.00	444	Saint Vincent and the Grenadines	2017	n/a	n/a
	2018	1.00	621		2018	n/a	n/a
	2019	0.40	20		2019	n/a	n/a
	2020	..	..		2020	n/a	n/a
	2021	n/a	n/a		2021	4.10	1 593
Colombia	2017	0.36 <sup>e</sup>	–	Spain	2017	0.66	2 079 <sup>e</sup>
	2018	0.63	887		2018	2.95	3 920
	2019	1.34	4 018		2019	16.58	37 389
	2020	8.50	18 063		2020	57.43	84 448
	2021	33.71	45 340		2021	8.86	20 591
Czechia	2017	..	95	Switzerland	2017	..	230
	2018	..	5		2018	..	106
	2019	..	26		2019	..	187
	2020	..	28		2020	..	232
	2021	..	62		2021	..	462
Denmark	2017	n/a	n/a	Thailand	2017	n/a	n/a
	2018	n/a	n/a		2018	n/a	n/a
	2019	1.83	2 112		2019	0.09	315
	2020	4.77	6 587		2020	3.57	1 371
	2021	4.00	32 433		2021	6.58	2 642
Germany	2017	n/a	n/a	Uganda	2017	n/a	n/a
	2018	n/a	n/a		2018	n/a	n/a
	2019	n/a	n/a		2019	n/a	n/a
	2020	n/a	n/a		2020	2.86	4 446
	2021	0.91	803		2021	2.86	4 446
Israel	2017	9.03	10 424	United Kingdom of Great Britain and Northern Ireland	2017	37.90	258 378
	2018	18.00	20 786		2018	21.00	217 197
	2019	23.60	26 662		2019	34.47	350 271
	2020	21.80	24 600		2020	33.79	238 671
	2021	58.00	89 400		2021	58.94	329 056
Italy	2017	..	60	United States	2017	..	74 <sup>f</sup>
	2018	..	..		2018	1.00	246 <sup>f</sup>
	2019	0.06	775		2019	..	642 <sup>f</sup>
	2020	..	..		2020	n/a	n/a
	2021	285.21	150 023		2021	..	23
Jamaica	2017	..	..	Uruguay	2017	n/a	n/a
	2018	..	..		2018	2.50	..
	2019	21.45	23 315		2019	2.10	5 552
	2020	..	..		2020	4.25	6 888
	2021	23.28	34 859		2021	4.73	7 165
Japan	2017	0.05	..	<b>Total</b>	<b>2017</b>	<b>68.84</b>	<b>406 088</b>
	2018	0.02	..		<b>2018</b>	<b>585.13</b>	<b>349 443</b>
	2019	1.30	..		<b>2019</b>	<b>478.58</b>	<b>498 614</b>
	2020	0.03	..		<b>2020</b>	<b>953.77</b>	<b>650 823</b>
	2021	0.03	..		<b>2021</b>	<b>535.81</b>	<b>764 280</b>
Lesotho	2017	9.00	16				
	2018	18.50	30 738				
	2019	?	?				
	2020	..	..				
	2021	..	..				

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

<sup>a</sup>In addition to the 26 countries listed in this table, 6 countries, Ecuador, Malawi, Paraguay, Peru, Poland and Zimbabwe, furnished estimates for 2022 and/or 2023 on the cultivation of cannabis plant and the production of cannabis.

<sup>b</sup>Only the number of cannabis plants harvested was reported; data on the area sown and the area harvested were not provided.

<sup>c</sup>Data reported are for the area sown for scientific purposes only.

<sup>d</sup>Since 14 February 2019, "North Macedonia" has replaced "the former Yugoslav Republic of Macedonia" as the short name used in the United Nations.

<sup>e</sup>The manufactured quantity is being used exclusively for research purposes.

<sup>f</sup>These figures refer only to the cultivation of cannabis plant authorized at the federal level. The figures were reported by the Government on the annual statistical return.

104. In 2021, the main exporter of cannabis was the United Kingdom (212.9 tons, or 58.4 per cent of the global total), followed by Canada (87 tons, or 23.9 per cent), Finland (28.3 tons, or 7.8 per cent), Portugal (12.1 tons, or 3.3 per cent), the Netherlands (8.1 tons, or 2.2 per cent), Denmark (4 tons, or 1.1 per cent), Uruguay (3.2 tons, or 0.9 per cent) and Germany (2.7 tons, or 0.7 per cent). Smaller exports were also reported by, in descending order of the amounts exported, Australia, Spain, Colombia, Israel,

South Africa, Austria, the United States, Poland, North Macedonia, New Zealand, Belgium and Sweden. In 2021, the United Kingdom imported 31.5 tons of cannabis, or 25.2 per cent of the global total, followed by Israel (25.5 tons, or 20.3 per cent), Germany (22.5 tons, or 18 per cent), Ireland (15 tons, or 12 per cent), Portugal (6.8 tons, or 5.4 per cent), Australia (6.4 tons, or 5.1 per cent), the Netherlands (3.3 tons, or 2.7 per cent), Spain (2.9 tons, or 2.2 per cent), North Macedonia (2.3 tons, or 1.8 per cent) and the United States (2 tons, or 1.6 per cent). Countries importing amounts of less than 2 tons were, in descending order of the amounts imported, Italy, Poland, France, Finland, Malta, the Republic of Korea, Denmark, Norway, Sweden and Chile. Most of the stocks of cannabis were held by the United Kingdom (2,515 tons, or 92 per cent of the global total), followed by Colombia (47.7 tons, or 1.8 per cent), North Macedonia (39.3 tons, or 1.4 per cent) and Denmark (32.4, or 1.2 per cent). Countries each holding stocks of less than 1 per cent of the global total were, in descending order of the amounts held, Israel, Spain, Australia, Germany, Jamaica, Uruguay, the Netherlands, Chile, Finland, the United States, Malta, Switzerland, Thailand, France, Belgium and New Zealand.

## Coca leaf and cocaine

### Coca leaf

105. 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 reaccessed to the 1961 Convention as amended by the 1972 Protocol. In that connection, the Plurinational State of Bolivia reported the production of 24,575 tons of coca leaf in 2021, while Peru reported the production of 1,170 tons.

106. Peru has been the only country exporting coca leaf for the global market since 2000. Most of the coca leaf is exported to the United States, where it is utilized for the extraction of flavouring agents and the manufacture of cocaine as a by-product. In 2020, exports of coca leaf from Peru amounted to 148.9 tons, all exported to the United States. Export data for 2021 were not available. However, the United States reported the import of 90.1 tons. In 2021,

109.8 tons of coca leaf were utilized in Peru and 105.8 tons in the United States. The largest stocks were held in Peru (1,508.9 tons) and the United States (699.4 tons). Stocks of less than 1 ton each were reported by Italy and France.

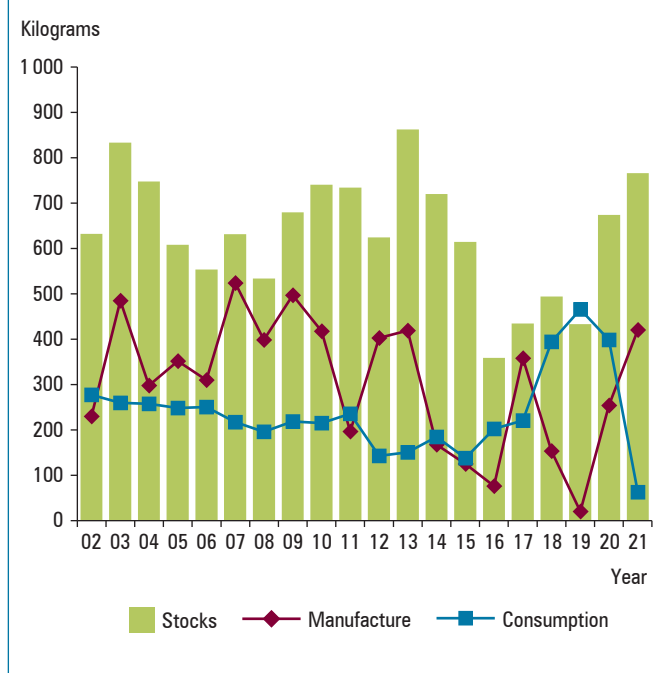
### Cocaine

107. The global licit manufacture of cocaine continued to fluctuate, as it has for more than 20 years. In 2021, manufacture increased to 420.7 kg, occurring almost exclusively in Peru (95.8 per cent of global manufacture) (see figure 31). The main exporting country in 2021 was Peru (300 kg, or 86.3 per cent of global exports), followed by the United Kingdom (33.8 kg, or 9.7 per cent), the Netherlands (5.9 kg, or 1.7 per cent), Germany (2.9 kg, or 0.9 per cent), Switzerland (2.7 kg, or 0.8 per cent) and the United States (1.9 kg, or 0.5 per cent), with other countries exporting minimal quantities. The United Kingdom was the main importing country (330.2 kg, or 83.1 per cent of global imports), followed by the Netherlands (26.7 kg, or



6.7 per cent) and Australia (11.8 kg, or 3 per cent). A number of other countries imported less than 10 kg each. The global licit consumption of cocaine, which had remained stable for the last 20 years, on average between 100 kg and 300 kg per year, stood at 63.2 kg in 2021, down from 398.6 kg in 2020. The countries reporting the highest consumption of cocaine in 2021 were the Netherlands (12.7 kg, or 20 per cent of global consumption), Australia (11.8 kg, or 18.7 per cent), the United Kingdom (11.6 kg, or 18.4 per cent), the United States (6.9 kg, or 10.9 per cent), Belgium (5.4 kg, or 8.6 per cent) and Austria (2.2 kg, or 3.6 per cent). A few other countries reported consumption of less than 2 kg each. Stocks of cocaine were held by Peru (477.4 kg, or 62.3 per cent of the global total), the United States (111.7 kg, or 14.6 per cent), the United Kingdom (51 kg, or 6.6 per cent), the Russian Federation (46.3 kg, or 6 per cent), the Netherlands (33.3 kg, or 4.3 per cent) and Türkiye (10.8 kg, or 1.4 per cent). A number of other countries held stocks of less than 10 kg each.

**Figure 31. Cocaine: global manufacture, consumption and stocks,<sup>a</sup> 2002–2021**



<sup>a</sup>Stocks as at 31 December of each year.

## Comparative trends in the consumption of opioid analgesics

108. The previous section highlighted the most salient trends in the manufacture, 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).<sup>20</sup>

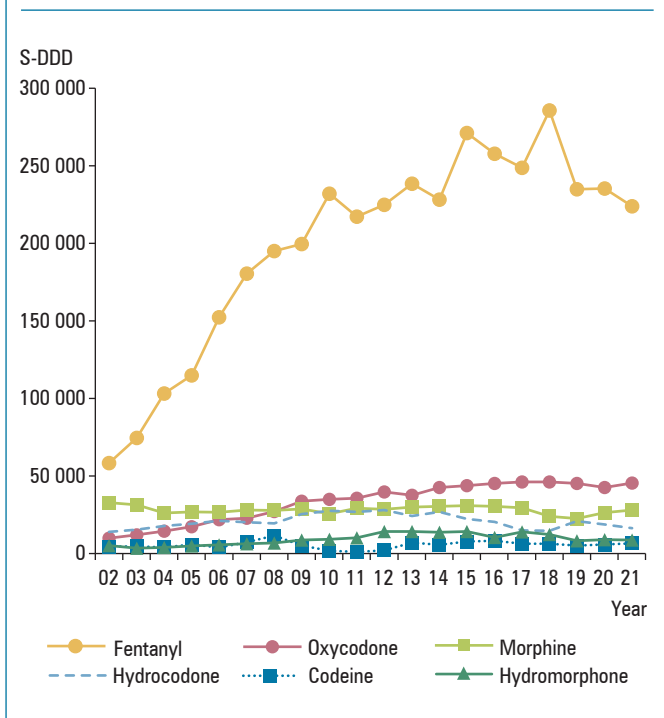
109. A comparison of the consumption of individual substances (see figures 32 and 33) shows the predominance of fentanyl over the past two decades. However, after peaking in 2018 at 285,959 S-DDD, global consumption of fentanyl decreased to 235,074 S-DDD in 2019 and remained relatively stable, albeit with a slight increase to 235,393 S-DDD in 2020. In 2021, it decreased further, to 224,017 S-DDD. Consumption of oxycodone has been increasing, although at a lower level, and since 2009 oxycodone has replaced morphine as the second most-consumed opioid (after fentanyl). Like fentanyl, consumption of oxycodone reached an all-time high level in 2018 (45,726 S-DDD). It then decreased to 44,821 S-DDD

<sup>20</sup>The list of defined daily doses for statistical purposes (S-DDD) and an explanation of that concept are contained in part three, in the notes to tables XIV.1.a–i, XIV.2 and XIV.3.

in 2019 and further, to 42,099 S-DDD, in 2020 but increased slightly in 2021, to 44,972 S-DDD. The trend in the use of morphine, on the other hand, remained relatively stable between 2004 (25,644 S-DDD) and 2019 (22,004 S-DDD). In 2020, it remained relatively stable at 25,938 S-DDD, then increased in 2021 to 27,605 S-DDD. After decreasing steadily since 2014, hydrocodone consumption increased from 14,161 S-DDD in 2018 to 20,415 S-DDD in 2019, but decreased again, to 18,366 S-DDD, in 2020. In 2021, it decreased further, to 15,857 S-DDD. The consumption of codeine for pain management decreased from 5,720 S-DDD in 2018 to 4,591 S-DDD in 2019, then increased to 5,231 S-DDD in 2020 and further, to 6,134 S-DDD, in 2021. Hydromorphone consumption decreased from 11,834 S-DDD in 2018 to 7,713 S-DDD in 2019, the lowest level since 2008, but increased to 8,528 S-DDD in 2020, decreasing again, to 8,315 S-DDD, in 2021. The United States accounted for almost all global hydrocodone use, whereas the consumption of the other drugs shown in the figures was reported in more than one country.

110. A regional analysis of the main trends in the consumption of the main opioid analgesics (codeine, dextro-propoxyphene, dihydrocodeine, fentanyl, hydrocodone, hydromorphone, ketobemidone, morphine, oxycodone, pethidine, tilidine and trimeperidine), expressed in S-DDD per million inhabitants per day, shows that the highest

**Figure 32. Consumption of codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone, expressed in total S-DDD,<sup>a</sup> 2002–2021**



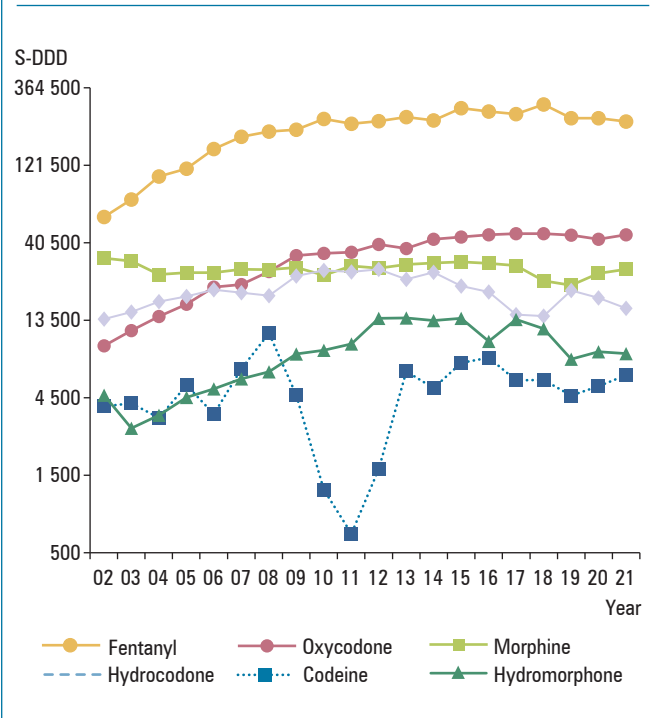
<sup>a</sup>Total consumption of a drug is the sum of the S-DDD of all individual countries reporting consumption.

consumption of these drugs is in developed countries in Europe and North America.

111. 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. In 2021, the reported consumption in some countries in North America, Oceania and Western and Central Europe resulted in regional averages of 17,035 S-DDD for North America, 8,721 S-DDD for Western and Central Europe and 7,146 S-DDD for Oceania. North America remains the region with the highest consumption of opioids for pain management in the world (see figures 34 and 35).

112. The levels of opioid consumption in North America, Oceania and Western and Central Europe are far higher than in all other regions in the world. A general upward trend in consumption was evident in South-Eastern Europe until 2018, when it reached 1,415 S-DDD, but it has stabilized at about 1,000 S-DDD in recent years (1,134 S-DDD in 2021). Consumption in South America has been increasing since 2017, when countries reported 537 S-DDD, and reached an all-time high level of 1,006 S-DDD in 2021. In West Asia, a similar trend has been observed, with consumption reaching an all-time high level (743 S-DDD) in 2020; however, that level was not confirmed in 2021, as consumption decreased to 509 S-DDD. In Eastern Europe,

**Figure 33. Consumption of codeine, fentanyl, hydrocodone, hydromorphone, morphine and oxycodone, expressed in total S-DDD,<sup>a</sup> 2002–2021 (semi-logarithmic scale)**



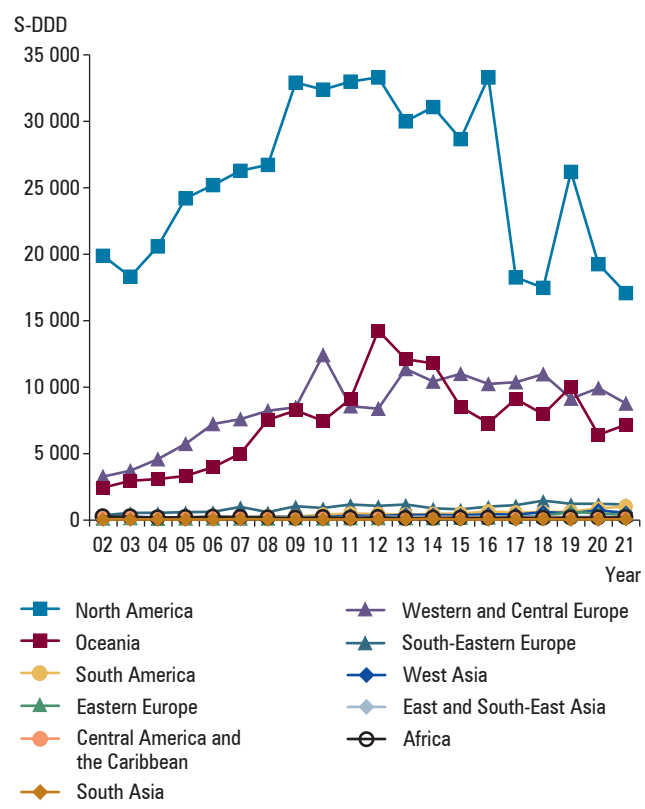
<sup>a</sup>Total consumption of a drug is the sum of the S-DDD of all individual countries reporting consumption.

opioid consumption reached an all-time high level in 2019, reaching 601 S-DDD, but in 2021 consumption decreased, to 344 S-DDD. 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 2021 in East and South-East Asia (198 S-DDD), Africa (63 S-DDD) and South Asia (26 S-DDD) are of particular concern.

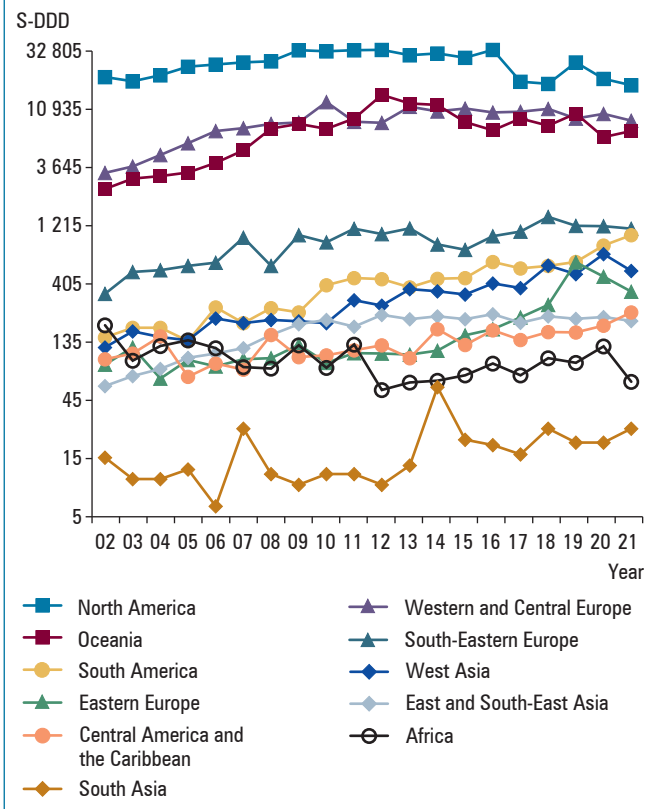
113. Figures 36 and 37 show consumption of opioid analgesics in total S-DDD by substance and region. This analysis highlights once again the predominance of fentanyl in most regions of the world. Consumption of oxycodone is highest in North America, Oceania, Western and Central Europe and West Asia, although the substance is also consumed in other regions. Hydrocodone consumption is significant in the Americas. The share of morphine consumption is less pronounced in most regions, except for South America and South-Eastern Europe.

114. The Board reiterates that there is an urgent need to increase the access to and availability of opioid analgesics and to improve the prescription and use of opioid analgesics in all countries reporting inadequate and very inadequate levels of consumption, and calls for targeted public policies supported by Governments, health systems and health professionals, civil society, the pharmaceutical industry and the international community.

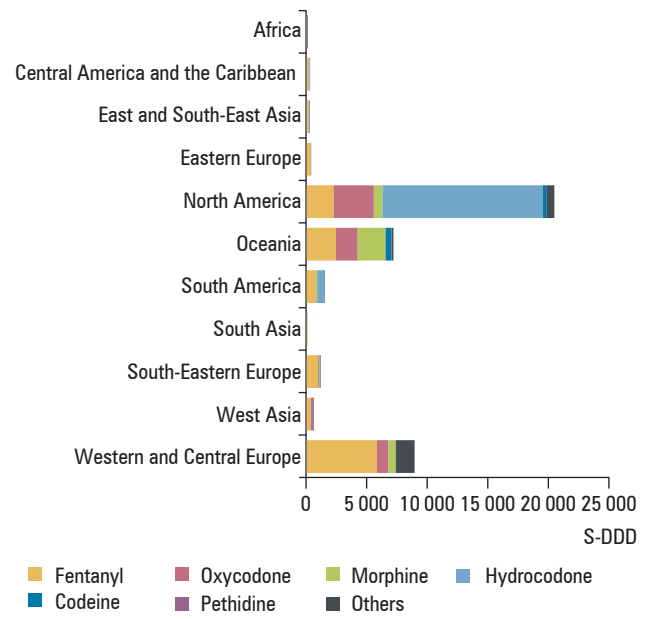
**Figure 34. Consumption of opioids for pain management in all regions, expressed in S-DDD per million inhabitants per day, 2002–2021**



**Figure 35. Consumption of opioids for pain management in all regions, expressed in S-DDD per million inhabitants per day, 2002–2021 (semi-logarithmic scale)**



**Figure 36. Consumption of codeine, fentanyl, hydrocodone, morphine, oxycodone, pethidine and other opioids, all regions, expressed in S-DDD, 2021**



**Figure 37. Consumption of codeine, fentanyl, hydrocodone, morphine, oxycodone, pethidine and other opioids, selected regions, expressed in S-DDD, 2021**

