

COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

Summary

The analysis in this section of the technical publication is based on the statistical data furnished by Governments. The quality of the analysis depends on the data provided.

The demand for natural alkaloids that are obtained from the opium poppy plant (morphine, codeine, thebaine and oripavine) continued to be high in 2011, in line with the trend of the preceding 20 years. About 82 per cent of the morphine and 96 per cent of the thebaine manufactured worldwide were obtained from poppy straw, while the rest was extracted from opium. Australia, France, Spain and Turkey continued to be the main producer countries in 2011, together accounting for about 88 per cent of global production of poppy straw rich in morphine. Australia, France and Spain were the main producers of poppy straw rich in thebaine, together accounting for about 98 per cent of global production of poppy straw rich in thebaine. India remained the only licit supplier of opium to the world market.

Manufacture of morphine followed a rising trend over the past two decades, reaching a level of almost 440 tons in 2007; after 2007, morphine manufacture fluctuated and reached a record level of more than 440 tons in 2011. Morphine and codeine are used in therapy and for conversion into other opioids. Manufacture of thebaine increased sharply after the late 1990s, reached an all-time high of 152 tons in 2009 and dropped to 145 tons in 2011. Manufacture of codeine stood at 381 tons in 2011, the highest level ever reported. Thebaine itself is not used in therapy, but it is an important starting material for the manufacture of a number of opioids. Australia, France, the United Kingdom of Great Britain and Northern Ireland and the United States of America continued to be the leading manufacturers of natural alkaloids.

Codeine has been the most commonly consumed opiate in the world in terms of the number of countries in which it is consumed. In 2011, its use reached 269 tons, the highest level ever reported. Global consumption of morphine for the treatment of severe pain rose by a factor of more than four over the past two decades, reaching the record level of 42 tons in 2011. That increase was due mainly to growing consumption in high-income countries, while consumption levels in most other countries remained very low. Australia, Canada, Japan, New Zealand, the United States and some countries in Europe accounted for more than 93 per cent of total morphine consumption in 2011.

In 2011, the semi-synthetic opioid hydrocodone remained the narcotic drug with the highest consumption in terms of doses consumed. Global consumption of hydrocodone amounted to 43 tons in 2011. High global consumption of oxycodone and hydromorphone continued in 2011 (81.6 tons and 4.3 tons, respectively). As in the past, the United States was the principal consumer country of those three opioids. The use of dihydrocodeine (28.5 tons in 2011) and pholcodine (9.6 tons in 2011) was relatively stable in recent years, although with fluctuations from year to year.

Fentanyl has been the synthetic opioid with the highest consumption in terms of doses consumed. Consumption of fentanyl has followed an increasing trend, reaching the all-time high of 1.7 tons in 2010 and standing at 1.4 tons in 2011. Consumption of methadone also followed a rising trend, amounting to 32.8 tons in 2011. Diphenoxylate consumption also increased in recent years, reaching a new all-time high in 2011 (22.6 tons). Global use of dextropropoxyphene (141 tons in 2011) and pethidine (6.6 tons in 2011) has shown a downward trend in the past 10 years.

1. The present comments are intended to facilitate the use of the statistical information on the licit production, manufacture, consumption,¹ utilization² and stocks of, as well as trade in, opiate raw materials, the main opioids, including synthetic narcotic drugs under international control, and cannabis, coca leaf and cocaine that is presented in the tables of reported statistics (see pages 123-246 and pages 397-432). Unless otherwise indicated, the comments refer to developments during the period 1992-2011.

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

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

2. The tables of reported statistics in part four and in 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 1961.³ The most recent statistical data reflected in the comments are those relating to 2011. The failure by some Governments to submit reports or to provide precise and complete reports may have a bearing on the accuracy of some of the information presented below.⁴ The most pertinent conclusions and recommendations of INCB based on the analysis of statistical data are included in chapter II of its annual report.⁵

³United Nations, *Treaty Series*, vol. 520, No. 7515.

⁴Details on the submission of statistical reports by individual Governments are contained in annex I of this publication.

⁵*Report of the International Narcotics Control Board for 2012* (United Nations publication, Sales No. E.13.XI.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.

4. The demand for alkaloids increased significantly over the 20-year period from 1992 to 2011. Throughout the period, the increased demand was covered mainly by poppy straw. In 2011, approximately 82 per cent of the morphine and about 96 per cent of the thebaine manufactured worldwide were obtained from poppy straw, while the rest was obtained from opium.

5. Details on trends in the production and use of opium and poppy straw, and on the manufacture and use of the principal opiates,⁶ including concentrate of poppy straw, are provided below. The current balance between the supply of opiate raw materials and the demand for opiates for medical and scientific needs is examined in a separate section of the present publication (see pages 93-100).

Opium

6. 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

⁶“Opiate” is the term generally used to designate drugs derived from opium and their chemically related derivatives, such as the semi-synthetic alkaloids.

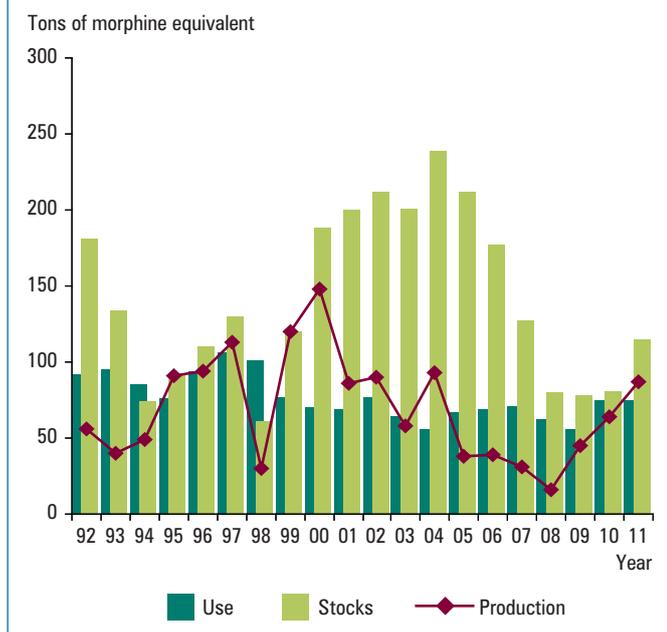
the production of and trade in opium are reported at 10 per cent moisture content. When appropriate, the data on opium are also expressed in morphine equivalent,⁷ in order to enable comparison between opium and poppy straw. Figure 1 shows the licit production, stocks and use (consumption plus utilization) of opium during the period 1992-2011, expressed in morphine equivalent. Not included in the data on stocks and use are the amounts of illicitly produced opium that were seized and released for licit purposes.

7. India has been the leading licit producer of opium for several decades, accounting for over 90 per cent of global production. Other opium-producing countries in recent times have been China,⁸ the Democratic People’s Republic of Korea and Japan (see table I). Production declined, with some fluctuations in the period 2000-2008, and then started to pick up again, reaching 789 tons in 2011 (or 87 tons in morphine equivalent), more than 99 per cent of which was produced in India. In China, poppy straw has replaced opium as the main raw material for the manufacture of alkaloids; in 2011, China reported no production of opium. In 2011, the Democratic People’s Republic of Korea produced 450 kg of opium.

⁷The morphine or thebaine equivalent is calculated by INCB on the basis of the industrial yield of the respective alkaloid obtained from opium or poppy straw. Lesser alkaloids contained in opium or poppy straw that are convertible into morphine or thebaine have also been included, adjusted by appropriate conversion rates, whenever the Board has been informed of their extraction in commercially significant quantities.

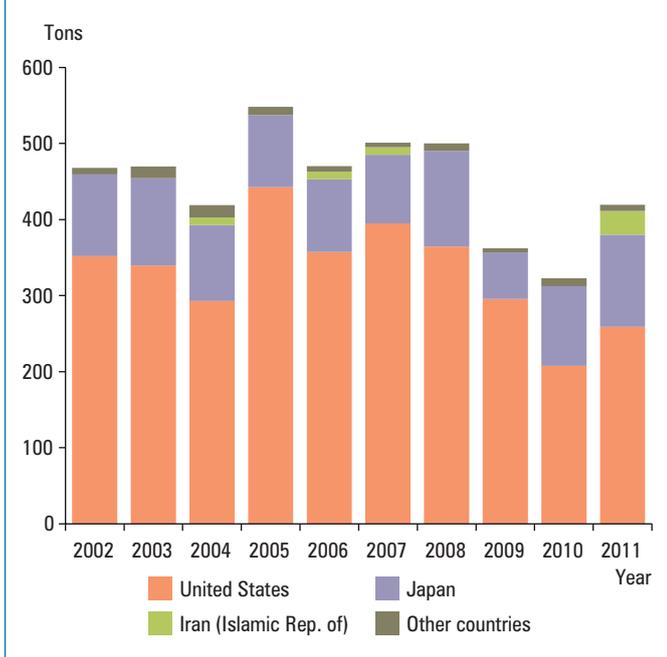
⁸Data for China do not include statistics relating to the Hong Kong Special Administrative Region of China, the Macao Special Administrative Region of China or Taiwan Province of China.

Figure 1. Opium: global production, stocks^a and use (consumption and utilization), in morphine equivalent, 1992-2011



^aStocks as at 31 December of each year.

Figure 2. Opium: imports from India, 2002-2011

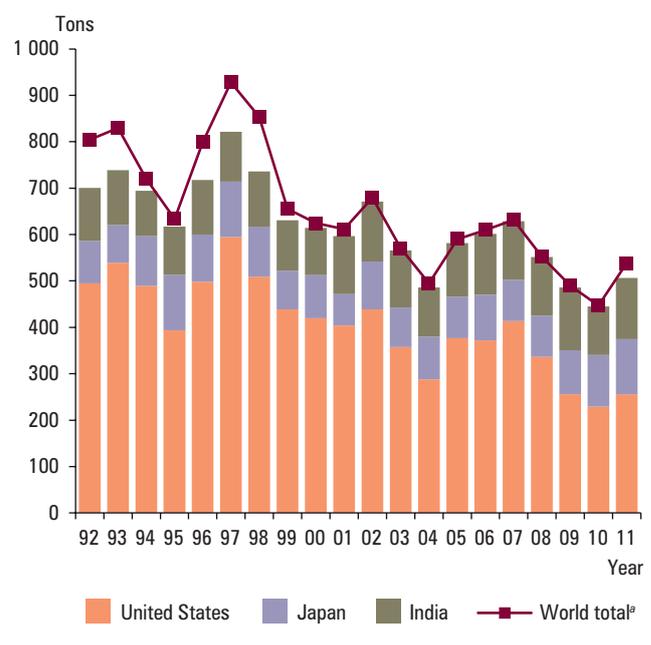


8. India is the only licit supplier of opium to the world market, and most of the opium produced in India is destined for export. Opium exported from India contains morphine in a concentration of 9.5-12.0 per cent, codeine in a concentration of about 2.5 per cent and thebaine in a concentration of 1.0-1.5 per cent. As shown in figure 2, imports from India had fluctuated in recent years and stood at about

420 tons (or 46 tons in morphine equivalent) in 2011. The United States of America and Japan continued to be the main importing countries, accounting for 62 per cent and 29 per cent of total imports in 2011, respectively. The Islamic Republic of Iran imported opium irregularly; in 2011, it accounted for 7.5 per cent of total imports.

9. The bulk of opium is used for the extraction of alkaloids. Total utilization of licitly produced opium for the extraction of alkaloids followed a declining trend during the period under consideration. Utilization dropped to 447 tons in 2010 but increased to 538 tons (or 59 tons in morphine equivalent) in 2011 (see figure 3). The United States, India and Japan, in descending order, are the main users of opium for the extraction of alkaloids, together accounting for 94 per cent of the global total in 2011. The Democratic People's Republic of Korea and Iran (Islamic Republic of)⁹ were the only other countries reporting the use of opium for the extraction of alkaloids in 2011. Details on the utilization of opium for the extraction of alkaloids and the alkaloids obtained are provided in table III.

Figure 3. Opium: utilization for the extraction of alkaloids, 1992-2011



^aExcluding the utilization of seized opium in Iran (Islamic Republic of), Myanmar and Turkey.

10. Opium is also consumed in many countries in the form of preparations, mainly for the treatment of diarrhoea and coughs. Most of those preparations are included in

⁹In the Islamic Republic of Iran, in addition to licitly produced opium imported from India, seized opium is released regularly in large quantities for the extraction of alkaloids. The yield of alkaloids extracted from seized opium is usually less than from licitly produced opium.

Schedule III of the 1961 Convention.¹⁰ Global consumption of opium has fluctuated, averaging about 17.2 tons per year since 2001. Total consumption in 2011 was 22 tons, which corresponds to 220 million defined daily doses for statistical purposes (S-DDD).¹¹ In 2011, consumption and use of opium for the manufacture of preparations in Schedule III amounted to 12 tons in China, 4 tons in India and 3.7 tons in France.

11. Global stocks of opium reached their peak of the last decade in 2004 (2,176 tons) and then began to decrease. In 2011, they increased significantly to 1,041 tons (or 115 tons of morphine equivalent), having stood at 736 tons in 2010. India continued to hold the largest stocks (834.7 tons, or 80 per cent of the global total), followed by Japan (100.6 tons), the United States (83.5 tons) and China (17 tons).¹²

Poppy straw

12. 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)”, and poppy straw produced from varieties of opium poppy plant rich in thebaine is referred to as “poppy straw (T)”. Some of those varieties contain, in addition to the main alkaloid (morphine or thebaine), other alkaloids that can be extracted, such as codeine and oripavine.

13. The concentration of alkaloids in poppy straw varies significantly among the producing countries.¹³ Production levels of poppy straw among those countries can be compared only by use of a common denominator, which is the morphine or thebaine equivalent of the quantity of poppy straw produced in each country. Commercial cultivation of the opium poppy plant with a high codeine content

¹⁰Preparations included in Schedule III of the 1961 Convention are exempt from several control measures that are otherwise mandatory for preparations containing narcotic drugs, including reporting on their consumption and international trade.

¹¹The list of defined daily doses for statistical purposes and an explanation of that concept are contained in the notes to table XIV.1.

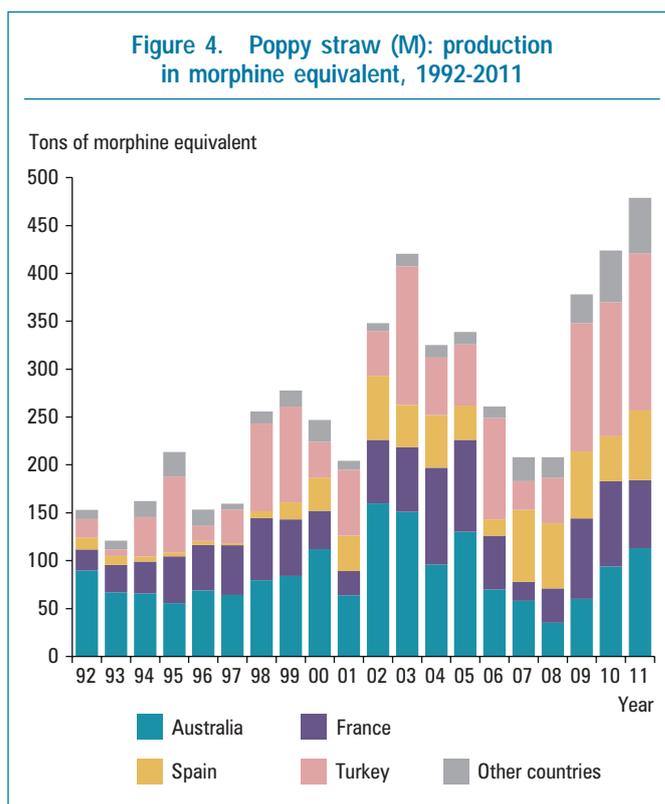
¹²For production of, stocks of and demand for opium, see also the section entitled “Supply of opiate raw materials and demand for opiates for medical and scientific purposes”, on pages 93-100.

¹³For example, in the period 2008-2011, the industrial yield of anhydrous morphine alkaloid obtained from poppy straw (M) during the manufacture of anhydrous morphine alkaloid contained in concentrate of poppy straw (AMA (CPS)) averaged 1.68 per cent in Australia, 1.5 per cent in France, 1.34 per cent in Spain and 0.44 per cent in Turkey.

started in Australia in 2010. For statistical purposes, the quantities of poppy straw produced from that variety of opium poppy are recorded under “poppy straw (M)”.

Poppy straw produced from opium poppy rich in morphine (poppy straw (M))

14. Although the submission of statistics on the production of poppy straw is voluntary, the countries cultivating opium poppy plants for the extraction of alkaloids provide such information. Global production of poppy straw (M) expressed in morphine equivalent followed an increasing trend in the two decades prior to 2011. Production fluctuated sharply, mainly because of weather conditions and in response to the demand in manufacturing countries. Production reached about 450 tons in morphine equivalent in 2003 and declined to about 240 tons in 2008. Production then increased strongly, reaching a peak of about 480 tons in 2011 (see figure 4). Throughout the two decades prior to 2011, Australia, France, Spain and Turkey were the main producer countries. In 2011, the leading producer was Turkey (164 tons in morphine equivalent, accounting for 34 per cent of global production), followed by Australia (113 tons, or 24 per cent), Spain (73 tons, or 15 per cent) and France (71 tons, or 15 per cent). Other main producers of poppy straw (M) in 2011 were China, Hungary and the United Kingdom of Great Britain and Northern Ireland, together accounting for more than 10 per cent of global production in morphine equivalent.



15. In 2011, production of poppy straw (M) increased in Australia, China, Spain, Turkey and the United Kingdom, while it decreased in France and Hungary. Changes in the area cultivated with the opium poppy plant, the amounts of poppy straw (M) harvested and the yields obtained in producing countries are shown in table II.

16. International trade in poppy straw (M) as a raw material continues to be limited, with the Czech Republic being the major exporter of poppy straw for the purpose of extraction of alkaloids (see annex IV, table 1). The Czech Republic, which cultivates opium poppy plants primarily for the production of seeds, produces poppy straw as a by-product and exports it to Slovakia, where it is used for the extraction of alkaloids. Such poppy straw has a significantly lower morphine content than poppy straw obtained from opium poppy plants cultivated for the production of alkaloids. In 2011, imports by Slovakia of poppy straw (M) from the Czech Republic decreased to 1,849 tons (in gross weight).

17. In 2011, utilization of poppy straw (M) in the main user countries amounted to 27,203 tons in gross weight in Turkey, 7,723 tons in Australia,¹⁴ 6,351 tons in Spain and 5,603 tons in France. Further details on the utilization of poppy straw (M) for the extraction of alkaloids and the yields obtained are contained in table IV.

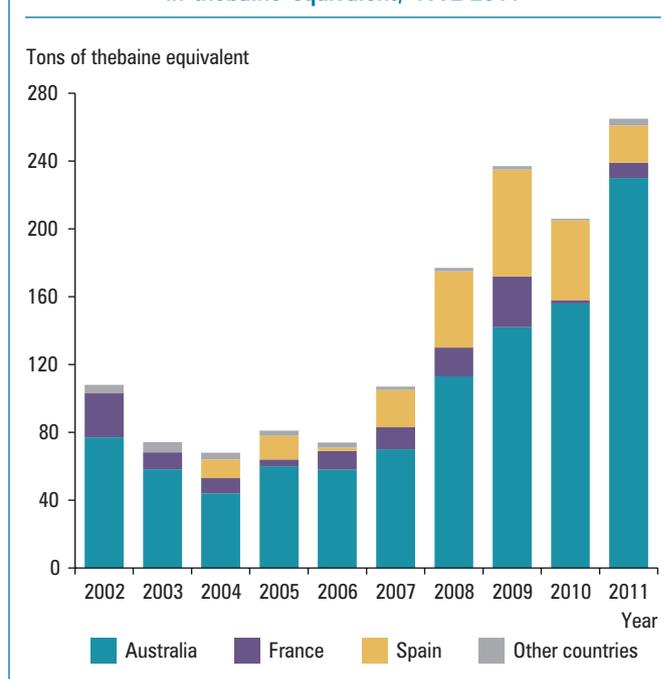
Poppy straw produced from opium poppy rich in thebaine (poppy straw (T))

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

19. Global production of poppy straw (T) expressed in thebaine equivalent during the period 2002-2011 is shown in figure 5. In 2011, total production amounted to about 265 tons in thebaine equivalent.¹⁵ Australia remained the leading producer (230 tons in thebaine equivalent, accounting for 87 per cent of global production), followed by Spain (22 tons, or 8 per cent) and France (9 tons, or 3 per cent).

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

Figure 5. Poppy straw (T): production, in thebaine equivalent, 1992-2011



Poppy straw used for decorative purposes

21. In some countries, poppy straw is used for decorative purposes. Austria was the main exporter of poppy straw for such purposes in 2011. The main importers in 2011 were Germany and Switzerland.

Concentrate of poppy straw

22. Most countries using poppy straw for the extraction of alkaloids first manufacture an intermediate product called “concentrate of poppy straw”, although in some countries morphine or thebaine is manufactured directly from poppy straw in a continuous process, which may involve a number of other intermediate products (for details, see tables IV and V). Until the second half of the 1990s, only concentrate of poppy straw containing morphine as the main alkaloid was manufactured. Since then, concentrate of poppy straw containing mainly thebaine, oripavine or codeine has started to be manufactured. Concentrate of poppy straw may contain a mixture of alkaloids, and more alkaloids than just the principal alkaloid may be extracted in industrial processes. The different types of concentrate of poppy straw are referred to by the main alkaloid contained in them.¹⁶

¹⁴This figure is being clarified with the Government.

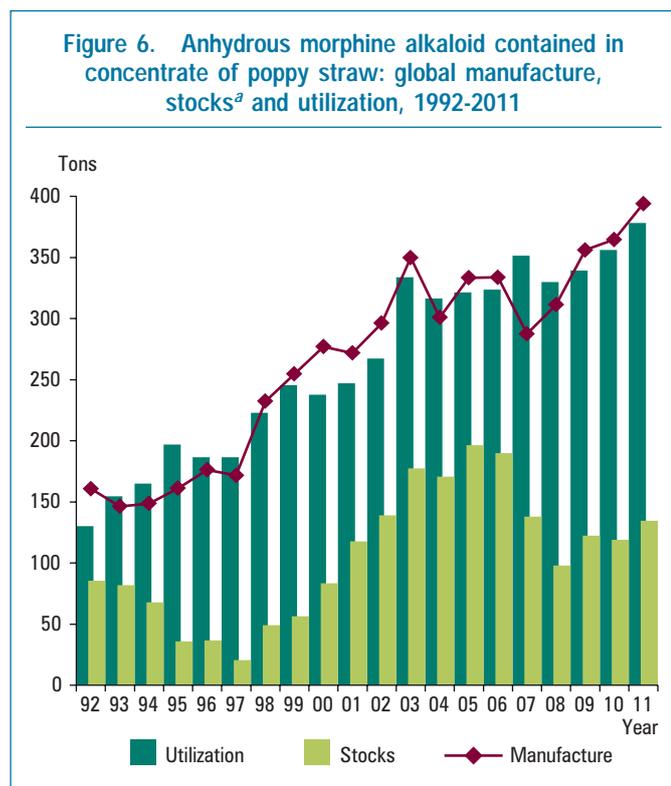
¹⁵The thebaine equivalent of the thebaine and oripavine alkaloids contained in poppy straw (M) is also included, where appropriate, in the data referred to in this paragraph.

¹⁶Currently, 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.

23. Since the actual content of alkaloids in concentrate of poppy straw may vary significantly, for purposes of comparison and for statistical purposes, all data referring to concentrate of poppy straw are expressed in terms of the quantity of the respective 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 the respective anhydrous alkaloid content.¹⁷

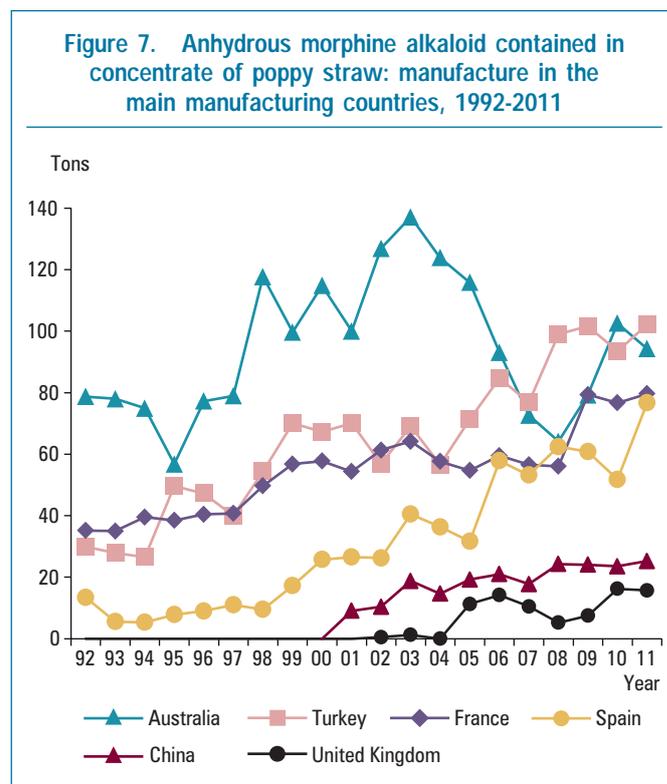
Anhydrous morphine alkaloid contained in concentrate of poppy straw (AMA (CPS))

24. AMA (CPS) continues to be the most important and most widely used alkaloid among the alkaloids contained in concentrate of poppy straw. Figure 6 shows the trends in its manufacture, stocks and utilization during the 20-year period from 1992 to 2011.



¹⁷The comments on concentrate of poppy straw in this publication are not directly comparable with comments on concentrate of poppy straw contained in editions of this publication prior to 2005, since at that time concentrate of poppy straw was expressed at 50 per cent of the main alkaloid contained therein.

25. Global manufacture of AMA (CPS) has risen sharply since the 1990s and fluctuated between 270 and 394 tons (which was the level in 2011) in the period 2001-2011. Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 1992-2011 are presented in figure 7. Australia and Turkey alternate as leading manufacturer. In 2011, Turkey accounted for 102.2 tons, or 26 per cent of the global total of 394 tons, followed by Australia (94.3 tons, or 24 per cent of global manufacture), France (79.6 tons, or 20 per cent) and Spain (76.8 tons, or 19 per cent). Other countries reporting manufacture of AMA (CPS) for 2011 were China (25.3 tons), the United Kingdom (15.7 tons) and the former Yugoslav Republic of Macedonia (172 kg).



26. Global exports of AMA (CPS) increased to 240 tons in 2003 and have fluctuated since then. In 2011, they amounted to 203 tons. Turkey remained the main exporting country in 2011 (with 77.8 tons, accounting for 38 per cent of global exports), followed by Australia (73.9 tons, or 36 per cent) and Spain (45.5 tons, or 22 per cent). The United Kingdom and the United States have been the leading importers of AMA (CPS), together accounting for 73 per cent of the world total in 2011. Other major importing countries were, in descending order, Norway, South Africa, Slovakia and France. Further details on international trade in AMA (CPS) can be found in annex IV, tables 1 and 2.

27. AMA (CPS) is an intermediate product for the manufacture of morphine. It is also used in continuous manufacturing processes for the manufacture of codeine.

Utilization of AMA (CPS) increased steadily until 2003 and has been fluctuating since then (see figure 8). In 2011, utilization amounted to 378 tons. The United Kingdom, at 111.4 tons, accounted for 29 per cent of the global utilization of AMA (CPS), followed by France (77.6 tons, or 21 per cent), the United States (67.6 tons, or 18 per cent) and Australia (28 tons, or 7 per cent).

Figure 8. Anhydrous morphine alkaloid contained in concentrate of poppy straw: utilization for the manufacture of opiates, 1992-2011

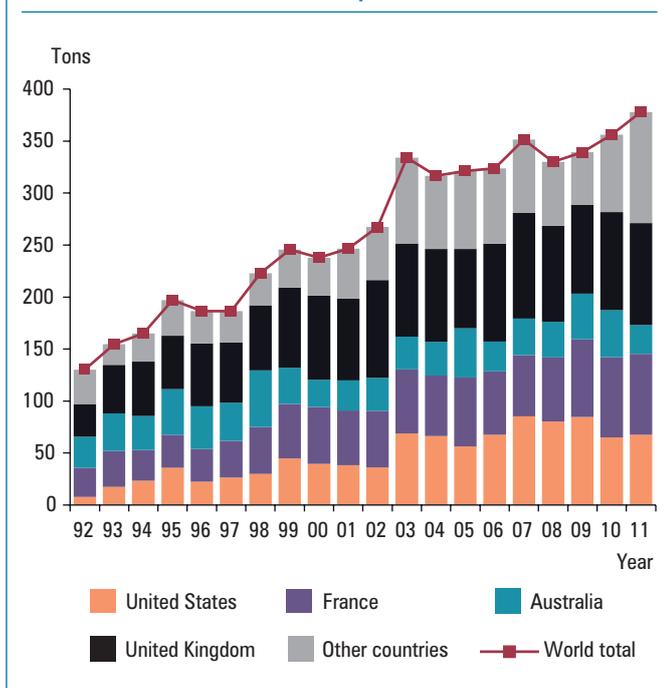
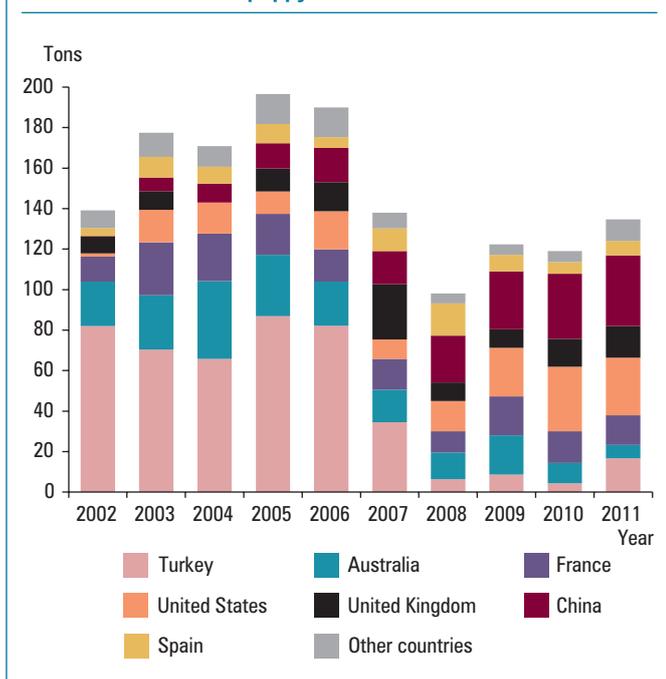


Figure 9. Anhydrous morphine alkaloid contained in concentrate of poppy straw: stocks,^a 2002-2011



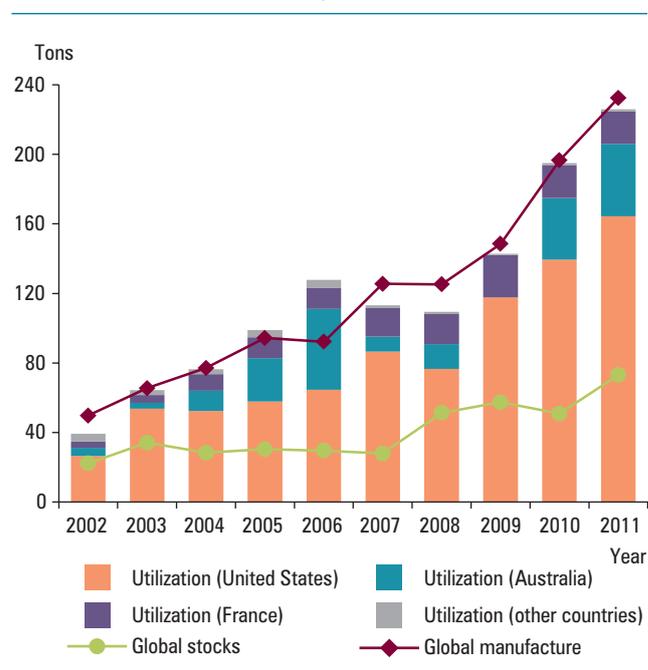
^aStocks as at 31 December of each year.

28. Global stocks of AMA (CPS) reached 135 tons in 2011 (see figure 9). China held the largest stocks in 2011 (34.8 tons, or 26 per cent of the global total); other countries holding significant stocks of AMA (CPS) in 2011 were the United States (28.5 tons, or 21 per cent) and Turkey (16.7 tons, or 12 per cent).

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

29. Figure 10 provides an overview of the manufacture, stocks and utilization of ATA (CPS) during the period 2002-2011. Industrial manufacture of ATA (CPS) started in 1998 and has increased rapidly since then, peaking at 232 tons in 2011, which represented an increase of 35 tons compared to 2010. Australia, France and Spain, in descending order, have been the only manufacturing countries, accounting for 86 per cent, 9 per cent and 5 per cent, respectively, of the global total in 2011. Australia was the main exporter, accounting for 146 tons, or 86 per cent, of global exports in 2011. The United States has been the leading importer of ATA (CPS); in 2011 it accounted for 99 per cent of total imports.

Figure 10. Anhydrous thebaine alkaloid contained in concentrate of poppy straw: utilization, global manufacture and stocks,^a 2002-2011



^aStocks as at 31 December of each year.

30. ATA (CPS) is an intermediate product for the manufacture of thebaine. Global utilization of ATA (CPS) increased sharply from 22 tons in 2000 to 226 tons in 2011, the highest level ever reported, and 31 tons higher than the level in 2010. This reflects the growing demand

for thebaine and the substances that may be obtained from it. The United States continued to be the main user in 2011 (accounting for 73 per cent of global utilization), followed by Australia (18 per cent) and France (8 per cent). Global stocks of ATA (CPS) stood at 81.3 tons in 2011. Australia (42.7 tons), the United States (35.2 tons) and France (2.3 tons) accounted for 99 per cent of global stocks.

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

31. Manufacture of AOA (CPS) in commercially usable quantities started in 1999; Australia has been the only manufacturing country. In 2011, global manufacture amounted to 20.1 tons. AOA (CPS) has been used in Australia and the United States for the manufacture of oripavine and oxymorphone. In 2011, total utilization of AOA (CPS) amounted to 26 tons, with 56 per cent of that total reported by Australia and 42 per cent by the

United States. Global stocks of AOA (CPS) have been fluctuating since 2001. In 2011, they stood at 17.6 tons, of which 75 per cent was held in Australia and 24 per cent in the United States.

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

32. Manufacture of ACA (CPS) amounted to 31 tons in 2011. France, Australia, Turkey and Spain, in descending order, have been the only countries manufacturing ACA (CPS), accounting respectively for 45 per cent, 32 per cent, 20 per cent and 2 per cent of the global total in 2011. ACA (CPS) is used for the extraction of codeine. Global utilization of ACA (CPS) amounted to 18.2 tons in 2011, of which 67 per cent was accounted for by France and 33 per cent by the United States. Global stocks of ACA (CPS) in 2011 stood at 6.2 tons, most of which was held in France (2.3 tons) and the United States (1.5 tons).

Opiates and opioids

33. "Opiate" is the term generally used to designate drugs derived from opium and their chemically related derivatives, such as the semi-synthetic alkaloids, while "opioid" is a more general term for both natural and synthetic drugs with morphine-like properties, although the chemical structure may differ from that of morphine.¹⁸

34. Opioids are used mostly for their analgesic properties to treat severe pain (fentanyl, hydromorphone, methadone, morphine and pethidine), moderate to severe pain (buprenorphine¹⁹ 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 addiction to opioids (buprenorphine and methadone).

Natural alkaloids

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

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

Morphine

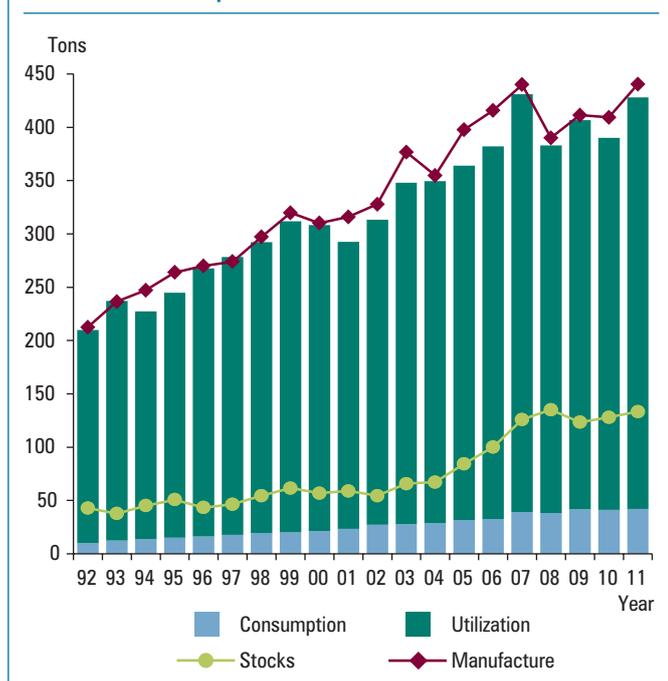
36. Figure 11 presents data on the manufacture,²⁰ stocks, consumption and utilization of morphine in the period 1992-2011. Global manufacture of morphine followed a rising trend during the 20-year period, increasing from about 212 tons in 1992 to a record 440.3 tons in 2011. Almost 90 per cent of the morphine manufactured globally is converted into other narcotic drugs, as well as into substances not covered by the 1961 Convention (see paras. 42-43 below). The rest is used for medical purposes.

¹⁸From a clinical point of view, opioids may be classified according to their actions compared with those of morphine: similar affinity (agonist), competitive (antagonist) or mixed (agonist/antagonist) for the same receptor sites (the so-called opioid receptors) in the central and peripheral nervous system.

¹⁹Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971. Comments on its licit movement are contained in para. 94 below.

²⁰In Australia, Brazil, China, Iran (Islamic Republic of), Italy, Norway, Portugal, Turkey and the United Kingdom, concentrate of poppy straw is used in continuous industrial processes for the manufacture of other narcotic drugs, without first separating morphine. For statistical and comparative purposes, the theoretical quantity of morphine involved in such conversions is calculated by INCB and included in the present publication in the statistics on global manufacture and utilization of morphine.

Figure 11. Morphine: global manufacture, stocks,^a consumption and utilization, 1992-2011



^aStocks as at 31 December of each year.

37. In 2011, the leading manufacturing country of morphine was the United Kingdom (107.3 tons, or 24 per cent of global manufacture), followed by the United States (87.8 tons, or 20 per cent), France (81.1 tons, or 18 per cent), Australia (33.4 tons, or 8 per cent) and Iran (Islamic Republic of) (20 tons, or 5 per cent). Together, those five countries accounted for 74 per cent of global manufacture. Six other countries reported the manufacture of morphine in 2011 in quantities of more than 10 tons: Norway (17.2 tons), Spain (14.4 tons), Japan (13.8 tons), Turkey (11.9 tons), India (11.7 tons) and Slovakia (more than 10 tons)

38. Total exports of morphine amounted to 21.9 tons in 2011. As can be seen in figure 12, the leading exporting country continued to be the United Kingdom (45 per cent of global exports),²¹ followed by France (15 per cent). Seven countries imported more than 1 ton of morphine in 2011: Germany (3.7 tons), Canada (3.3 tons), Brazil (2.3 tons), the Netherlands (2 tons), Austria (1.9 tons), the United Kingdom (1.6 tons)²² and Hungary (1.2 tons). Further details on exports and imports of morphine can be found in annex IV, tables 3 and 4, respectively.

39. Global consumption of morphine, excluding preparations included in Schedule III of the 1961 Convention (see

²¹This figure is based on data submitted by the importing countries; it is being clarified with the Government.

²²This figure is based on data submitted by the exporting countries; it is being clarified with the Government.

para. 42 below), grew by a factor of more than four between 1992 and 2011. Consumption grew steadily from 10 tons in 1992, reaching 42 tons (or 420 million S-DDD) in 2011. The differences in consumption levels between countries continued to be very significant (see figure 13 and table XIV) owing to various economic, knowledge, regulatory and other factors influencing the use of morphine in the treatment of pain.

Figure 12. Morphine: export shares, 2002-2011

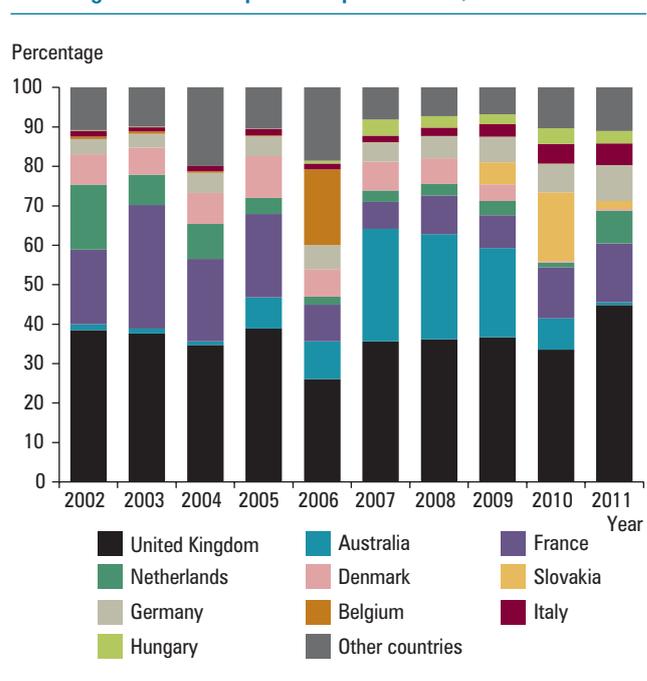
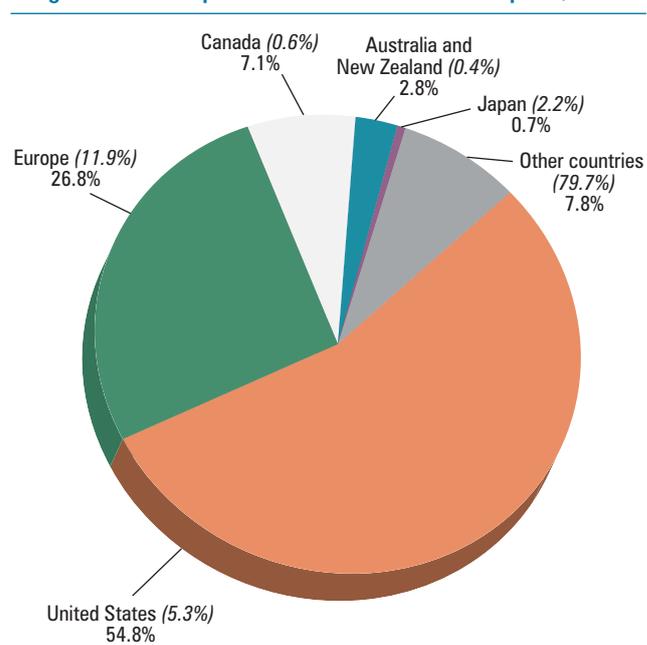


Figure 13. Morphine: distribution of consumption, 2011



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

40. In 2011, the United States was the main consumer country of morphine; with consumption of 23.1 tons, it accounted for 55 per cent of global consumption of morphine, excluding preparations included in Schedule III of the 1961 Convention. It was followed by Canada and the United Kingdom (both 3 tons, or 7 per cent),²³ France (2 tons, or 5 per cent), Austria and Germany (both 1.9 tons, or 4 per cent) and Australia and China (both 1 ton, or 2 per cent). On the basis of defined daily doses for statistical purposes consumed per million inhabitants per day, the country with the highest consumption was Austria (6,187 S-DDD), where morphine is used for the treatment of pain as well as in substitution treatment for opioid addiction. In seven other countries, morphine consumption was over 1,000 S-DDD per million inhabitants per day in 2011: Canada (2,502 S-DDD), Denmark (2,086 S-DDD), United States (2,050 S-DDD), United Kingdom (1,350 S-DDD), Australia (1,338 S-DDD), Switzerland (1,219 S-DDD) and New Zealand (1,045 S-DDD).

41. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention. In 2011, China reported the use of 7.4 tons of morphine for the manufacture of such preparations. Other countries using morphine for that purpose in significant quantities were Italy (836 kg) and the United Kingdom (400 kg).

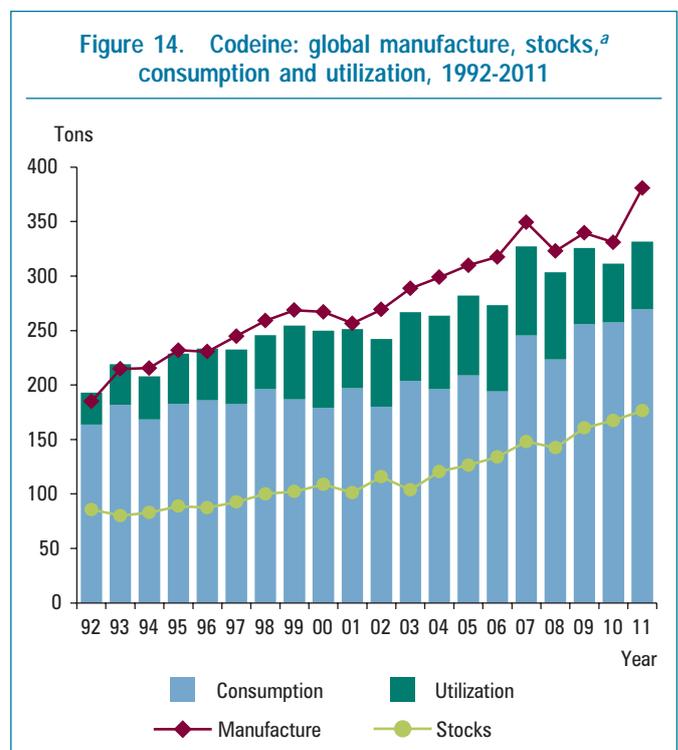
42. The largest share of morphine is used for conversion into other opiates, such as codeine, ethylmorphine and pholcodine (see table VI). The amounts utilized for that purpose, which fluctuated around the level of 200 tons per year until the beginning of the 1990s, have increased steadily since then, reaching 385 tons in 2011. Of the quantity utilized in 2011, 97 per cent was converted into codeine. The six main user countries in 2011 were the United Kingdom (89.3 tons, or 23 per cent of the world total), France (75.8 tons, or 20 per cent), the United States (60.9 tons, or 16 per cent), Australia (33.3 tons, or 9 per cent), Iran (Islamic Republic of) (20.9 tons, or 5 per cent) and Norway (16.3 tons, or 4 per cent), which together accounted for 77 per cent of global utilization. Other countries reporting conversion of morphine into other drugs in significant quantities in 2011 were Spain (14.2 tons), Japan (12.2 tons), Turkey (11.8 tons), India (11.6 tons) and China (10.9 tons).

43. Morphine is also used for the manufacture of substances not controlled under the 1961 Convention, such as noroxymorphone, nalorphine and naloxone. The quantity of morphine utilized for that purpose fluctuated considerably in the last two decades, amounting to 1,057 kg in 2011, of which 924 kg was used by the United Kingdom and 133 kg by France.

44. Global stocks of morphine followed a rising trend; in 2011, they stood at 133 tons. The largest stocks were held by the United States (50.9 tons, or 38 per cent of global stocks), the United Kingdom (35 tons, or 26 per cent) and France (11.5 tons, or 9 per cent).

Codeine

45. Codeine is a natural alkaloid of the opium poppy plant, but most (90-95 per cent) of the codeine currently being manufactured is obtained from morphine through a semi-synthetic process. Codeine is used mainly for the manufacture of preparations in Schedule III of the 1961 Convention, while a smaller quantity is used for the manufacture of other narcotic drugs, such as dihydrocodeine and hydrocodone. The trends in global manufacture, consumption, utilization and stocks of codeine during the period 1992-2011 are shown in figure 14.



^aStocks as at 31 December of each year.

46. After a general upward trend in the 1990s and an increase to 349 tons in 2007, codeine manufacture reached a peak of 381 tons in 2011 (see figure 15). The main manufacturing country was the United Kingdom (85 tons, or 22 per cent of global manufacture), followed by France (78.3 tons, or 21 per cent), the United States (64.6 tons, or 17 per cent) and Australia (31.9 tons, or 8 per cent).

47. World exports of codeine followed a rising trend, reaching 168.4 tons in 2011, the highest level ever reported (see figure 16). France was the leading exporting country of codeine in 2011, with 46.8 tons, accounting for 28 per cent of world exports, followed by Australia (26.3 tons, or

²³For the United Kingdom, this figure was calculated by INCB using available data series; it is being clarified with the Government.

16 per cent), the United Kingdom (21.1 tons, or 13 per cent)²⁴ and Iran (Islamic Republic of) (16.8 tons, or 10 per cent). The main importing countries of codeine in 2011 were India (48.9 tons), Canada (20.2 tons), Switzerland (13 tons), Hungary (9.3 tons) and Germany (9 tons). Seventeen other countries reported imports of between 1 and 4 tons in 2011. More details on international trade in codeine can be found in annex IV, tables 3 and 4.

Figure 15. Codeine: manufacture, 1992-2011

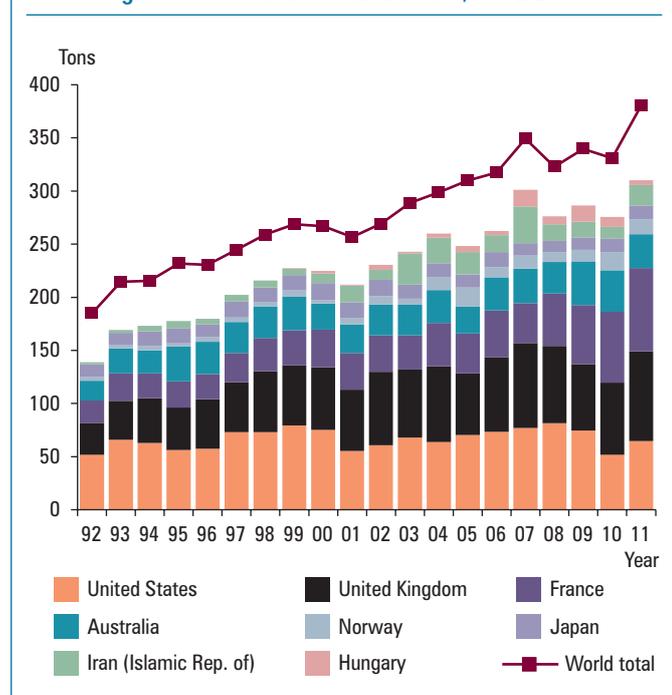
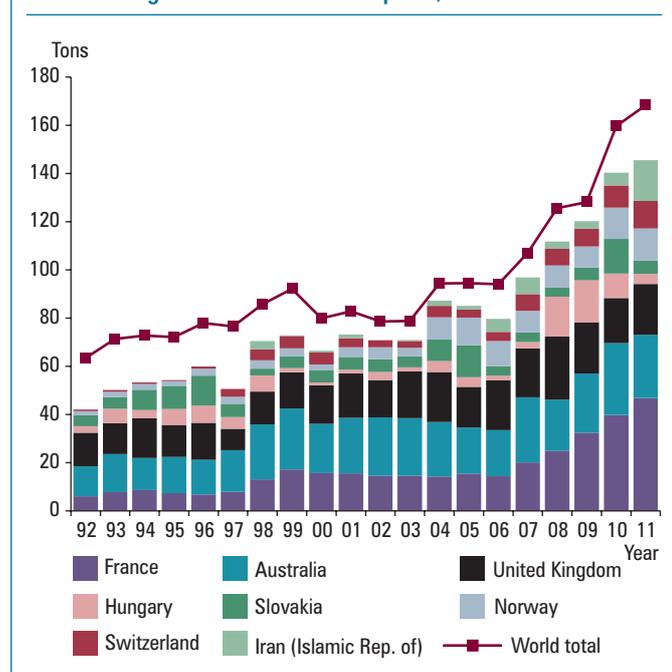


Figure 16. Codeine: exports, 1992-2011

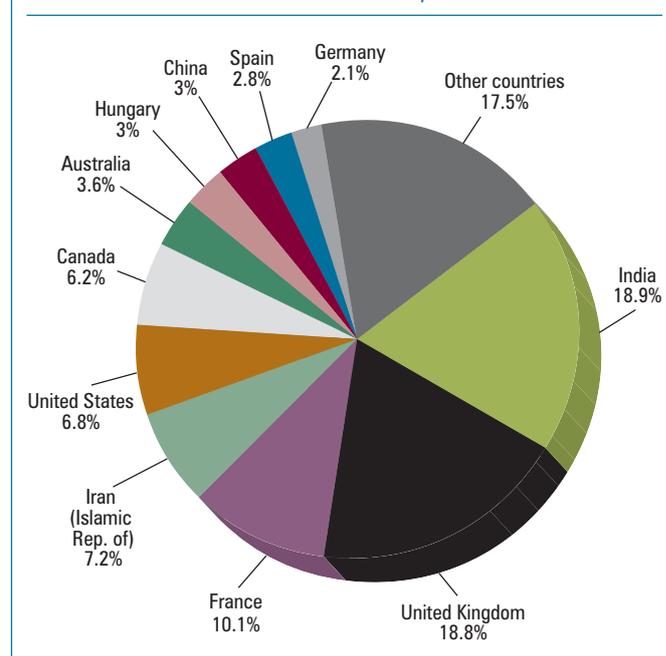


²⁴This figure is based on data submitted by the importing countries; it is being clarified with the Government.

48. Codeine is used mainly in the form of preparations listed in Schedule III of the 1961 Convention. In 2011, preparations listed in Schedule III accounted for 99 per cent of the total consumption of codeine. The consumption of codeine grew from 164 tons in 1992 to 269 tons in 2011 (see figure 14), making codeine the second most widely used opiate in medical practice globally in terms of defined daily doses for statistical purposes (2.7 billion S-DDD). It should be noted that countries reporting the utilization of codeine for the manufacture of preparations listed in Schedule III are not necessarily the countries of consumption of those preparations. Large quantities of those preparations are exported from some of those countries.

49. The main countries reporting the use of codeine for the manufacture of preparations listed in Schedule III in 2011 were India (50.3 tons), the United Kingdom (50 tons), France (27 tons), Iran (Islamic Republic of) (19.2 tons), the United States (18.2 tons) and Canada (16.4 tons), which together accounted for 68 per cent of global use in 2011. Other major user countries were, in descending order of quantity used, Australia, Hungary, China, Spain, Germany and Ireland (see figure 17).

Figure 17. Codeine: utilization for the manufacture of preparations listed in Schedule III of the 1961 Convention, 2011



50. Utilization of codeine for the manufacture of other narcotic drugs, mainly dihydrocodeine and hydrocodone, increased steadily, reaching the highest level in 2007 (81.8 tons). Utilization declined to 62.3 tons in 2011. Of the amount reported for 2011, 30.1 tons was used in the United States, mainly for the manufacture of hydrocodone, while 12 tons was used in the United Kingdom, 11.5 tons in Japan and 3.5 tons in Italy for the manufacture of dihydrocodeine.

51. Global stocks of codeine amounted to 176 tons in 2011. About 56 per cent of global stocks were held by four countries: United States (36 tons), United Kingdom (25 tons), France (19 tons) and India (18 tons). Fourteen other countries held stocks of codeine in quantities of more than 1 ton: in descending order of quantity of stocks, Canada, Japan, Australia, Hungary, Romania, Norway, Spain, Switzerland, Germany, China, South Africa, Turkey, Russian Federation and Italy.

Thebaine

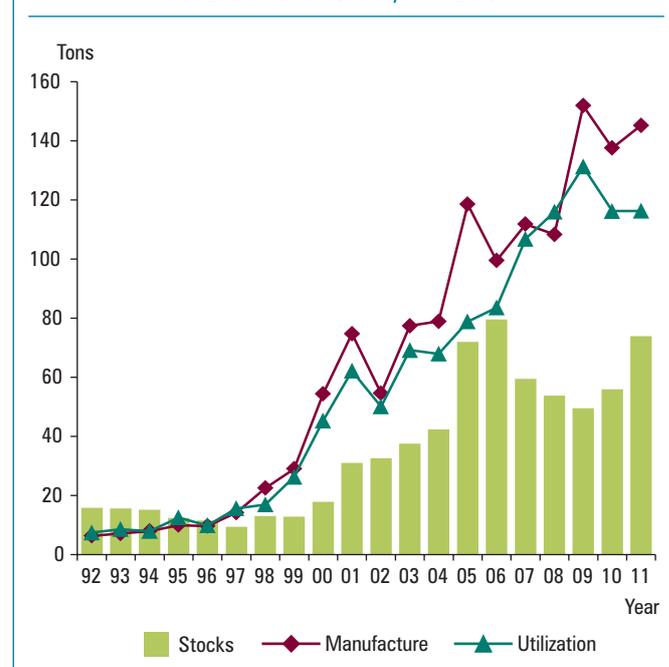
52. Until the 1990s, thebaine was manufactured mainly from opium; since 1999, it has been obtained primarily from poppy straw. Thebaine may also be obtained through the conversion of oripavine or from semi-synthetic opioids, such as hydrocodone. Thebaine itself is not used in therapy, but it is an important starting material for the manufacture of a number of opioids, mainly codeine, dihydrocodeine, etorphine, hydrocodone, oxycodone and oxymorphone (all of which are substances controlled under the 1961 Convention) and buprenorphine (which is a substance controlled under the Convention on Psychotropic Substances of 1971),²⁵ as well as for substances not under international control, such as the derivatives naloxone, naltrexone, nalorphine and nalbuphine.

53. Global manufacture of thebaine has increased sharply since the late 1990s, as a consequence of the growing demand for oxycodone and other drugs and substances that may be derived from it. In 2009 global manufacture reached a peak of 152 tons (see figure 18 and tables III and V), and in 2011 manufacture decreased to 145 tons, mostly because of reductions in manufacture in Spain. The United States continued to be the leading manufacturing country, accounting for 84.3 tons, or 58 per cent of global manufacture, in 2011. The other major manufacturers of thebaine were Australia (39.5 tons, or 27 per cent) and Spain (13.9 tons, or 10 per cent). Global exports of thebaine reached 45 tons in 2011. Australia and Spain remained the main exporting countries in 2011, together accounting for 99 per cent of the world total. The main importing country of thebaine was the United Kingdom (34.7 tons).²⁶

54. Utilization of thebaine for the manufacture of other narcotic drugs reached 104 tons in 2011 (see figure 19 and table VII). The United States was the main user country of thebaine during the 20-year period from 1992 to 2011. In 2011, the United States accounted for 72 per cent of global use, followed by the United Kingdom, which accounted for

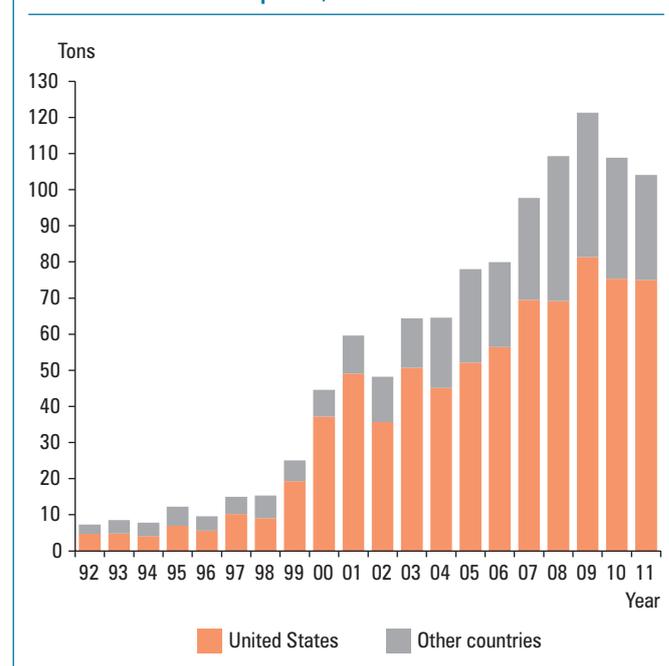
18 per cent. The quantity of thebaine reported as used for the manufacture of substances not covered under the 1961 Convention (mainly buprenorphine) fluctuated during the 10-year period from 2001 to 2011; in 2011, it amounted to 12.2 tons, with the United Kingdom and Germany together accounting for 71 per cent of the world total.

Figure 18. Thebaine: global manufacture, utilization and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

Figure 19. Thebaine: utilization for the manufacture of opioids, 1992-2011



²⁵United Nations, *Treaty Series*, vol. 1019, No. 14956.

²⁶This figure is based on data submitted by the exporting countries; it is being clarified with the Government.

55. Global stocks of thebaine stood at 74 tons in 2011. Major stocks were held in the United States (36 tons), the United Kingdom (19 tons), France (8.4 tons), Japan (3.3 tons) and India (1.7 tons).

Oripavine

56. In 2007, oripavine was included in Schedule I of the 1961 Convention. The United States (9.7 tons) and Australia (5.1 tons) were the only countries reporting manufacture of oripavine in 2011. The use of oripavine in significant quantities for the manufacture of other drugs was reported in 2011 by the United States (8 tons, mainly for oxycodone and hydromorphone) and Australia (1.7 tons, mainly for thebaine). In 2011, global stocks of oripavine amounted to 8.2 tons, of which 66 per cent was held in the United States.

Semi-synthetic opioids

57. Semi-synthetic opioids are made by relatively simple chemical modifications of natural opiates, such as morphine, codeine and thebaine. Some examples of these derivatives are dihydrocodeine, ethylmorphine, heroin, hydrocodone, oxycodone and pholcodine. The information on semi-synthetic opioids is presented below in English alphabetical order.

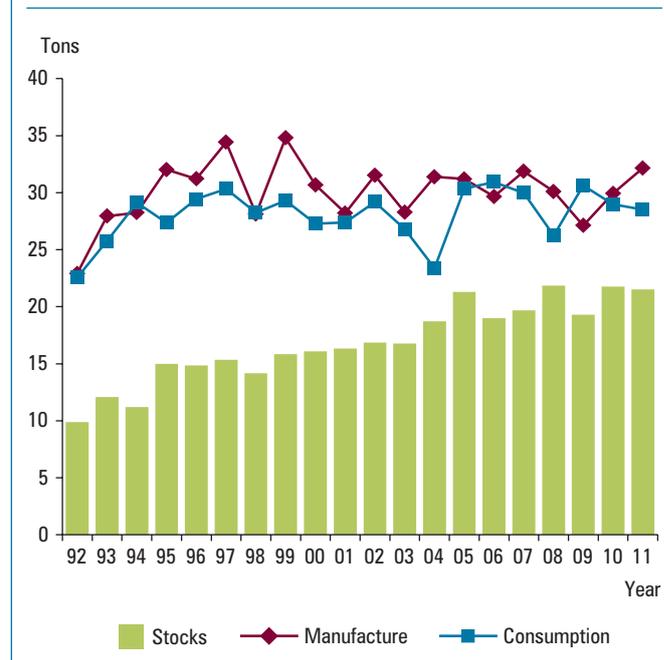
Dihydrocodeine

58. Global manufacture of dihydrocodeine rose until 1999, when it reached 34.8 tons. After 2000, the annual manufacture fluctuated between 27.1 tons and 31.9 tons and stood at 32.2 tons in 2011 (see figure 20). Japan (12.3 tons), the United Kingdom (11.4 tons) and Italy (3.2 tons) have been the main manufacturing countries, together accounting for 84 per cent of total world dihydrocodeine manufacture in 2011. Global exports of dihydrocodeine amounted to 12.1 tons in 2011. The main exporting country remained Italy, accounting for 23 per cent of world exports, followed by the United Kingdom, France and Belgium. The Republic of Korea became the leading importing country of dihydrocodeine in 2011 (4.2 tons); other main importers were the United Kingdom (2 tons) and France (1.6 tons).

59. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention, accounting for 97 per cent of total consumption. In 2011, use of dihydrocodeine reached 28.5 tons (about 298 million S-DDD). The main user countries of dihydrocodeine were Japan, the Republic of Korea and the United Kingdom, together accounting for 89 per cent of total

global utilization. In 2011, global stocks of dihydrocodeine amounted to 21.5 tons; major stocks were held in Japan (10.1 tons) and the Republic of Korea (3.3 tons).

Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

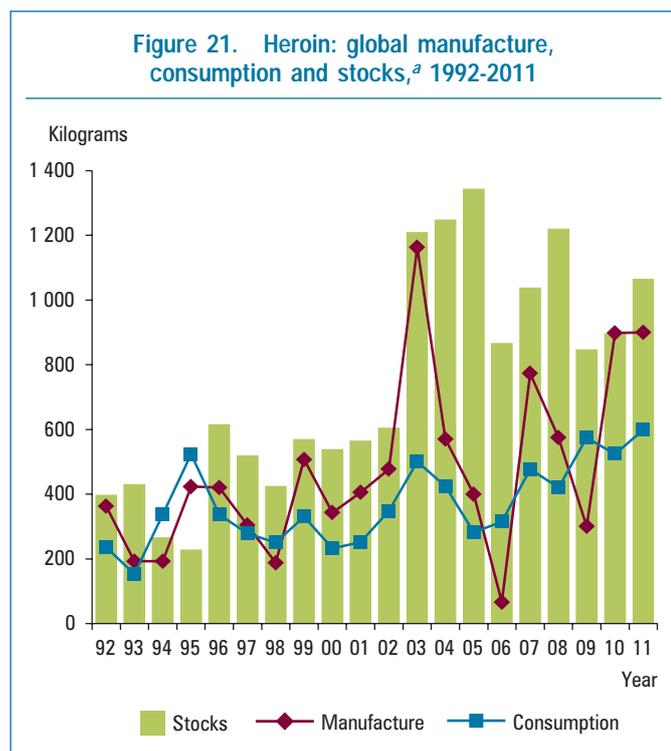
Ethylmorphine

60. Global manufacture of ethylmorphine has followed a downward trend in the last 20 years, remaining stable at 1 ton in 2011. France and India, the main manufacturing countries in 2011, accounted for 57 per cent and 19 per cent of global manufacture, respectively. France, at 562.5 kg, continued to be the leading exporting country, accounting for 68 per cent of global exports. The two largest importers in 2011, Sweden and Belgium, imported 315.9 kg and 162.4 kg of ethylmorphine, respectively. Ethylmorphine is consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (about 89 per cent of total consumption). Global utilization reached 1.4 tons in 2011 (28 million S-DDD). The main user countries in 2011 were Sweden (31 per cent of the world total) and France (30 per cent). In 2011, global stocks of ethylmorphine totalled 1.1 tons; the largest holder of stocks was France (36 per cent of global stocks).

Heroin

61. From 1992 to 2002, global licit manufacture of heroin fluctuated between 200 kg and 500 kg. In 2003, it increased sharply to 1.2 tons, the largest amount ever reported. After 2003, manufacture declined and fluctuated, reflecting the changes in the manufacture reported by Switzerland and

the United Kingdom. In 2011, global manufacture amounted to 900 kg (see figure 21), manufactured by the United Kingdom (573 kg) and Switzerland (327 kg). In 2011, the United Kingdom continued to be the main exporting country of heroin (469 kg, or 58 per cent of global exports).²⁷ Other exporters of heroin in amounts exceeding 10 kg were Germany (241 kg), Switzerland (59 kg), Hungary (15 kg) and France (12 kg). Switzerland became the main importing country of heroin in 2011 (416 kg), followed by Germany (135 kg) and the Netherlands (120 kg).



^aStocks as at 31 December of each year.

62. Global consumption of heroin amounted to 599 kg in 2011. Switzerland, where heroin is prescribed for long-term opiate addicts, reported consumption of 238 kg in 2011. Other countries with significant heroin consumption in 2011 were the United Kingdom (160 kg),²⁸ the Netherlands (137 kg), Denmark (30 kg) and Germany (29 kg). In 2011, global stocks of heroin amounted to 1.1 tons. The countries holding significant stocks in 2011 were Switzerland (666 kg), the United Kingdom (130 kg), Germany (118 kg) and the Netherlands (93 kg).

Hydrocodone

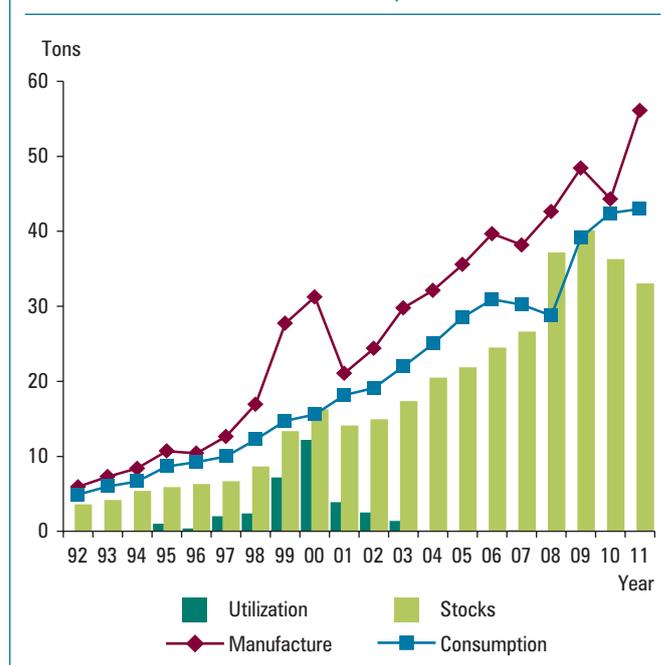
63. Global manufacture of hydrocodone has followed an upward trend in the last 20 years, reaching 56.1 tons in

²⁷This figure is based on data submitted by the importing countries; it is being clarified with the Government.

²⁸This figure was calculated by INCB using available data series; it is being clarified with the Government.

2011 (see figure 22), with the United States accounting for almost 100 per cent of global manufacture.

Figure 22. Hydrocodone: global manufacture, consumption, utilization^a and stocks,^b 1992-2011



^aUtilization for the manufacture of other drugs.

^bStocks as at 31 December of each year.

64. Global consumption of hydrocodone stood at 43 tons in 2011, with the United States accounting for more than 99 per cent of the total. The high consumption in the United States makes hydrocodone the most used narcotic drug in medical practice in terms of defined daily doses for statistical purposes (about 2.9 billion S-DDD). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the countries with the highest consumption of hydrocodone in 2011 were the United States (25,382 S-DDD) and Palau (365 S-DDD). In the past, hydrocodone had been used in the United States for the manufacture of thebaine for the purpose of manufacturing other narcotic drugs; no such use was reported after 2003, as extraction of thebaine from poppy straw had increased since the late 1990s and replaced the use of hydrocodone in the manufacture of thebaine. In 2011, global stocks of hydrocodone accounted for 33 tons; more than 99 per cent was held by the United States.

Hydromorphone

65. Global manufacture of hydromorphone increased sharply during the last 20 years, reaching 6.1 tons in 2011. The United States (75 per cent of global manufacture) and the United Kingdom (17 per cent) were the leading manufacturing countries in 2011. Total exports of hydromorphone have followed an upward trend, reaching 3 tons in

2011. The leading exporting countries were the United Kingdom (31 per cent of world exports)²⁹ and the United States (16 per cent). Canada remained the main importing country (1 ton) in 2011, followed by Germany (546 kg) and France (538 kg).

66. Global consumption of hydromorphone increased steadily, reaching 4.3 tons (215 million S-DDD) in 2011. The United States remained the main consumer country in 2011 (65 per cent of global consumption), followed by Canada (20 per cent) and Germany (7 per cent). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the countries with the highest consumption of hydromorphone in 2011 were Canada (3,589 S-DDD) and Austria (1,402 S-DDD). Global stocks of hydromorphone reached 5.2 tons in 2011, of which 62 per cent was held in the United States.

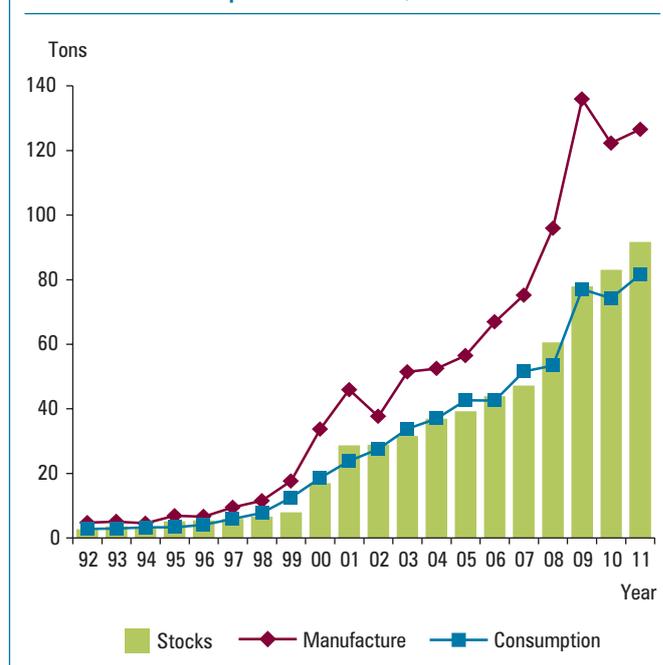
Oxycodone

67. Global manufacture of oxycodone has increased sharply over recent years, reaching a record level of 135.9 tons in 2009 and standing at 127 tons in 2011 (see figure 23). In 2011, the United States accounted for 84 per cent of the world total manufacture, followed by the United Kingdom (10 per cent) and Switzerland (3 per cent). Total exports of oxycodone have risen steadily and stood at 25.8 tons in 2011. The United Kingdom continued to be the main exporting country in 2011 (57 per cent of world exports),³⁰ followed by the United States (19 per cent). Canada and the United Kingdom remained the major importers of oxycodone in 2011, accounting for 24 per cent and 13 per cent³¹ of global oxycodone imports, respectively. Tables 3 and 4 of annex IV provide further details on exports and imports, respectively, of oxycodone.

68. Global consumption of oxycodone has been steadily rising; in 2011, it amounted to 81.6 tons (1.1 billion S-DDD). The United States, which continued to be the principal consumer country of oxycodone, accounted for 81 per cent of the world total. Other major consumer countries in 2011 were Canada (5 tons), Germany (2.6 tons) and Australia (2.1 tons). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the countries with the highest consumption of oxycodone in 2011 were the United States (7,834 S-DDD), Canada (5,564 S-DDD) and Australia (3,597 S-DDD). Global stocks of oxycodone increased to 92.7 tons in 2011—the highest level

ever recorded—with the United States accounting for 78 per cent of the world total.

Figure 23. Oxycodone: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

Pholcodine

69. Global manufacture of pholcodine has fluctuated in the past 20 years, amounting to 10.4 tons in 2011 (see figure 24). The main manufacturers in 2011 were France (3.7 tons), the United Kingdom (2.2 tons) and Hungary (1.8 tons). Total exports of pholcodine reached 8.1 tons in 2011, the main exporting countries being Norway (26 per cent of total exports), France (26 per cent), the United Kingdom (24 per cent) and Hungary (19 per cent). The main importers in 2011 were Hong Kong, China (4.2 tons), and Algeria (820 kg). Further details on exports and imports of pholcodine are provided in annex IV, tables 3 and 4, respectively.

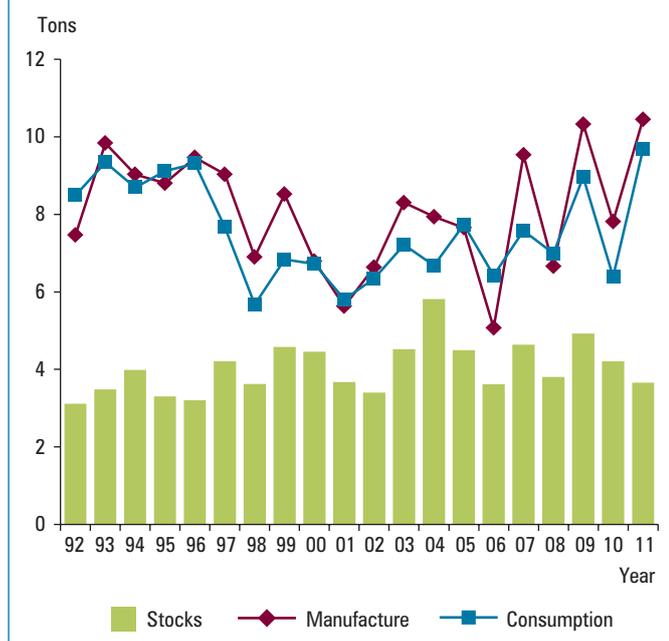
70. Most pholcodine is consumed in the form of preparations listed in Schedule III of the 1961 Convention; in 2011, such preparations accounted for 94 per cent of total consumption. Global utilization of pholcodine amounted to 9.6 tons (192 million S-DDD) in 2011. The major user countries and territories in 2011 were Hong Kong, China (44 per cent of the world total), France (19 per cent), Pakistan (13 per cent) and Australia (7 per cent). Global stocks of pholcodine decreased to 3.7 tons in 2011. Major stocks were held by France (22 per cent of global stocks), Pakistan (12 per cent), Hungary (9 per cent) and the United Kingdom (8 per cent).

²⁹This figure is based on data submitted by the importing countries; it is being clarified with the Government.

³⁰This figure is based on data submitted by the importing countries; it is being clarified with the Government.

³¹This figure is based on data submitted by the exporting countries; it is being clarified with the Government.

Figure 24. Pholcodine: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

Synthetic opioids

71. Synthetic opioids are used in the treatment of chronic, moderate or severe pain. They are also used for the induction of general anaesthesia and in the treatment of specific conditions such as gastrointestinal disorders. In addition, methadone is used in treatment related to drug dependency. The information on synthetic opioids is presented below in English alphabetical order.

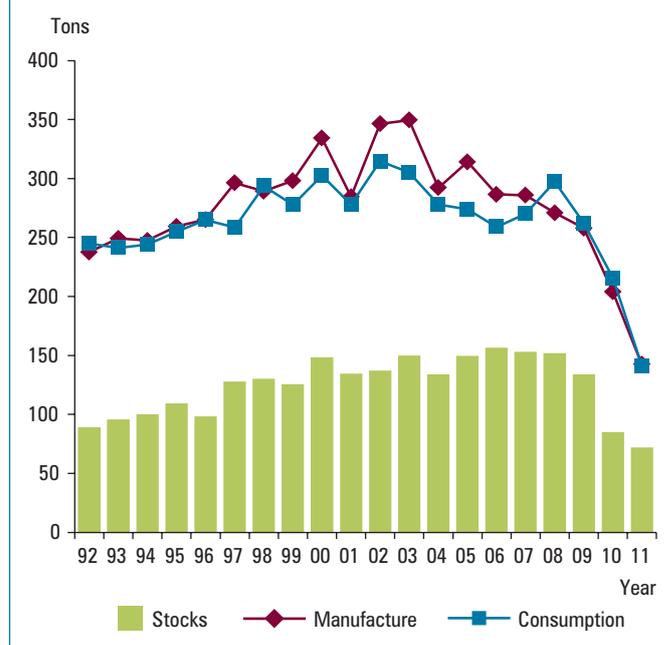
Dextropropoxyphene

72. Global manufacture of dextropropoxyphene has followed a downward trend since 2003 and declined sharply in 2011 to 142 tons (see figure 25), corresponding to about 41 per cent of the record level of 349.6 tons in 2003. India was the only country reporting manufacture in significant quantities in 2011. Global exports also declined sharply, from almost 119 tons in 2002 to less than 5 tons in 2011. Exports from India, the principal exporting country of dextropropoxyphene, accounted for 38 per cent of global exports in 2011. Exports from France and Italy accounted for 25 per cent and 22 per cent of the global total, respectively. Mexico was the main importing country of dextropropoxyphene in 2011 (1.9 tons), followed by Ireland (1.3 tons) and Australia (747 kg).

73. Dextropropoxyphene is consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (more than 99 per cent of total consumption in 2011).

Global use of dextropropoxyphene peaked in 2002 at 315 tons and has followed a sharp downward trend since then, declining to 141 tons in 2011 (about 564 million S-DDD). The countries reporting the highest utilization in 2011 were India (92 per cent of the global total), the United States (4 per cent) and Mexico (2 per cent). Global stocks of dextropropoxyphene decreased to 72 tons in 2011. The largest stocks were held by India (32 tons), the United States (16 tons) and Italy (13 tons).

Figure 25. Dextropropoxyphene: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

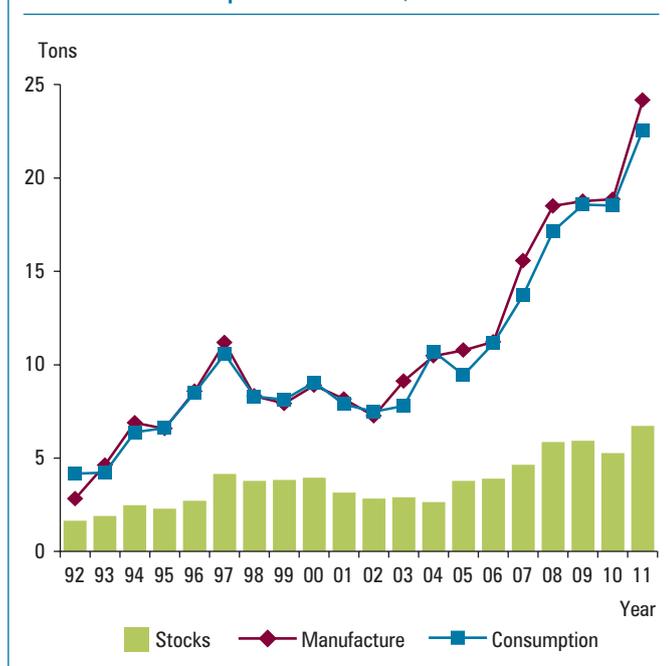
Diphenoxylate

74. Global manufacture of diphenoxylate has followed a generally rising trend during the last two decades, reaching a peak of 24.2 tons in 2011 (see figure 26). India remained the main manufacturing country in 2011, contributing 89 per cent of the global total, followed by China (8 per cent of the global total) and the United States (3 per cent). India was also the main exporting country, accounting for 2 tons, or 93 per cent of world exports. In 2011, the Islamic Republic of Iran was the principal importing country of diphenoxylate (579 kg), followed by Singapore (118 kg) and the United Kingdom (93 kg).

75. Diphenoxylate is consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (more than 99 per cent of total consumption in 2011). Global use in 2011 reached the record level of 22.6 tons, corresponding to 1.5 billion S-DDD. The countries reporting the highest utilization in 2011 were India (80 per cent of the global total), China (9 per cent), Pakistan (4 per cent),

Iran (Islamic Republic of) (3 per cent) and the United States (3 per cent). Global stocks of diphenoxylate in 2011 amounted to 6.7 tons, 87 per cent of which was held by India, 5 per cent by the United States and 3 per cent by Pakistan.

Figure 26. Diphenoxylate: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

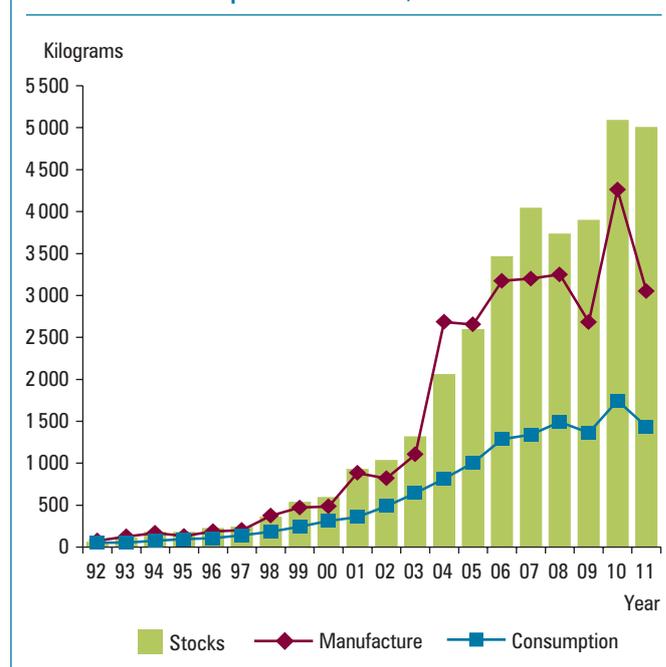
Fentanyl

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

77. Global manufacture of fentanyl increased slowly until 1992, when it reached 77 kg. After that, manufacture of fentanyl grew rapidly, reaching the record level of 4.3 tons in 2010 and standing at 3.1 tons in 2011 (see figure 27). In 2011, the United States was the main manufacturing country of fentanyl (52 per cent of global manufacture), followed by Belgium (16 per cent) and South Africa (12 per cent). Belgium remained the principal exporting country, exporting 374 kg of fentanyl in 2011, followed by Germany (301 kg) and South Africa (293 kg). In 2011, Germany was the leading importing country of fentanyl

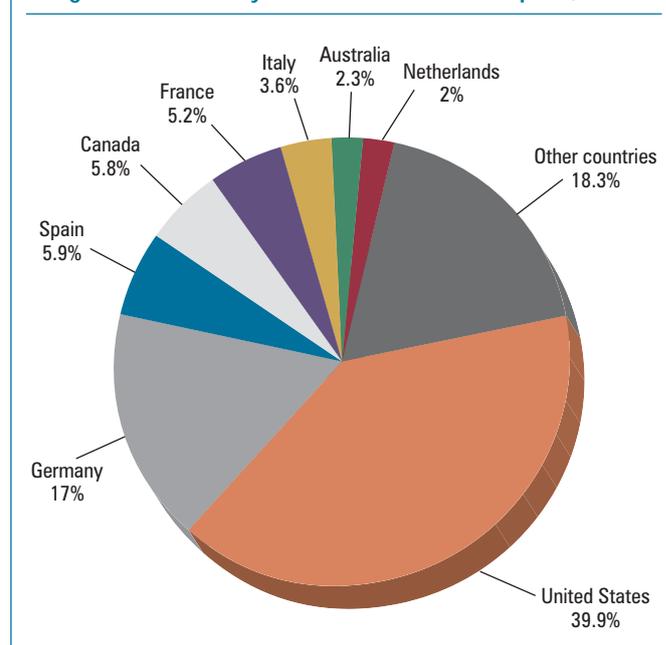
(531 kg), followed by the United Kingdom (92 kg)³² and France (80 kg). Tables 3 and 4 of annex IV provide further details on exports and imports, respectively, of fentanyl.

Figure 27. Fentanyl: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

Figure 28. Fentanyl: distribution of consumption, 2011



78. Global consumption of fentanyl has followed a steady increasing trend and reached a peak of 1.7 tons in 2010. Global consumption stood at 1.4 tons (corresponding to

³²This figure is based on data submitted by the exporting countries; it is being clarified with the Government.

2.3 billion S-DDD) in 2011, which made fentanyl the synthetic opioid with the highest consumption in terms of defined daily doses. The United States, accounting for 40 per cent of the world total, continued to be the main consumer country in 2011, followed by Germany, Spain, Canada and France (see figure 28). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the countries and territories having the highest consumption of fentanyl in 2011 were Gibraltar (13,656 S-DDD), Germany (13,569 S-DDD) and Austria (11,871 S-DDD). In 2011, global stocks of fentanyl stood at 5.2 tons. The largest stocks were held by Belgium (39 per cent of global stocks), followed by the United States (31 per cent).

Fentanyl analogues

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

Alfentanil

80. Global manufacture of alfentanil has fluctuated sharply from year to year; it declined from 38.5 kg in 2010 to 11.9 kg in 2011. The principal manufacturers in 2011 were the United States (65 per cent of global manufacture) and the United Kingdom (34 per cent). Belgium, the main manufacturing country in 2010 (27 kg) reported no manufacture in 2011. Global consumption of alfentanil remained stable, at 21.6 kg, in 2011. The United Kingdom was the main consumer country of alfentanil (51 per cent of global consumption),³³ followed by Italy (15 per cent), Germany (7 per cent) and France (6 per cent). Detailed information on the consumption of fentanyl analogues is provided in table XIII.1. In 2011, global stocks of alfentanil stood at 45 kg, of which 68 per cent was held by Belgium, followed by Italy (12 per cent) and Germany (9 per cent).

Remifentanil

81. In 2011, global manufacture of remifentanil reached a record high of 93 kg, a sharp increase from 32.2 kg in 2010. Germany accounted for 21 per cent of the global total, followed by Belgium (20 per cent), the United Kingdom (18 per cent), South Africa (12 per cent) and China (10 per cent). Global consumption of remifentanil followed a rising trend and reached a peak of 43 kg in 2011. Germany was the leading consumer (accounting for 17 per cent of global consumption), followed by China, Italy and Japan (each accounting for 12 per cent of global

consumption). In 2011, global stocks of remifentanil amounted to 91 kg, of which 18 per cent was held by Italy, 17 per cent by Belgium, 17 per cent by the United Kingdom and 14 per cent by Germany.

Sufentanil

82. Global manufacture of sufentanil amounted to 5 kg in 2011, with the United States and Belgium accounting for 43 per cent and 39 per cent of global manufacture, respectively. Global consumption of sufentanil reached 2.6 kg in 2011. Austria, China, France, Germany and the United States were the five largest consumers of sufentanil, together accounting for 83 per cent of the global total. In 2011, global stocks of sufentanil totalled 12.4 kg, most of which was held by the United States (53 per cent) and Belgium (24 per cent).

Ketobemidone

83. Global manufacture of ketobemidone reached 507 kg in 2003, the highest level in 10 years. In the past five years, manufacture was reported only in 2008, by Denmark, which manufactured less than 1 kg, and in 2011, by the United Kingdom, which manufactured 182 kg. The United Kingdom was the main exporting country of ketobemidone in 2011, accounting for 182 kg, or 81 per cent, of global exports,³⁴ followed by Germany (37 kg, or 17 per cent of global exports). The main importing countries were Germany (182 kg), Sweden (22 kg) and Norway (13 kg).

84. Global consumption of ketobemidone, which occurs mostly in the Scandinavian countries, amounted to 85 kg in 2011 (corresponding to 1.7 million S-DDD). Denmark (50 per cent of the global total), Sweden (29 per cent) and Norway (18 per cent) remained the main consumer countries of ketobemidone. Global stocks of ketobemidone stood at 220 kg in 2011. Germany continued to hold the largest stocks (84 per cent of the global total).

Methadone

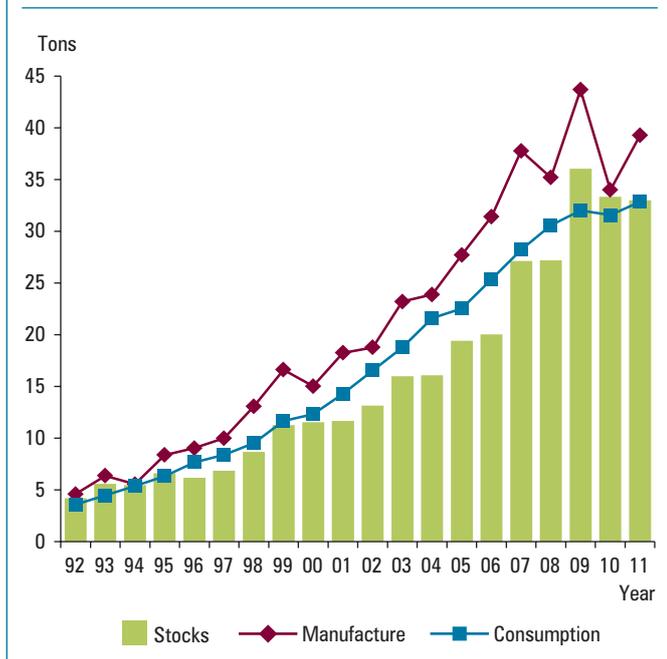
85. Global manufacture of methadone has increased steadily over the past 20 years. After a peak of 43.7 tons in 2009, global manufacture stood at 39.3 tons in 2011 (see figure 29). The two countries accounting for most of global manufacture in 2011 were the United States (17.4 tons, or 44 per cent of global manufacture) and Switzerland (12.4 tons, or 32 per cent). Four other countries reported manufacture of methadone in 2011 in quantities of more

³³This figure was calculated by INCB using available data series; it is being clarified with the Government.

³⁴This figure is based on data submitted by the importing countries; it is being clarified with the Government.

than 1 ton: the United Kingdom (2.6 tons), China (2.1 tons), Spain (1.5 tons) and Germany (1.2 tons).

Figure 29. Methadone: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

86. Global exports of methadone amounted to 17.8 tons in 2011. Switzerland remained the main exporting country (12.2 tons), followed by Slovakia (1.1 tons) and the United Kingdom (1.0 tons). The largest imports of methadone were reported by Iran (Islamic Republic of) (2.2 tons). Five other countries reported imports of more than 1 ton: the United Kingdom (1.8 tons),³⁵ Canada (1.7 tons), Germany (1.6 tons), Italy (1.4 tons) and France (1.2 tons). Tables 3 and 4 of annex IV provide further details on exports and imports, respectively, of methadone.

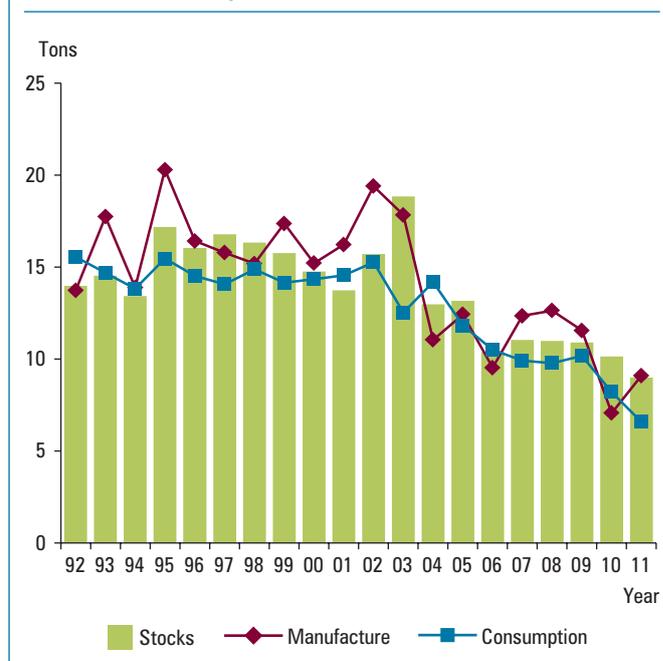
87. The sharp upward trend in consumption of methadone is attributable to its growing use in the treatment of opioid addiction, although it is also used in several countries for the treatment of pain. Global consumption of methadone stabilized after 2008 and amounted to 32.8 tons in 2011. The United States remained the main consumer country (47 per cent of the global total), followed by the United Kingdom (7 per cent), Canada (5 per cent) and China (5 per cent). More details on the consumption of methadone can be found in table XII. Global stocks of methadone stood at 33 tons in 2011. The countries holding the largest stocks remained the United States (more than 30 per cent of global stocks) and Switzerland (29 per cent).

³⁵This figure is based on data submitted by the exporting countries; it is being clarified with the Government.

Pethidine

88. Global manufacture of pethidine followed a declining trend during the last 20 years, reaching a low of 7 tons in 2010. In 2011, global manufacture increased to 9.1 tons (see figure 30). The United States continued to be the main manufacturing country in 2011, with 3.2 tons, or 35 per cent of global manufacture, followed by Spain (2.9 tons, or 32 per cent) and China (1.6 tons, or 18 per cent). In 2011, global exports of pethidine increased slightly to 5.3 tons. Spain remained the principal exporting country in 2011, accounting for 42 per cent of global exports. The main importer of pethidine in 2011 was the United Kingdom (668 kg),³⁶ followed by Canada (504 kg) and Switzerland (487 kg). Tables 3 and 4 of annex IV provide further details on exports and imports, respectively, of pethidine.

Figure 30. Pethidine: global manufacture, consumption and stocks,^a 1992-2011



^aStocks as at 31 December of each year.

89. Pethidine consumption has followed a downward trend, reaching 6.6 tons in 2011 (corresponding to 16.5 million S-DDD). The United States and China were the main consumer countries, accounting for 35 per cent and 19 per cent, respectively, of global consumption. Global stocks of pethidine totalled 9 tons in 2011. The largest stocks were held by the United States (33 per cent of global stocks), Germany (11 per cent) and China (10 per cent).

³⁶This figure is based on data submitted by the exporting countries; it is being clarified with the Government.

Tilidine

90. Global manufacture of tilidine has fluctuated from year to year; in 2011 it amounted to 31.7 tons, of which Germany was the main manufacturer, accounting for 98 per cent of total manufacture. Total exports of tilidine reached 8 tons in 2011. Germany continued to be the principal exporting country in 2011, accounting for 79 per cent of global exports, followed by Belgium (21 per cent). Those two countries were also the main importers in 2011.

91. Consumption of tilidine reached a record level of 41.7 tons in 2010 and declined to 30.8 tons in 2011 (corresponding to 154 million S-DDD). Most tilidine has been consumed in Germany, which accounted for 92 per cent of the world total in 2011. In 2011, the countries with the highest consumption of tilidine, in terms of defined daily doses for statistical purposes consumed per million inhabitants per day, were Germany (4,705 S-DDD), Belgium (3,025 S-DDD) and Luxembourg (1,270 S-DDD). Global stocks of tilidine stood at 46.1 tons in 2011, almost all being held by Germany (97 per cent) and Belgium (3 per cent).

Trimeperidine

92. Global manufacture of trimeperidine has fluctuated from year to year; in 2011 it amounted to 309 kg. India, Ukraine and the Russian Federation were the only manufacturers in 2011, accounting for 41 per cent, 30 per cent and 29 per cent of total manufacture, respectively. India was the leading exporting country of trimeperidine in 2011 (119 kg), followed by Ukraine (54 kg). Most of the global consumption of trimeperidine in 2011 (207 kg, corresponding to 1 million S-DDD) occurred in the Russian Federation (58 per cent), Belarus (11 per cent), Kazakhstan (11 per cent) and Ukraine (9 per cent). The countries with the highest consumption, expressed in defined daily doses for statistical purposes per million inhabitants per day, were Belarus (31 S-DDD) and the Russian Federation (19 S-DDD). In 2011, global stocks amounted to 451 kg, with the Russian Federation reporting the largest share (70 per cent of the global total).

Opioid analgesics controlled under the 1971 Convention

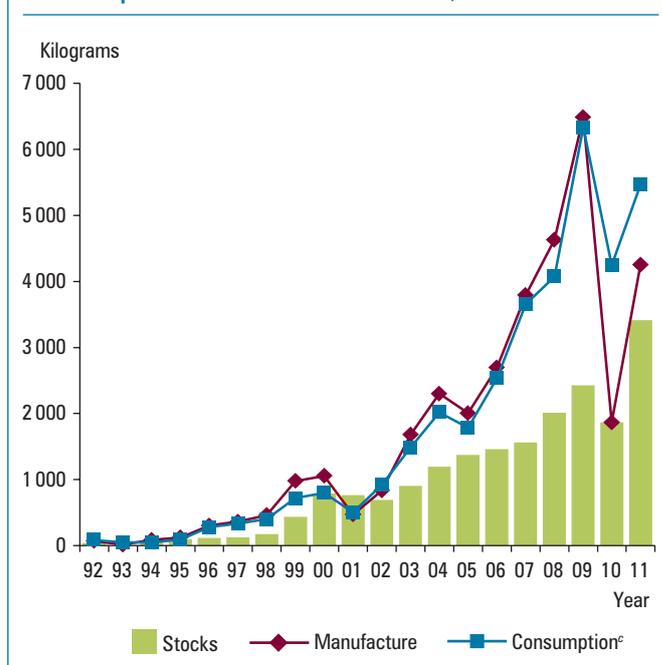
93. Buprenorphine and pentazocine are opioid analgesics that are controlled under the 1971 Convention. Brief information on these opioids is included in the present publication; more detailed comments on statistics on buprenorphine and pentazocine can be found in the INCB technical report on psychotropic substances.³⁷

³⁷*Psychotropic Substances: Statistics for 2011—Assessments of Annual Medical and Scientific Requirements for Substances in Schedules II, III and IV of the Convention on Psychotropic Substances of 1971* (United Nations publication, Sales No. T.13.XI.3).

Buprenorphine

94. Buprenorphine is an opioid used as an analgesic and in detoxification and substitution treatment for opioid dependence. Since the late 1990s, global manufacture of buprenorphine has increased steadily, reaching a peak of 6.5 tons in 2009. Total reported global manufacture stood at 4.2 tons in 2011 (see figure 31); manufacture was reported by nine countries, including the United States (1.5 tons), Belgium (1.3 tons), the United Kingdom (739 kg) and Switzerland (406 kg). Global exports of buprenorphine amounted to 5.4 tons in 2011. The main exporters were, in descending order, the United Kingdom, Belgium, Germany and the Czech Republic. The United States, Germany and France, in descending order, were the main importing countries of buprenorphine in 2011.

Figure 31. Buprenorphine: global calculated consumption,^a reported manufacture and stocks,^b 1992-2011



^aApproximate global consumption, calculated on the basis of statistical data submitted by Governments.

^bStocks as at 31 December of each year; data are provided on a voluntary basis and may therefore be incomplete.

^cData for 2011 are incomplete.

Pentazocine

95. Pentazocine is an opioid analgesic with properties and uses similar to those of morphine. Global manufacture of pentazocine reached a peak of 8.5 tons in 2009 and declined to 6.8 tons in 2010, with India being the main manufacturer in 2009 and 2010. In 2011, when India did not submit data on manufacture of pentazocine, global reported manufacture fell to 1.4 tons, with the majority (857 kg) manufactured by the United States. India became the world's leading exporter of pentazocine in 2011, followed by Italy. Japan and Switzerland were the main importers in 2011.

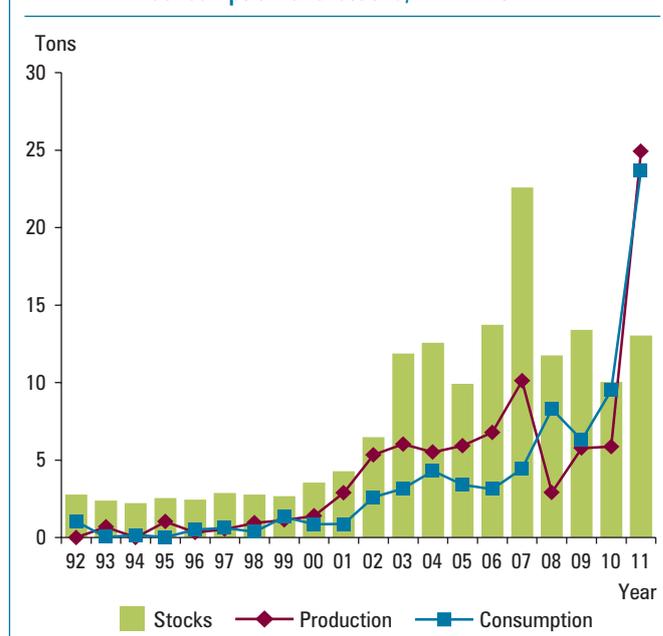
Cannabis

96. Prior to 2000, the United States had been the only country to report the use of cannabis solely for scientific purposes. Since then, some countries have started to use cannabis and/or cannabis extracts³⁸ for medical purposes, in addition to scientific research. Global licit production of cannabis reached a record high of 23 tons in 2011 (see figure 32). The principal producers in 2011 remained Canada and the United Kingdom, accounting for 94 per cent and 5 per cent of global production, respectively. While cannabis produced in Canada is used for medical purposes in that country, cannabis produced in the United Kingdom is used mainly for the manufacture of cannabis extracts for medicinal preparations, which are partly exported to other countries. Production data for 2011 were not received from Israel, where 1.5 tons of cannabis were produced in 2010. In addition, Sri Lanka has regularly released seized cannabis for use for licit purposes (in Ayurvedic medicine).

97. Global consumption of cannabis amounted to 23.7 tons in 2011. Canada remained the main consumer country (22.7 tons), followed by Sri Lanka (421 kg), Germany (169 kg), the United Kingdom (152 kg), the Netherlands (83 kg) and Spain (75 kg). No data on consumption were received from Israel. The countries reporting significant cannabis

stocks in 2011 were the United Kingdom (10.2 tons),³⁹ Canada (1.2 tons) and the United States (525 kg).

Figure 32. Cannabis: global production, consumption and stocks,^a 1992-2011



Note: The graph does not include data on consumption of cannabis in Canada.
^aStocks as at 31 December of each year.

³⁹This figure was calculated by INCB using available data series; it is being clarified with the Government.

³⁸In 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").

Coca leaf and cocaine

Coca leaf

98. Peru has been the only country exporting coca leaf for the global market since 2000. The United States has been the leading importing country, accounting for almost 100 per cent of global imports. Imports by the United States declined from 175 tons in 2001 to 90 tons in 2011. Coca leaf is used in the United States for the extraction of flavouring agents and the manufacture of cocaine as a by-product. Such use in the United States fluctuated in the period 1992-2011, following a general downward trend

ending in 2008 and then gradually increasing again to more than 125 tons in 2011. In Peru, the amount of coca leaf used for the manufacture of cocaine amounted to 30 tons, a decline from the annual average of about 90 tons used in 2009 and 2010. In recent years, small quantities of coca leaf have been used in Italy, the Netherlands and Switzerland for the extraction of flavouring agents and in France for use in homeopathic medicines. Stocks of coca leaf held in the United States account for the majority of global stocks. In 2011, stocks held in that country amounted to about 629 tons, or 80 per cent of the world total.

Cocaine

99. Global licit manufacture of cocaine followed a declining trend during the period 1992-2011, reaching a record low of 197 kg in 2011 (see figure 33). The main manufacturing countries in 2011 were Peru (182 kg) and the United States (12 kg). Peru remained the leading exporting country in 2011 (accounting for 637 kg, or 79 per cent of global exports). Exports from Peru in 2011 continued to be destined mainly for the United Kingdom, where imported cocaine is purified and partly re-exported. Consumption of cocaine has followed a declining trend, from more than 500 kg in 1992 to 234 kg in 2011. In 2011, the United States remained the main consumer country of cocaine (82 kg, or 35 per cent of global consumption), followed by the United Kingdom (40 kg), the Netherlands (27 kg) and Canada (14 kg). In 2011, global stocks of cocaine stood at 715 kg. The countries holding the largest stocks were the United Kingdom (430 kg), the United States (59 kg) and Peru (53 kg).

