

# COMMENTS ON THE REPORTED STATISTICS ON NARCOTIC DRUGS

## Summary

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

The demand for natural alkaloids that are obtained from the opium poppy plant (morphine, codeine, thebaine and oripavine) continued to be high in 2008, in line with the trend of the preceding 20 years. About 83 per cent of the morphine and 91 per cent of the thebaine manufactured worldwide were obtained from poppy straw, while the remainder was extracted from opium. Australia, France, Spain and Turkey continued to be the main producer countries in 2008, together accounting for more than three quarters of global production of poppy straw rich in morphine. Australia, France and Spain were the only producers of poppy straw rich in thebaine in 2008. India remained the sole licit supplier of opium to the world market.

Manufacture of morphine followed a rising trend over the past two decades, reaching a record level of 440 tons in 2007; in 2008, that level decreased to 390 tons. Manufacture of thebaine experienced a decline from the all-time high of 119 tons in 2005 to 106 tons in 2008. Manufacture of codeine reached a record high of 349 tons in 2007 but declined to 323 tons in 2008, which was, however, still more than the average of the preceding five years. Morphine and codeine are used in therapy and for conversion into other opioids. 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 (a narcotic drug used to treat mild to moderate pain, suppress coughs and treat diarrhoea) has been the most commonly consumed opiate in the world, in terms of doses and of the number of countries in which it is consumed. Its consumption reached an all-time high in 2007 (249 tons), after which it decreased slightly to 226 tons in 2008, the second highest level ever recorded. Global consumption of morphine for the treatment of severe pain amounted to 37.6 tons in 2008. Developed countries accounted for 92 per cent of total morphine consumption in 2008.

Among the semi-synthetic opioids obtained from natural alkaloids, hydrocodone has been the drug with the highest consumption in terms of doses consumed. Global consumption of hydrocodone amounted to 28.6 tons in 2008. As in the past, the United States accounted for almost the entire world total. Global consumption of oxycodone and hydromorphone continued to follow a steady upward trend in 2008 (52.5 tons and 2.3 tons respectively). The use of dihydrocodeine (26.2 tons in 2008) and pholcodine (7.0 tons in 2008) was relatively stable in recent years, although showing fluctuations from year to year. In a reversal of the previous downward trend, the use of ethylmorphine increased to 1.6 tons in 2008.

Among the synthetic opioids, consumption of fentanyl and methadone followed a steadily rising trend, reaching new record levels in 2008 (1.5 tons and 30.0 tons respectively). Fentanyl (a narcotic drug used to treat severe pain) has been the synthetic opioid with the highest consumption in terms of doses consumed. Consumption of tilidine (25.4 tons in 2008) increased steadily over the 20-year period from 1989 to 2008, albeit with fluctuations from year to year. Diphenoxylate consumption also increased in recent years, reaching a new all-time high in 2008 (17.2 tons). Global use of dextropropoxyphene stabilized (297 tons in 2008), while consumption of pethidine (9.8 tons in 2008) showed a downward trend.

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 (see pages 177-310 below). References to those tables are contained in the text, as appropriate. Unless otherwise indicated, the comments refer to developments during the period 1989-2008.

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

<sup>2</sup>The parties shall furnish 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 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.<sup>3</sup> The most recent statistical data reflected in the comments are those relating to the year 2008. 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.<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>

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<sup>3</sup>United Nations, *Treaty Series*, vol. 520, No. 7515.

<sup>4</sup>Details on the submission of statistical reports by individual Governments are contained in part two of this publication.

<sup>5</sup>*Report of the International Narcotics Control Board for 2009* (United Nations publication, Sales No. E.10.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 1989 to 2008. Throughout the period, the increased demand was covered mainly by poppy straw. In 2008, approximately 83 per cent of the morphine and about 91 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,<sup>6</sup> 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 94-100 below).

## Opium

6. Opium (also called “raw opium”) is the latex obtained by making incisions on the green capsules of opium poppy

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

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>7</sup> 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 1989-2008, 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 (see paragraph 10 below).

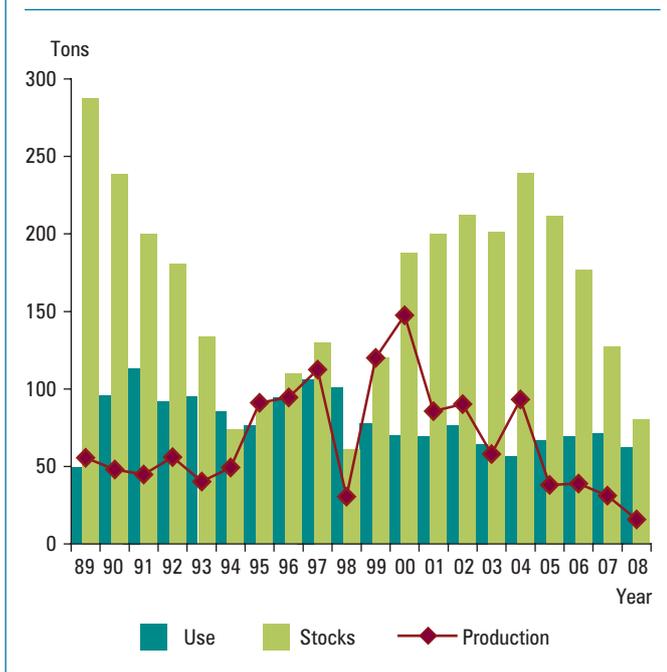
7. India has been the leading licit producer of opium for several decades, accounting for over 90 per cent of global production. Other opium-producing countries are China,<sup>8</sup> the Democratic People’s Republic of Korea and Japan (see table I, on page 177 below). Since 2000, production has been declining, with some fluctuations; in 2008, it reached 144 tons (or 16 tons in morphine equivalent), of which 94 per cent was produced in India. In China, opium is produced for domestic use of opium preparations, while poppy straw has replaced opium as the main raw material for the manufacture of alkaloids. In 2008, China produced 8.7 tons of opium and the Democratic People’s Republic of Korea produced 450 kg of opium.

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<sup>7</sup>The morphine or thebaine equivalent is calculated by the International Narcotics Control Board 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.

<sup>8</sup>Data 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.

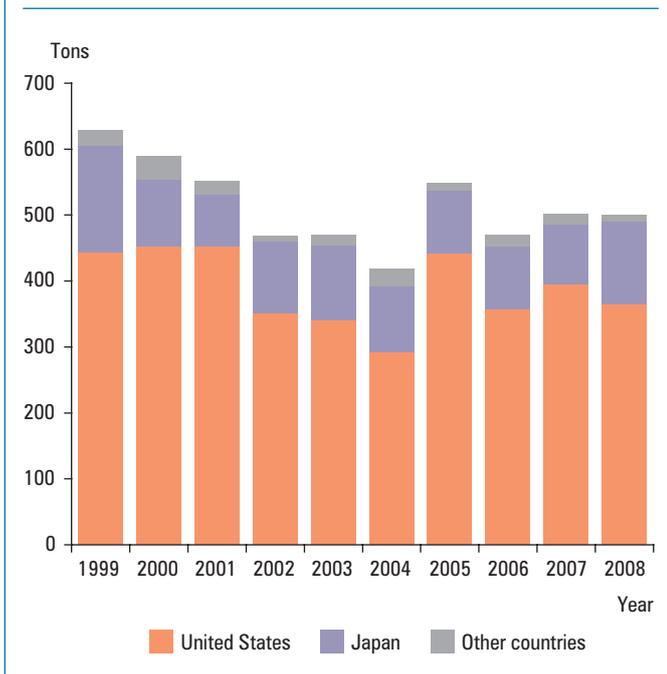
**Figure 1. Opium: global production, stocks<sup>a</sup> and use (consumption and utilization), in morphine equivalent, 1989-2008**



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

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 of about 2.5 per cent and thebaine of 1.0-1.5 per cent. As shown in figure 2, imports from India had fluctuated in recent years, but in 2008 they remained

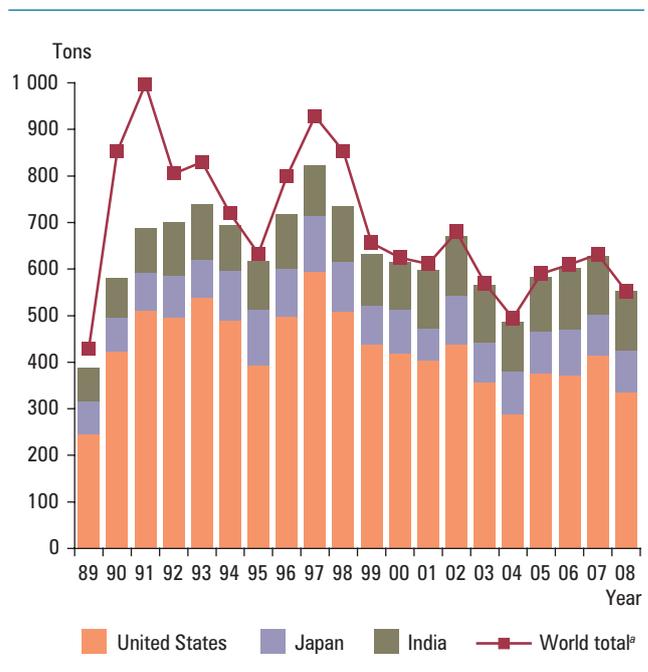
**Figure 2. Opium: imports from India, 1999-2008**



at the level of the previous year, at 500 tons (or 55 tons in morphine equivalent). The United States and Japan continued to be the main importing countries, accounting for 73 per cent and 25 per cent of total imports in 2008 respectively.

9. The bulk of opium is used for the extraction of alkaloids. Total utilization of licitly produced opium for the extraction of alkaloids fluctuated during the period under consideration (see figure 3), dropping to 552 tons (or 60.7 tons in morphine equivalent) in 2008. The United States, India and Japan, in descending order, were the main users of opium for the extraction of alkaloids during the 10 years prior to 2008, together accounting for almost the entire global total in 2008. Details on the utilization of opium for the extraction of alkaloids and the alkaloids obtained are provided in table III (see pages 182-183 below).

**Figure 3. Opium: utilization for the extraction of alkaloids, 1989-2008**



<sup>a</sup>Excluding Iran (Islamic Republic of), Myanmar and Turkey.

10. In the Islamic Republic of Iran, seized opium is released in large quantities for the extraction of alkaloids. The quantities released for such purposes steadily increased from 31 tons in 2002 to 211 tons in 2007, but then declined to 85 tons in 2008. The yield of alkaloids extracted from seized opium is usually less than from licitly produced opium.<sup>9</sup> The alkaloids obtained from seized opium are destined for domestic use.

<sup>9</sup>For the yields obtained in countries that extract alkaloids from opium, see table III, on pages 182-183 below.

11. In addition to being used for the extraction of alkaloids, 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 Schedule III of the 1961 Convention.<sup>10</sup> Global consumption of opium has fluctuated, averaging around 16.4 tons per year since 2001. Total consumption in 2008 was 14.7 tons, which corresponds to 147 million defined daily doses for statistical purposes (S-DDD).<sup>11</sup> In 2008, consumption and use of opium for the manufacture of preparations in Schedule III amounted to 6.1 tons in China, 3.3 tons in India and 2.7 tons in France.

12. Global stocks of opium reached their peak of the last decade in 2004 (2,176 tons) and then began to decrease. In 2008, they amounted to 729 tons (or 80 tons of morphine equivalent). India continued to hold the largest stocks (522 tons, or 72 per cent of the global total), followed by Japan (139 tons), China (31.8 tons) and the United Kingdom (17.4 tons).<sup>12</sup>

## Poppy straw

13. 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. However, the opium poppy plant with high thebaine content, commercial cultivation of which started in the second half of the 1990s, is increasingly in demand. 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.

14. The concentration of alkaloids in poppy straw varies significantly among the producing countries.<sup>13</sup> 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.

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

<sup>11</sup>The list of defined daily doses for statistical purposes and an explanation of that concept are contained in the notes to tables XIV.1 and XIV.2 (see pages 260-270 below).

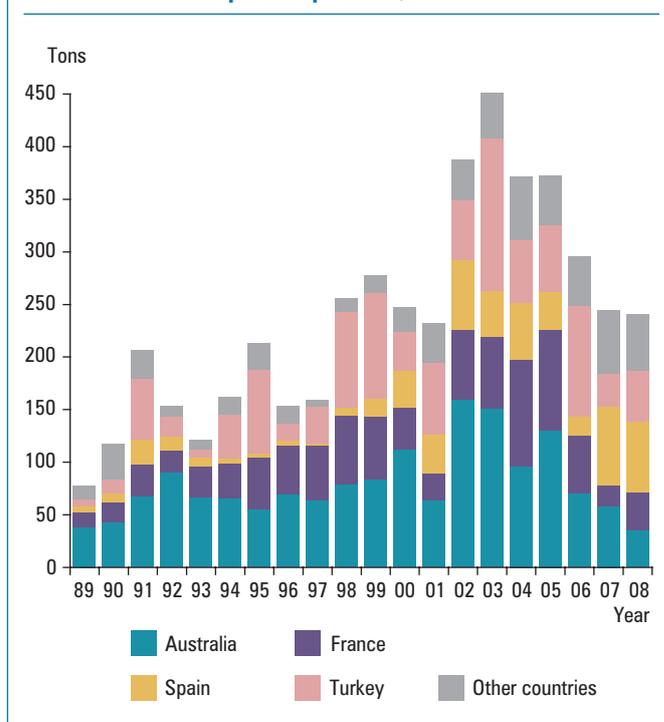
<sup>12</sup>For production of, stocks of and demand for opium, see also the section entitled “Supply of opiate raw materials and demand for opiates for medical and scientific purposes” on page 94.

<sup>13</sup>For example, in the period 2006-2008, 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 1.64 per cent in Australia, 1.14 per cent in France, 1.23 per cent in Spain and 0.38 per cent in Turkey.

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

15. Although 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 fluctuated widely in the two decades prior to 2008, because of weather conditions and in response to the demand in producer countries. Production reached its highest level to date in 2003, at about 450 tons in morphine equivalent, and then declined to a level of about 241 tons in 2008 (see figure 4).<sup>14</sup> Throughout the decade prior to 2008, Australia, France, Spain and Turkey were the main producer countries. In 2008, the leading producer was Spain (68 tons, accounting for 28 per cent of global production), followed by Turkey (48 tons, or 20 per cent of the world total), France (36 tons, or 15 per cent of the world total) and Australia (35 tons, or 15 per cent of the world total). Together, those four countries accounted for more than three quarters of global production. Other main producers of poppy straw (M) in 2008 were China, Hungary and the United Kingdom, together accounting for about 20 per cent of global production in morphine equivalent.

**Figure 4. Poppy straw (M): production, in morphine equivalent, 1989-2008**



<sup>14</sup>The morphine equivalent of the morphine and codeine alkaloids contained in poppy straw (T) is also included, where appropriate, in the data in this paragraph.

16. In 2008, production of poppy straw (M) decreased slightly in Spain, owing to a reduction in the area used for the cultivation of opium poppy for the production of poppy straw. In Turkey and France, production increased significantly in 2008, while production in Australia declined. 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 (see pages 178-181 below).

17. International trade in poppy straw (M) as a raw material continues to be limited, with the Czech Republic being the only exporter of poppy straw for the purpose of extraction of alkaloids (see table XVI.1, on pages 260-270 below). 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 2008, imports by Slovakia of poppy straw (M) from the Czech Republic declined to 1,988 tons.

18. In 2008, utilization of poppy straw (M) in the main user countries amounted to 22,565 tons in Turkey, 4,498 tons in France, 4,245 tons in Australia, 3,809 tons in Spain, 1,470 tons in China, 1,436 tons in Slovakia and 1,319 tons in Hungary. Further details on the utilization of poppy straw (M) for the extraction of alkaloids and the yields obtained are contained in table IV (see pages 184-187 below).

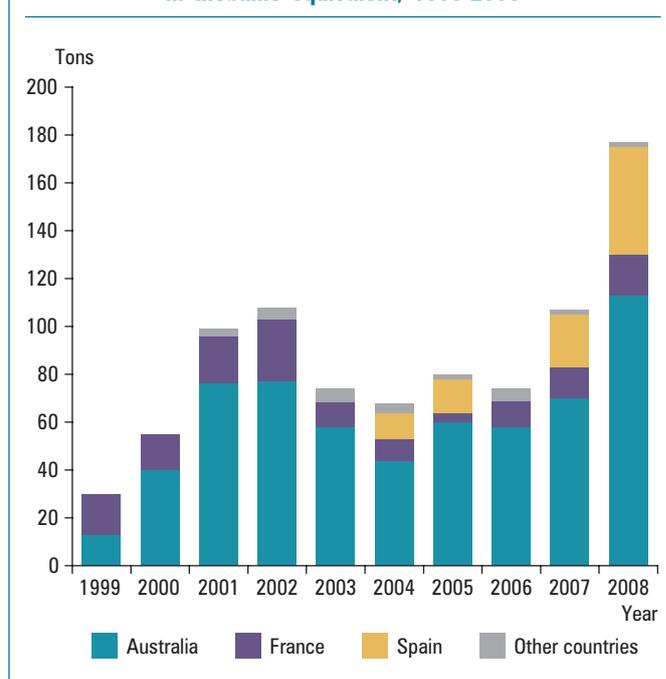
### Poppy straw produced from opium poppy rich in thebaine (poppy straw (T))

19. 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 has reported sporadic production in recent years. More details on the production of poppy straw (T) can be found in table II (see pages 178-181 below).

20. Global production of poppy straw (T) expressed in thebaine equivalent during the period 1999-2008 is shown in figure 5. In 2008, total production amounted to 177 tons.<sup>15</sup> Production peaked in Australia, which remained the leading producer (113 tons in thebaine equivalent, accounting for 64 per cent of global production). It was followed by Spain (45 tons, or 25 per cent of the world total) and France (17 tons, or 10 per cent of the world total).

<sup>15</sup>The 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.

**Figure 5. Poppy straw (T): production, in thebaine equivalent, 1999-2008**



21. All poppy straw (T) is used in the producing 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 (see pages 188-189 below).

### Poppy straw used for decorative purposes

22. In some countries, poppy straw is used for decorative purposes. Austria and Hungary remained the main exporters of poppy straw for such purposes in 2008, reporting exports of 18.2 tons and 14.4 tons respectively. The main importers in 2008 were Germany and the Netherlands.

### Concentrate of poppy straw

23. Most countries using poppy straw for the extraction of alkaloids first manufacture an intermediate product called “concentrate of poppy straw”, although in some countries morphine or thebaine are manufactured directly from poppy straw in a continuous process, which may involve a number of other intermediate products (for details, see table IV, on pages 184-187 below, and table V, on pages 188-189 below). 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 or oripavine 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.<sup>16</sup>

24. Since the actual content of alkaloids in concentrate of poppy straw may vary significantly, for purposes of comparison and for statistical purposes all data referring to concentrate of poppy straw are expressed in terms of the quantity of the 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.<sup>17</sup>

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

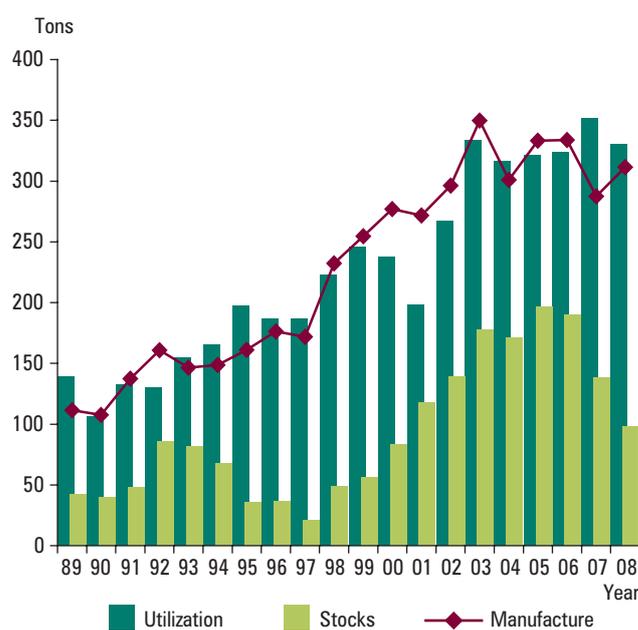
25. AMA (CPS) continues to be the most important and most widely used alkaloid among the alkaloids contained in concentrate of poppy straw. Figure 6 shows the trends in its manufacture, stocks and utilization during the 20-year period from 1989 to 2008.

26. Global manufacture of AMA (CPS) has risen sharply since the 1990s, reaching a peak of 350 tons in 2003 and fluctuating thereafter. Following a drop to 287 tons in 2007, global manufacture rose again to 311 tons in 2008. Trends in the manufacture of AMA (CPS) in the main manufacturing countries in the period 1989-2008 are presented in figure 7. While Australia had been the leading manufacturer throughout the two decades prior to 2007, Turkey became the leading manufacturer in 2007 and maintained that position in 2008 (accounting for 99 tons, or 32 per cent of the global total). It was followed by Australia (64.2 tons, or 21 per cent of global manufacture), Spain (62.5 tons, or 20 per cent of global manufacture) and France (56.1 tons, or 18 per cent of global manufacture). Other countries reporting manufacture of AMA (CPS) for 2008 were China (24.3 tons), the United Kingdom (5.2 tons) and the former Yugoslav Republic of Macedonia (153 kg).

<sup>16</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; and (c) concentrate of poppy straw containing oripavine as the main alkaloid.

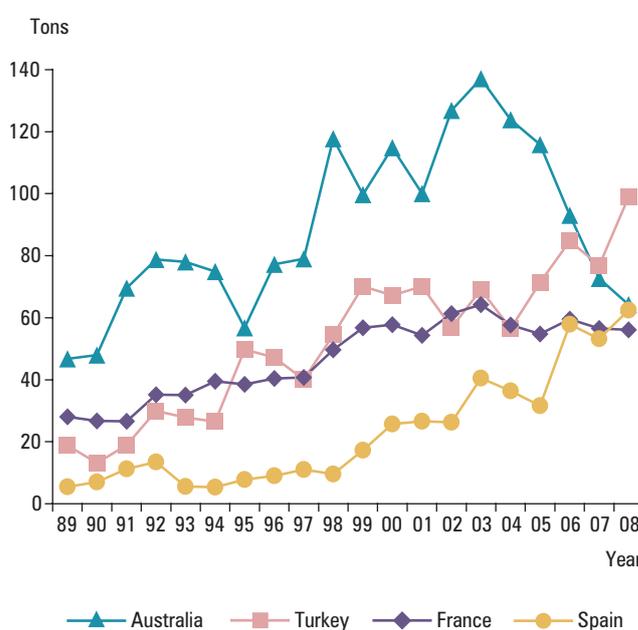
<sup>17</sup>The comments on concentrate of poppy straw in this publication are not directly comparable with comments on concentrate of poppy straw contained in editions of this publication prior to 2005, since at that time concentrate of poppy straw was expressed at 50 per cent of the main alkaloid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

**Figure 6. Anhydrous morphine alkaloid contained in concentrate of poppy straw: global manufacture, stocks<sup>a</sup> and utilization, 1989-2008**



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

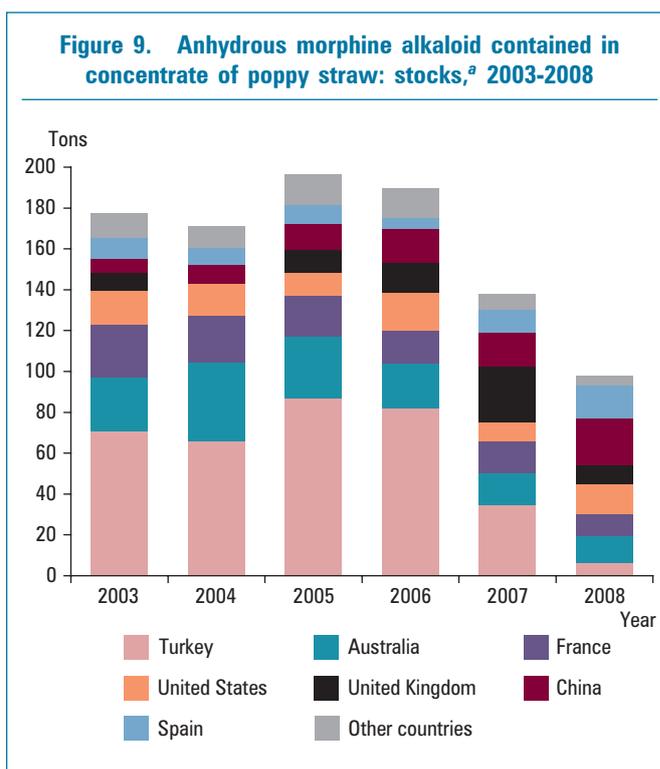
**Figure 7. Anhydrous morphine alkaloid contained in concentrate of poppy straw: manufacture in the main manufacturing countries, 1989-2008**



27. Global exports of AMA (CPS) increased to 240 tons in 2003 and have fluctuated since then. In 2008, they amounted to 206 tons. Turkey was the main exporting country in 2008 (with 121 tons, accounting for 59 per cent of global exports), followed by Spain (56.5 tons, or 27 per cent of global exports) and

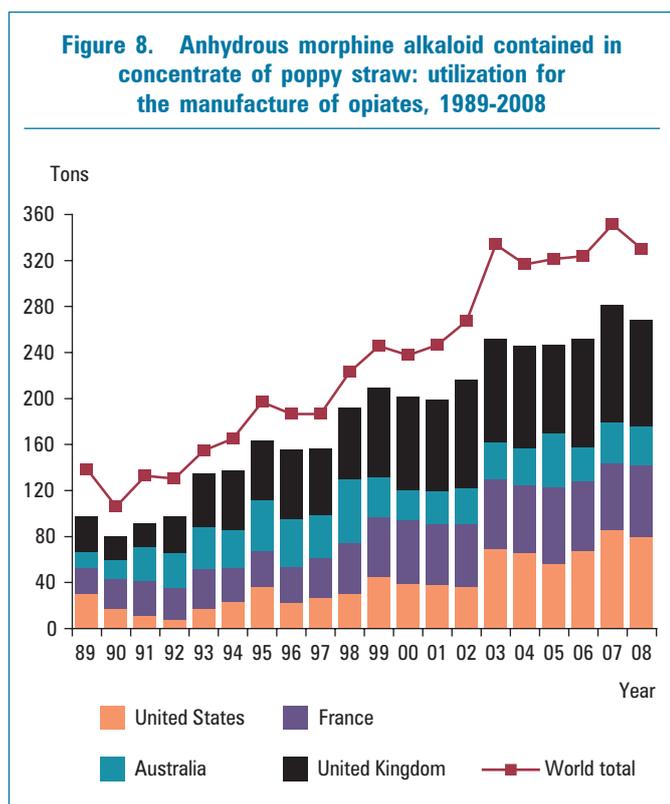
Australia (23.2 tons, or 11 per cent of global exports). The United Kingdom and the United States have been the leading importers of AMA (CPS), together accounting for 80 per cent of the world total in 2008. Other importing countries were, in descending order, Norway, France, South Africa, the Islamic Republic of Iran and Switzerland. Further details on international trade in AMA (CPS) can be found in tables XVI.1 (see pages 275-276 below) and XVI.2 (see pages 277-279 below).

28. AMA (CPS) is an intermediate product for the manufacture of morphine. It is also used in continuous manufacturing processes for the manufacture of codeine. Utilization of AMA (CPS) increased steadily until 2003, owing to the growing demand for morphine and codeine and the substances that may be derived from them (see figure 8). At a reported level of 330 tons in 2008, utilization had declined compared with the record level of 351 tons reported in 2007. The United Kingdom continued to be the major user country of AMA (CPS) (with 92.5 tons, or 28 per cent of the global total), followed by the United States (80.2 tons, or 24 per cent of the global total), France (61.7 tons, or 19 per cent of the global total), Australia (34.2 tons, or 10 per cent of the global total), China (19.6 tons, or 6 per cent of the global total), Norway (9.7 tons, or 3 per cent of the global total), the Islamic Republic of Iran (8.7 tons, or 3 per cent of the global total), South Africa (7.8 tons, or 2 per cent of the global total) and Turkey (6.1 tons, or 2 per cent of the global total).



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

29. Global stocks of AMA (CPS) declined from the peak level of 197 tons in 2005 to 98 tons in 2008 (see figure 9), mostly because of the reduction of stocks in Turkey. China held the largest stocks in 2008 (23.1 tons, or 24 per cent of the global total); other countries holding significant stocks of AMA (CPS) in 2008 were Spain (16 tons), the United States (15 tons), Australia (13.2 tons), France (10.4 tons), the United Kingdom (9.2 tons), Turkey (6.4 tons) and Norway (2.5 tons).

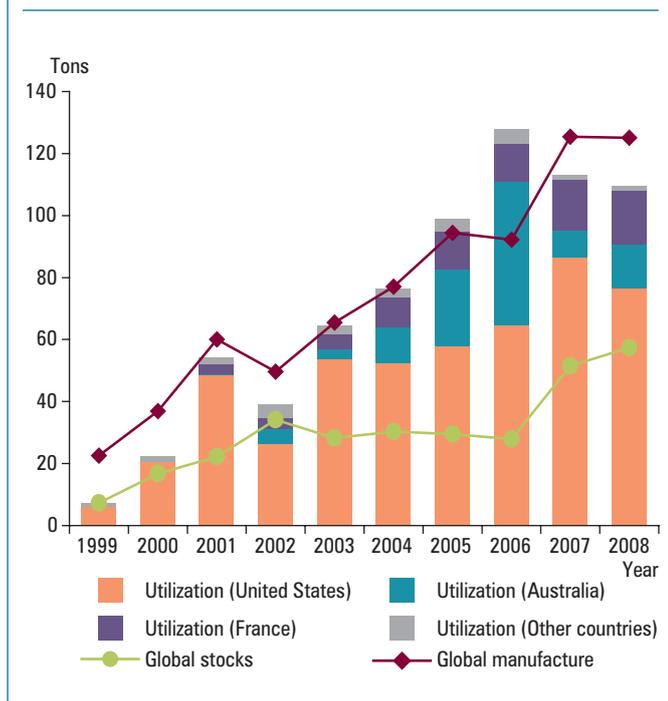


### Anhydrous thebaine alkaloid contained in concentrate of poppy straw (ATA (CPS))

30. Figure 10 provides an overview of the manufacture, stocks and utilization of ATA (CPS) during the period 1999-2008.

31. Industrial manufacture of ATA (CPS) started in 1998 and has increased rapidly since then, amounting to 125 tons in 2008. Australia, France and Spain, in descending order, have been the only manufacturing countries, accounting respectively for 77 per cent, 20 per cent and 3 per cent of the global total in 2008. The United States has been the leading importer of ATA (CPS). In 2008, total imports were 101 tons, with the United States accounting for 99 per cent of those imports.

**Figure 10. Anhydrous thebaine alkaloid contained in concentrate of poppy straw: utilization and global manufacture and stocks,<sup>a</sup> 1999-2008**



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

32. ATA (CPS) is an intermediate product for the manufacture of thebaine. Global utilization of ATA (CPS) increased sharply between 1999 (7 tons) and 2006 (128 tons), reflecting the growing demand for thebaine and the substances that may be obtained from it. In 2008, however, global utilization declined for the second consecutive year, to 109 tons. The United States was the main user in 2008 (accounting for 70 per cent of global utilization), followed by France (16 per cent) and Australia (13 per cent). Global stocks of ATA (CPS) increased from

21 tons in 2002 to 57.4 tons in 2008. The United States accounted for 52 per cent of the global total (29.8 tons), with significant stocks also being held in Australia (12.4 tons), France (11.3 tons) and Spain (3.8 tons).

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

33. Manufacture of AOA (CPS) in commercially usable quantities started in 1999; Australia has been the only manufacturing country. In 2008, global manufacture amounted to 36.5 tons. AOA (CPS) has been used in Australia and the United States for the manufacture of oripavine, oxymorphone and thebaine (see table V, on pages 188-189 below). In 2008, total utilization of AOA (CPS) amounted to 17.4 tons, with 85 per cent of that total reported by the United States and 15 per cent by Australia. Global stocks of AOA (CPS) have been fluctuating since 2001. In 2008, they stood at 14 tons, of which 65 per cent were held in Australia and the rest in the United States.

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

34. Manufacture of ACA (CPS) amounted to 13.9 tons in 2008. France, Turkey and Spain, in descending order, have been the only countries manufacturing ACA (CPS), accounting respectively for 59 per cent, 39 per cent and 1 per cent of the global total in 2008. ACA (CPS) is used for the extraction of codeine. Global utilization of ACA (CPS) amounted in 2008 to 13.1 tons, of which 80 per cent was accounted for by France and 19 per cent by the United States. Global stocks of ACA (CPS) in 2008 stood at 1.6 tons, most of which were held in the United States, France and Turkey.

## Opiates and opioids

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

36. Opioids are used mostly for their analgesic properties to treat severe pain (fentanyl, hydromorphone,

methadone, morphine and pethidine), moderate to severe pain (buprenorphine<sup>19</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 addiction to opioids (buprenorphine and methadone).

<sup>18</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 system.

<sup>19</sup>Buprenorphine is controlled under the Convention on Psychotropic Substances of 1971. Comments on its licit movement are contained in paragraphs 106 and 107 below.

## Natural alkaloids

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

### Morphine

38. Figure 11 presents data on the manufacture,<sup>20</sup> stocks, consumption and utilization of morphine in the period 1989-2008. Global manufacture of morphine followed a rising trend during the 20-year period, going from an average of about 200 tons per year in the period 1989-1991 to a record level of 440 tons in 2007. In 2008, global manufacture reached 390 tons. Almost 90 per cent of the morphine manufactured globally is converted into other narcotic drugs and substances not covered by the 1961 Convention (see paragraphs 44 and 45 below). The rest is used for medical purposes.

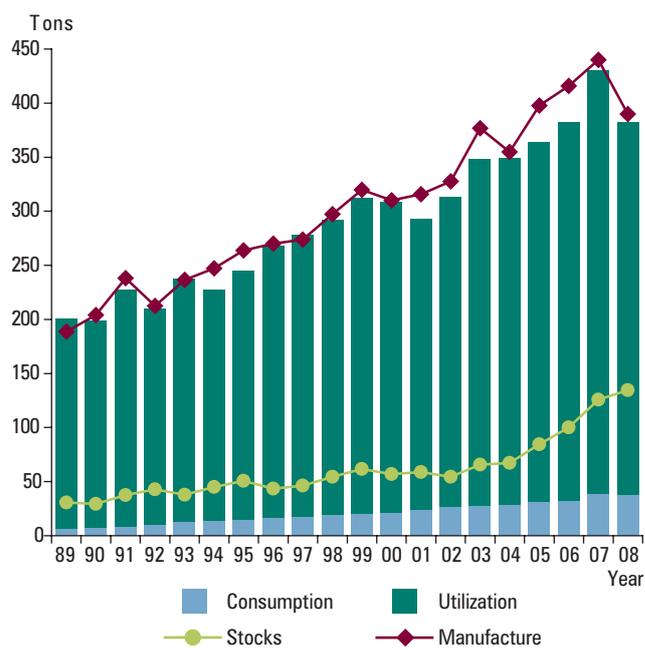
39. In 2008, the leading manufacturing country of morphine was the United States (119 tons, or 30 per cent of global manufacture), followed by the United Kingdom (95 tons, or 24 per cent of global manufacture), France (50.2 tons, or 13 per cent of global manufacture), Australia (31.5 tons, or 8 per cent of global manufacture) and China (18.7 tons, or 5 per cent of global manufacture). Together, those five countries accounted for 80 per cent of global manufacture. Six other countries reported the manufacture of morphine in 2008 in quantities of more than 5 tons: Islamic Republic of Iran (15.3 tons), Japan (10.2 tons), Norway (10 tons), Hungary (9 tons), India (8.7 tons) and South Africa (7.7 tons).

40. Total exports of morphine amounted to 28.7 tons in 2008. As can be seen in figure 12, the leading exporting country continued to be the United Kingdom (36 per cent<sup>21</sup> of global exports), followed by Australia (27 per cent), France (10 per cent), Denmark (7 per cent) and Germany (6 per cent). Seven countries imported

<sup>20</sup>In Australia, Brazil, China, Iran (Islamic Republic of), the Netherlands, 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 comparison 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.

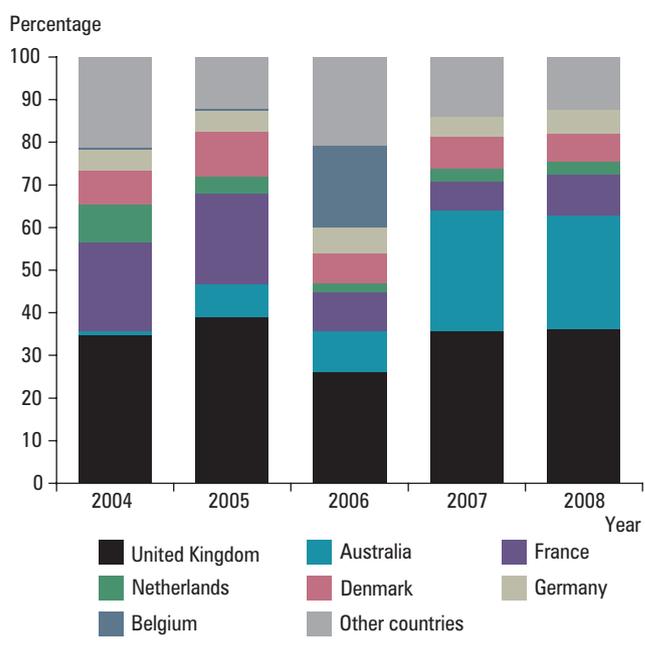
<sup>21</sup>This figure is based on data reported by the importing countries. It is being verified with the Government of the United Kingdom.

Figure 11. Morphine: global manufacture, stocks,<sup>a</sup> consumption and utilization, 1989-2008



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

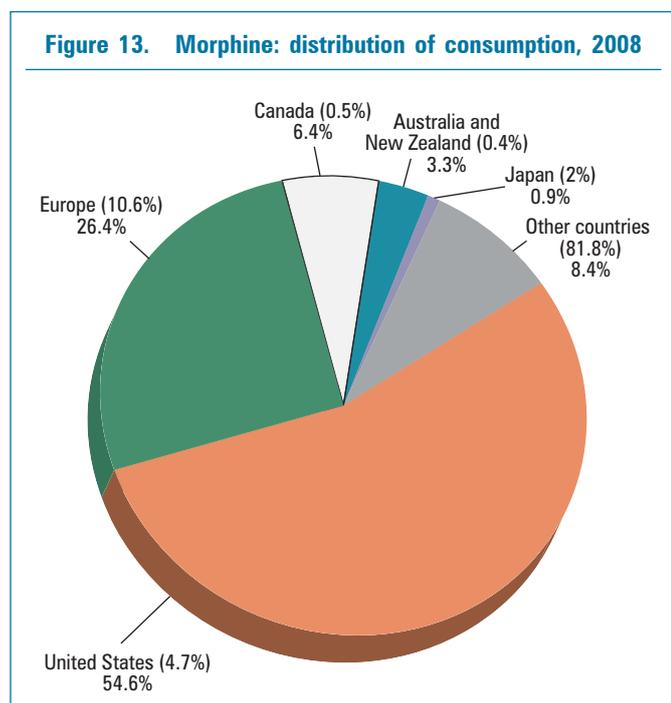
Figure 12. Morphine: export shares, 2004-2008



more than 1 ton of morphine in 2008: Brazil (9.8 tons), Germany (3.7 tons), Canada (2.9 tons), Denmark (2.3 tons), Austria (2.1 tons), Hungary (1.9 tons) and United Kingdom (1.5 tons).<sup>22</sup> Further details on exports and imports of morphine can be found in tables XVI.3 (see pages 280-287 below) and XVI.4 (see pages 288-305 below) respectively.

<sup>22</sup>The figure for the United Kingdom is based on data reported by the exporting countries. It is being verified with the Government.

41. Global consumption of morphine, excluding preparations included in Schedule III of the 1961 Convention (see paragraph 43 below), rose considerably during the period 1989-2008. Between 1989 and 1998, consumption increased more than threefold, from 6.5 tons to 19.6 tons, and then grew steadily, amounting to 37.6 tons (or 376 million S-DDD) in 2008. Consumption of morphine was reported by 158 countries in 2008 (see table XII, on pages 208-235 below). The differences in consumption levels among countries continued to be very significant (see figure 13 and table XIV.1, on pages 260-270 below), owing to several economic, regulatory and other factors influencing clinical practice in the treatment of pain.



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

42. In 2008, the United States was the main consumer country of morphine; with reported consumption of 20.5 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 France (2.4 tons, or 6 per cent of global consumption each), the United Kingdom (2.3 tons, or 5 per cent of global consumption), Germany (1.9 tons, or 5 per cent of global consumption), Austria (1.4 tons, or 4 per cent of global consumption) and Australia (1 ton, or 3 per cent of global consumption). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the country with the highest consumption was Austria (4,629 S-DDD), where morphine is used for the treatment of pain as well as in substitution treatment of opioid addiction. In six other countries, morphine consumption was over 1,000 S-DDD per million inhabitants per day in 2008:

Canada (2,084 S-DDD), United States (1,906 S-DDD), New Zealand (1,588 S-DDD), Australia (1,387 S-DDD), Denmark (1,334 S-DDD) and France (1,070 S-DDD).

43. In some countries, morphine is used for the manufacture of preparations included in Schedule III of the 1961 Convention. In 2008, China reported the use of 7.3 tons of morphine for the manufacture of such preparations. Other countries reporting the use of morphine for that purpose were Italy (648 kg), the United Kingdom (350 kg), India (173 kg), Uganda (23 kg), Australia (5 kg), Kazakhstan (4 kg), Denmark (1 kg) and Panama (less than 1 kg).

44. The largest share of morphine is used for conversion into other opiates, such as codeine, ethylmorphine and pholcodine (see table VI, on pages 190-194 below). The amounts utilized for that purpose, which had fluctuated at around 200 tons per year until the beginning of the 1990s, has increased steadily since then, reaching 338 tons in 2008. Of the quantity utilized in 2008, 95 per cent was converted into codeine. The eight main user countries in 2008 were the United States (83.9 tons, or 25 per cent of the world total), the United Kingdom<sup>23</sup> (80.5 tons, or 24 per cent of the world total), France (54.3 tons, or 16 per cent of the world total), Australia<sup>23</sup> (30.9 tons, or 9 per cent of the world total), the Islamic Republic of Iran<sup>23</sup> (15.3 tons, or 5 per cent of the world total), China<sup>23</sup> (10.3 tons, or 3 per cent of the world total) and Norway<sup>23</sup> and India (each 10.1 tons, or 3 per cent of the world total), which together accounted for nearly 90 per cent of global utilization. Other countries reporting conversion of morphine into other drugs in significant quantities in 2008 were Hungary (9.7 tons), Japan (9.4 tons), South Africa (7.3 tons), Slovakia (5.5 tons) and Turkey<sup>23</sup> (3.7 tons).

45. 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, which fluctuated between 7 tons and 25.7 tons during the 10-year period from 1998 to 2007, totalled 6.5 tons in 2008. The use of morphine for the manufacture of substances not controlled under the 1961 Convention was reported in 2008 by Brazil (6.3 tons), France (212 kg) and India (25 kg).

46. Global stocks of morphine followed a rising trend during the 20-year period from 1989 to 2008, reaching a total of 134 tons in 2008. The largest stocks were held by the United States (50.7 tons, or 38 per cent of global stocks) and the United Kingdom (29.5 tons, or 22 per cent

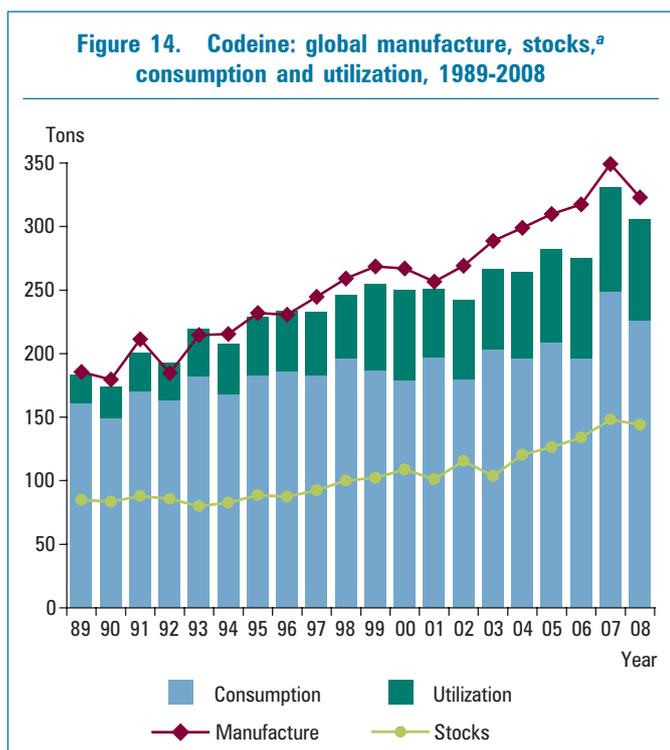
<sup>23</sup>This country reported utilization of large quantities of morphine alkaloid contained in concentrate of poppy straw for the manufacture of other alkaloids in continuous manufacturing processes. The published figure includes the theoretical quantity of morphine involved in such conversions as calculated by INCB.

of global stocks). The other countries holding large stocks of morphine in 2008 were Hungary (19 tons, or 14 per cent of global stocks) and France (9 tons, or 7 per cent of global stocks).

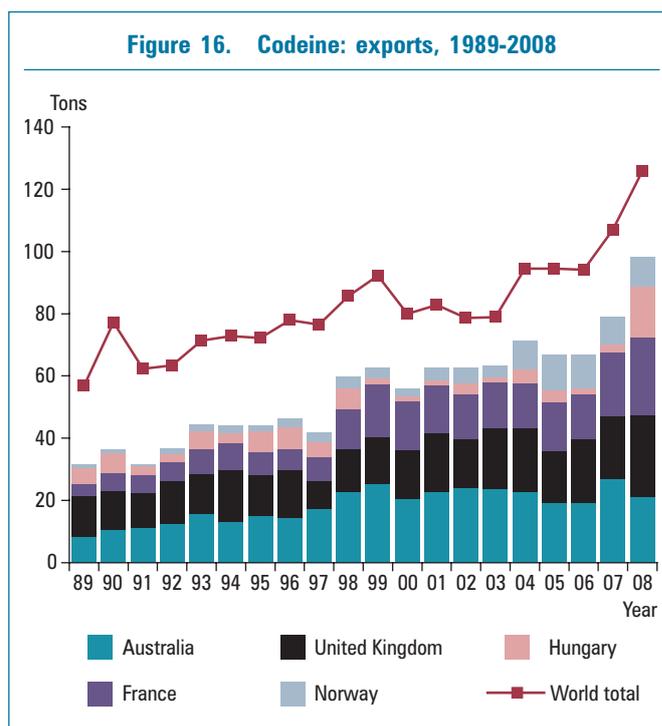
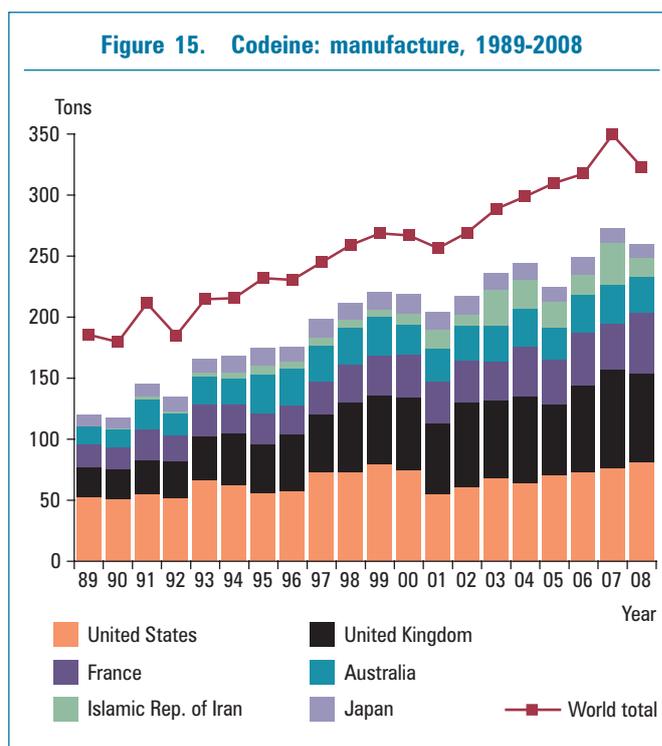
### Codeine

47. 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 1989-2008 are shown in figure 14.

48. After a general upward trend in the 1990s and an increase in 2007 to the highest level ever reported (349 tons), codeine manufacture stood at 323 tons in 2008 (see figure 15). The main manufacturing country was the United States, with 81.5 tons (25 per cent of global manufacture), followed by the United Kingdom with 72.9 tons (23 per cent of global manufacture). The other major manufacturers were France (49.2 tons), Australia (29.7 tons), the Islamic Republic of Iran (15.5 tons), Japan (10.7 tons), China (9.4 tons), Norway (9.2 tons), India (8.9 tons) and Hungary (7.6 tons).



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



49. World exports of codeine followed a rising trend until 1999. They remained stable until 2003 before increasing again, to an average of 97 tons annually, in the period 2004-2007. In 2008, world exports reached 126 tons, the highest level ever reported (see figure 16). The United Kingdom was the leading exporting country of codeine in 2008, accounting for 21 per cent of world exports (26.2 tons),<sup>21</sup> followed by France (24.9 tons, or 20 per cent of world exports), Australia (21.3 tons, or 17 per cent of world exports) and Hungary (16.6 tons,

or 13 per cent of world exports). The other major exporters in 2008 were Norway (9.2 tons), Switzerland (6.9 tons), Portugal (4.6 tons), Slovakia (3.7 tons) and the Islamic Republic of Iran (3 tons). As in preceding years, the main importing countries of codeine in 2008 were India (25.8 tons), Canada (16.5 tons) and Switzerland (10 tons). Fifteen other countries reported imports of between 1 and 10 tons in 2008, and 75 other countries reported imports of more than 1 kg. More details on international trade in codeine can be found in tables XVI.3 (see pages 280-287 below) and XVI.4 (see pages 288-305 below).

50. Codeine is used mainly in the form of preparations listed in Schedule III of the 1961 Convention. In 2008, preparations listed in Schedule III accounted for 97 per cent of the total consumption of codeine. The consumption of codeine fluctuated between about 150 tons and 249 tons over the period 1989-2008. In 2008, consumption stood at 226 tons (see figure 14), making codeine the most widely used opiate in medical practice globally in terms of defined daily doses for statistical purposes (2.3 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 these countries.

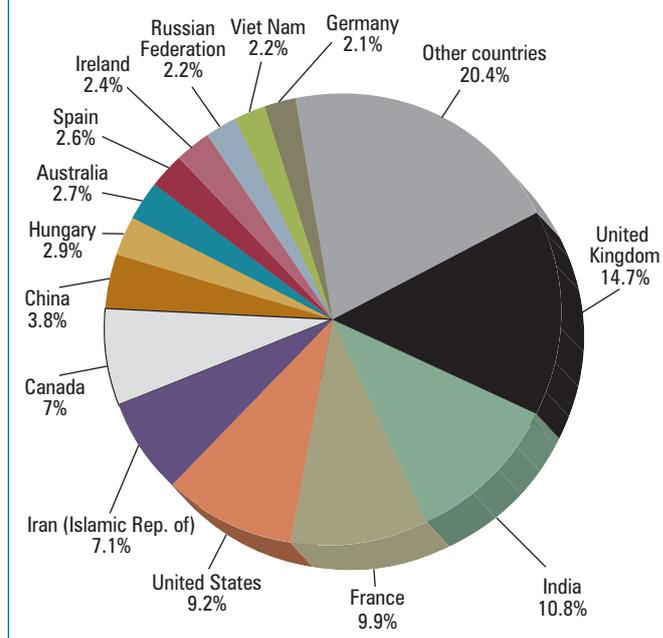
51. The main countries reporting the use of codeine for the manufacture of preparations listed in Schedule III in 2008 were the United Kingdom (32.2 tons), India (23.7 tons),<sup>24</sup> France (21.7 tons), the United States (20 tons), the Islamic Republic of Iran (15.5 tons) and Canada (15.4 tons), which together accounted for 59 per cent of global use in 2008. Other major user countries were, in descending order of quantity used, China, Hungary, Australia, Spain, Ireland, the Russian Federation, Viet Nam and Germany (see figure 17).

52. Utilization of codeine for the manufacture of other narcotic drugs, mainly dihydrocodeine and hydrocodone, increased steadily from 47.7 tons in 1996 to 80 tons in 2008. Of the amount reported for 2008, 49.1 tons were used in the United States, mainly for the manufacture of hydrocodone, while 12.6 tons were used in the United Kingdom, 11.1 tons in Japan and 3.9 tons in Italy for the manufacture of dihydrocodeine.

53. Global stocks of codeine amounted to 144 tons in 2008. More than 50 per cent of global stocks were held by five countries: United States (23.2 tons), France (18.3 tons), United Kingdom (18.2 tons), Australia (12.7 tons) and India (11.6 tons). Thirteen other countries held stocks of codeine in quantities of more than

<sup>24</sup>This figure was calculated by INCB using available data series. It is being verified with the Government.

**Figure 17. Codeine: utilization for the manufacture of preparations listed in Schedule III of the 1961 Convention, 2008**



1 ton; those countries, in descending order of quantity of stocks, were Japan, Hungary, Spain, Canada, Germany, Slovakia, Norway, Italy, South Africa, Switzerland, Iraq, Ireland and China.

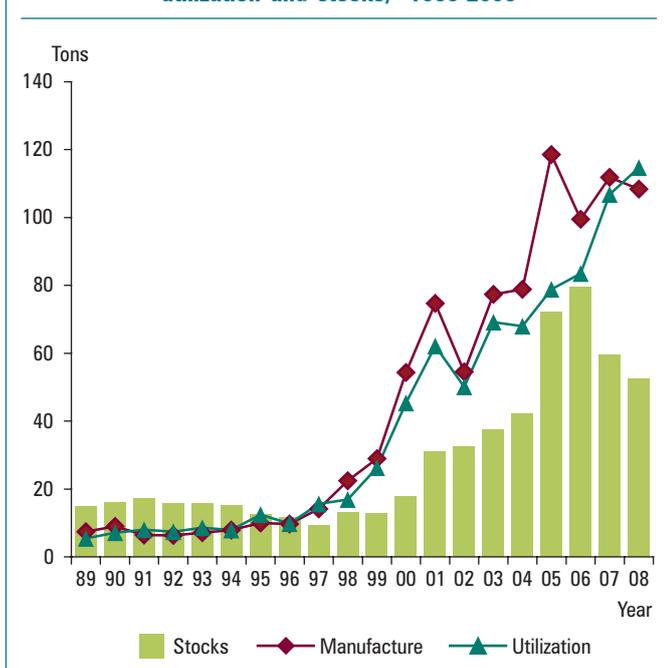
## Thebaine

54. Until the 1990s, thebaine was manufactured mainly from opium; since 1999, it has been obtained primarily from poppy straw. Thebaine may also be obtained through the conversion of oripavine or from semi-synthetic opioids. Thebaine is not itself 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 controlled substances under the 1961 Convention) and buprenorphine (which is a controlled substance under the Convention on Psychotropic Substances of 1971),<sup>25</sup> as well as for substances not under international control, such as the derivatives naloxone, naltrexone, nalorphine and nalbuphine.

55. Global manufacture of thebaine has increased sharply since the late 1990s as a consequence of the growing demand for oxycodone and other drugs and substances that may be derived from it; a peak of 119 tons was reached in 2005 (see figure 18 and table III, on pages 182-183 below, and table V, on pages 188-189 below). In 2008, total manufacture amounted to 106 tons. In 2008, the United States continued to be the leading manufacturing country, accounting for 67.1 tons, or

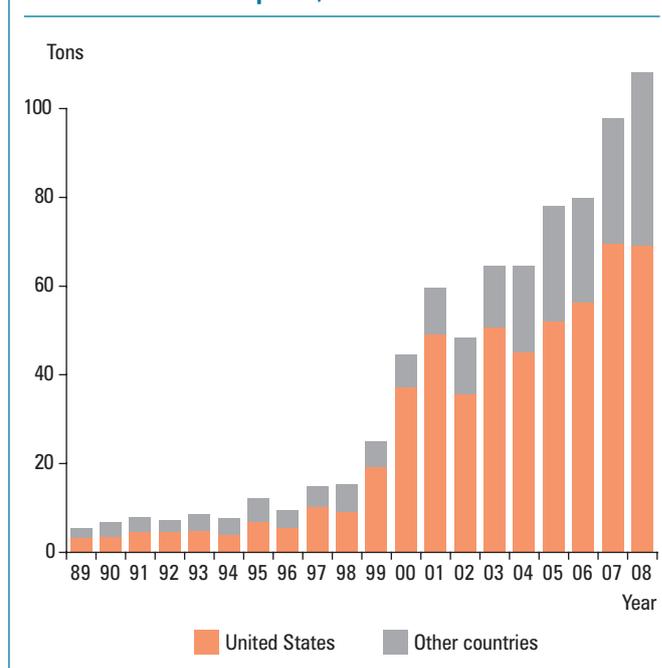
<sup>25</sup>United Nations, *Treaty Series*, vol. 1019, No. 14956.

**Figure 18. Thebaine: global manufacture, utilization and stocks,<sup>a</sup> 1989-2008**



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

**Figure 19. Thebaine: utilization for the manufacture of opioids, 1989-2008**



63 per cent of global manufacture. The other major manufacturers of thebaine were Spain (21 per cent of the world total), Australia (11 per cent) and France (2 per cent). Global exports of thebaine reached a peak of 41.6 tons in 2008. Spain and Australia, in descending order, remained the main exporting countries in 2008, together accounting for 93 per cent of the world total. The main importing country of thebaine was the United Kingdom (20.4 tons).<sup>22</sup>

56. Utilization of thebaine for the manufacture of other narcotic drugs (see table VII, on pages 195-197 below) for the narcotic drugs derived from thebaine and the yields obtained) continued to increase, reaching 108 tons in 2008 (see figure 19). The United States was the main user country of thebaine during the 20-year period from 1989 to 2008; in 2008, it accounted for 64 per cent of global use. It was followed by the United Kingdom and France, which together accounted for 32 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 1999 to 2008; in 2008, it amounted to 6.7 tons, with Australia, the United Kingdom and Switzerland together accounting for 87 per cent of the world total.

57. Global stocks of thebaine increased steadily until 2006, when they reached 79.6 tons. In 2008, global stocks fell to 52.3 tons. Major stocks were held in the United States (32.1 tons), Japan (4.6 tons), the United Kingdom (4.3 tons), France (3.5 tons), Spain (2.5 tons) and Australia (1.9 tons).

## Oripavine

58. In 2007, oripavine was included in Schedule I of the 1961 Convention. Australia was the only country reporting manufacture of oripavine in 2008 (2.2 tons). Significant stocks of oripavine were reported by Australia (4.6 tons) and Switzerland (34 kg). The use of oripavine in significant quantities for the manufacture of other drugs, mainly oxymorphone, was reported in 2008 by the United States (9.5 tons).

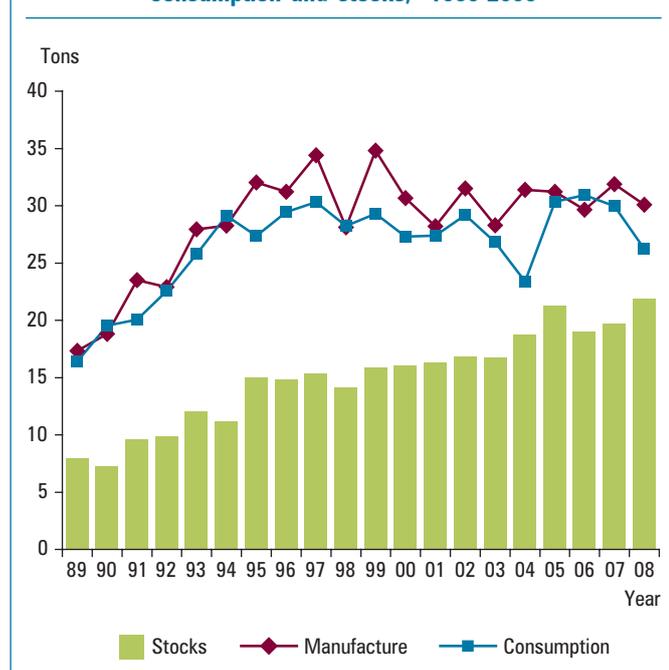
## Semi-synthetic opioids

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

## Dihydrocodeine

60. Global manufacture of dihydrocodeine rose until 1999, when it reached 34.8 tons. After 2000, the annual manufacture fluctuated between 28.2 tons and 31.9 tons and stood at 30.1 tons in 2008 (see figure 20). In 2008, the United Kingdom and Japan continued to be the main manufacturing countries, accounting for 12 tons (40 per cent of the world total) and 11.6 tons (38 per cent

**Figure 20. Dihydrocodeine: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**



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

of the world total) respectively. Other countries manufacturing dihydrocodeine in quantities of more than 100 kg in 2008 were Italy (3.7 tons), Slovakia (1.5 tons), Belgium (872 kg) and Turkey (276 kg).

61. Global exports of dihydrocodeine amounted to 10.6 tons in 2008. The main exporting countries were Italy and the United Kingdom,<sup>21</sup> each accounting for 31 per cent (3.3 tons) of world exports. The Republic of Korea was the leading importing country of dihydrocodeine in 2008 (3.3 tons); other main importers were the United Kingdom (1.8 tons)<sup>22</sup> and France (1.6 tons).

62. Dihydrocodeine is consumed mainly in the form of preparations included in Schedule III of the 1961 Convention. In 2008, such preparations accounted for 97 per cent of total consumption. Use of dihydrocodeine declined from 30.3 tons in 1997 to 23.4 tons in 2004. In 2008, use of dihydrocodeine reached 26.2 tons (262 million S-DDD). The main user countries of dihydrocodeine were Japan (10.5 tons, or 40 per cent of the world total), the United Kingdom (9 tons, or 34 per cent of the world total), the Republic of Korea (2.7 tons, or 10 per cent of the world total) and Hungary (887 kg, or 3 per cent of the world total).

63. Global stocks of dihydrocodeine have followed an upward trend, amounting to 21.8 tons in 2008. Major stocks were held in Japan (10.3 tons, or 47 per cent of global stocks), Italy (2.4 tons, or 11 per cent of global stocks) and the United Kingdom (2.3 tons, or 11 per cent of global stocks).

## Ethylmorphine

64. Global manufacture of ethylmorphine declined steadily over the period 1988-2004, falling from a level of 5.5 tons in 1988 to just 941 kg in 2004, the lowest level ever reported.<sup>26</sup> Manufacture started to increase again in 2005 and reached 2.3 tons in 2008. France remained the main manufacturing country in 2008, with an output of 1.5 tons (64 per cent of the world total), followed by India with 383 kg (17 per cent) and Turkey with 314 kg (14 per cent). Global exports of ethylmorphine reached 873 kg in 2008. France continued to be the leading exporting country, accounting for 75 per cent of global exports. Sweden remained the principal importing country of ethylmorphine, importing 451 kg of ethylmorphine in 2008. Ethylmorphine is consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (about 84 per cent of total consumption). Global utilization had been following a downward trend but in 2008 increased again, to 1.6 tons (33 million S-DDD). The main user countries of ethylmorphine in 2008 were India (415 kg, or 26 per cent of the world total) and Sweden (407 kg, or 25 per cent of the world total). Global stocks of ethylmorphine totalled 1.7 tons in 2008. Major stocks were held in France (793 kg) and Turkey (364 kg).

## Heroin

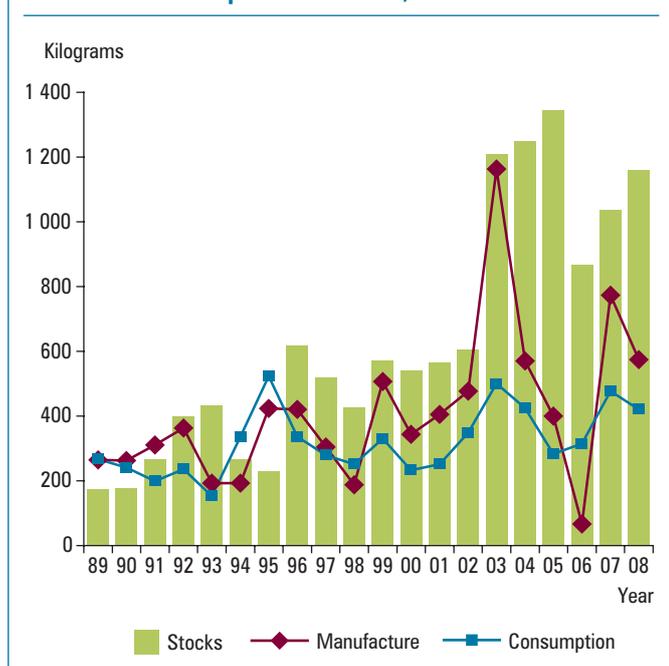
65. From 1989 to 2002, global licit manufacture of heroin fluctuated between 200 kg and 500 kg. In 2003, it increased sharply to 1.2 tons, the highest amount ever reported. After 2003, manufacture declined, dropping to 66 kg in 2006, but in 2008 it increased again, to 575 kg (see figure 21). The fluctuations reflect changes in the manufacture reported by the United Kingdom, the main manufacturing country (493 kg in 2008). Switzerland (81 kg) was the only other country reporting manufacture of a significant quantity of heroin in 2008.

66. In 2008, the United Kingdom continued to be the main exporting country of heroin (495 kg,<sup>21</sup> or 87 per cent of global exports). The only other countries reporting exports of heroin greater than 1 kg were the Netherlands (40 kg) and Switzerland (31 kg). Switzerland continued to be the main importing country of heroin in 2008 (226 kg), followed by the Netherlands (211 kg) and the United Kingdom (71 kg).<sup>22</sup>

67. Global consumption of heroin fluctuated between 230 kg and 500 kg during the 10-year period from 1999 to 2008; it stood at 421 kg in 2008. Switzerland, where heroin is prescribed to long-term opiate addicts, reported consumption of 206 kg in 2008 (49 per cent of the world

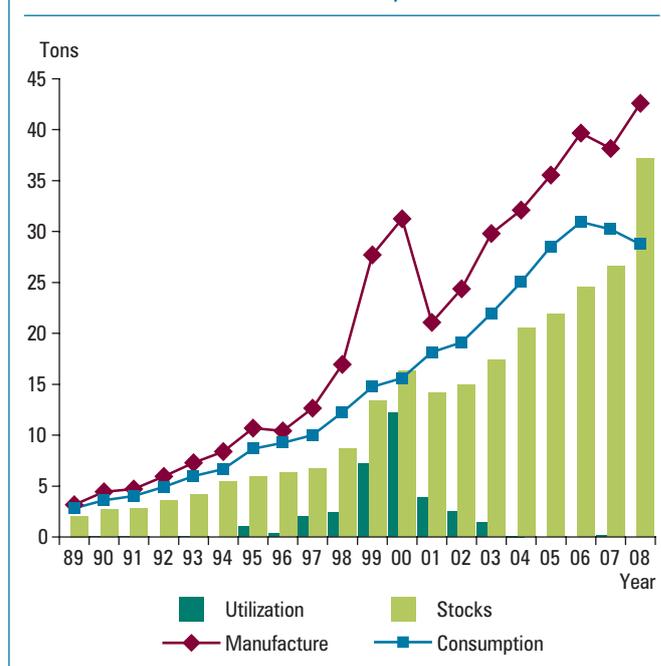
<sup>26</sup>In 1972, global manufacture of ethylmorphine reached a record high of 10 tons.

**Figure 21. Heroin: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**



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

**Figure 22. Hydrocodone: global manufacture, consumption, utilization<sup>a</sup> and stocks,<sup>b</sup> 1989-2008**



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

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

total). Heroin consumption declined to 107 kg (25 per cent of the world total) in the Netherlands. Other countries with significant heroin consumption in 2008 were the United Kingdom (73 kg), Germany (29 kg), Spain (4 kg) and Belgium (1.6 kg).

68. Global stocks of heroin amounted to 1.2 tons in 2008. Countries reporting significant stocks in 2008 were the United Kingdom (722 kg), Switzerland (233 kg) and the Netherlands (115 kg).

## Hydrocodone

69. Global manufacture of hydrocodone followed an upward trend in the period 1989-2008, reaching 42.6 tons in 2008 (see figure 22). The United States accounted for 42.5 tons, which was more than 99 per cent of the world total.

70. Global consumption of hydrocodone stood at 28.6 tons in 2008, with the United States accounting for almost the entirety of the world total. Hydrocodone consumption in the United States increased almost twelvefold in the period 1989-2008, reaching 30.8 tons in 2006 and then declining slightly to 28.6 tons in 2008. That high consumption in the United States makes hydrocodone one of the narcotic drugs most used in medical practice in terms of defined daily doses for statistical purposes (about 1.9 billion S-DDD). Other countries reporting consumption of hydrocodone in quantities of more than 10 kg in 2008 were Germany

(46 kg), Canada (46 kg), India (23 kg) and Colombia (13 kg). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the countries with the highest consumption of hydrocodone in 2008 were the United States (17,680 S-DDD), Palau (452 S-DDD), Canada (260 S-DDD) and Germany (102 S-DDD). Global stocks of hydrocodone also showed an upward trend, standing at 37.2 tons in 2008. The United States accounted for 99 per cent of hydrocodone stocks.

## Hydromorphone

71. Global manufacture of hydromorphone increased sharply during the period 1989-2008, reaching 5 tons in 2008. Throughout that period, the United States and the United Kingdom were the leading manufacturing countries; in 2008, they reported the manufacture of 3.9 tons (78 per cent of the world total) and 1 ton (20 per cent) respectively. Three other countries reported the manufacture of hydromorphone in 2008: Belgium (82 kg), Germany (40 kg) and Denmark (1 kg). Total exports of hydromorphone have followed an upward trend, reaching 1.7 tons in 2008. The leading exporting countries were the United Kingdom (51 per cent of world exports),<sup>21</sup> the United States (17 per cent of world exports) and Denmark (16 per cent of world exports). Canada remained the main importing country (689 kg) in 2008, followed by Germany (543 kg) and Denmark (224 kg).

72. Global consumption of hydromorphone increased steadily, reaching in 2008 its highest level of 2.3 tons (115 million S-DDD). The United States remained the main consumer country in 2008 (1 ton, or 43 per cent of global consumption), followed by Canada (647 kg, or 28 per cent of global consumption) and Germany (458 kg, or 20 per cent of global consumption). Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the countries with the highest consumption of hydromorphone in 2008 were Canada (2,771 S-DDD), Austria (947 S-DDD), Germany (759 S-DDD), the United States (460 S-DDD) and Sweden (227 S-DDD). Global stocks of hydromorphone reached 3.4 tons in 2008, of which 2.5 tons (74 per cent) were held in the United States.

## Oxycodone

73. Global manufacture of oxycodone rose gradually during the 1990s, amounting to 11.5 tons in 1998. Since 1999, the global manufacture of oxycodone has accelerated, reaching a record level of 94.9 tons in 2008 (see figure 23). The United States accounted for 68.2 tons, or 72 per cent of the world total. The manufacture of oxycodone grew steadily in the United Kingdom and France, which each contributed 13 per cent (12.3 tons and 12.1 tons) of the world total. Other major manufacturing countries were Slovakia (1.2 tons) and Switzerland (606 kg).

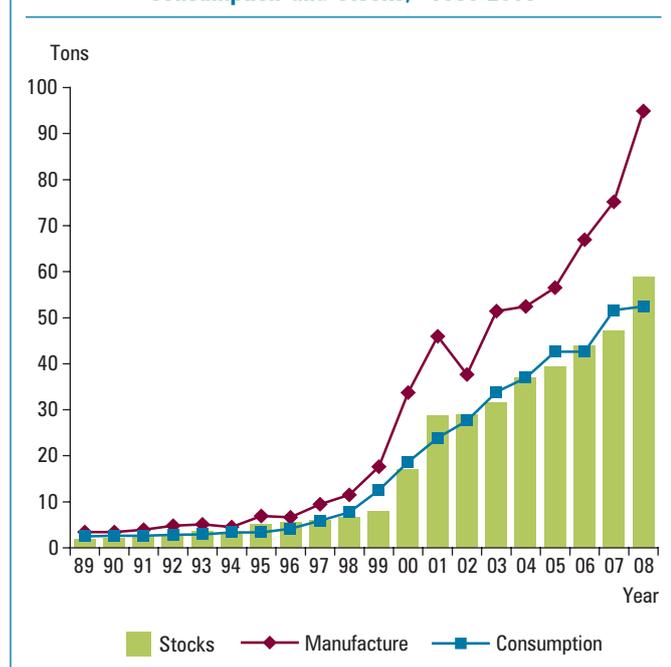
74. Total exports of oxycodone rose steadily during the period 1998-2008, reaching a record level of 19.2 tons in 2008. The United Kingdom continued to be the main

exporting country in 2008 (11.3 tons,<sup>21</sup> or 59 per cent of world exports), followed by the United States (2.6 tons, or 14 per cent of world exports) and Switzerland (1.6 tons, or 8 per cent of world exports). Quantities between 1.4 tons and 4.5 tons were imported by Australia, Canada, Denmark, Germany, Switzerland and the United Kingdom.

75. Global consumption has also risen steadily, reflecting the increased use of controlled-release preparations containing oxycodone for the treatment of moderate to severe pain. In 2005 and 2006, global consumption reached a level of 42.6 tons and, in 2008, it further increased, considerably, to 52.5 tons (700 million S-DDD), the highest level ever recorded. That was mainly a result of increased consumption in the United States, which continued to be the principal consumer country of oxycodone, accounting for 40.5 tons, or 77 per cent of the world total. Other major consumer countries in 2008 were Canada (4.5 tons), Germany (2 tons), Australia (1.3 tons) and the United Kingdom (902 kg), together accounting for 17 per cent of global consumption. Consumption of oxycodone has spread to more than 50 other countries, including developing countries. Tables XVI.3 (see pages 280-287 below) and XVI.4 (see pages 288-305 below) provide further details on exports and imports of oxycodone. Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the five countries with the highest consumption of oxycodone in 2008 were Canada (5,152 S-DDD), the United States (5,008 S-DDD), Australia (2,378 S-DDD), Denmark (2,324 S-DDD) and Norway (1,198 S-DDD).

76. Global stocks of oxycodone increased in the period 2000-2008, reaching 58.9 tons in 2008, the highest level ever recorded. The United States accounted for 76 per cent of the world total, followed by the United Kingdom, which accounted for 9 per cent.

**Figure 23. Oxycodone: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**

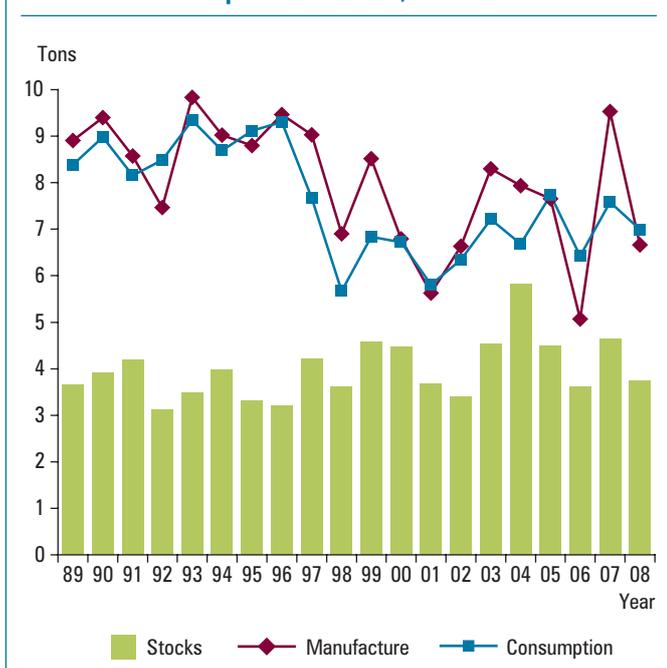


<sup>a</sup>Stocks as at 31 December of each year.

## Pholcodine

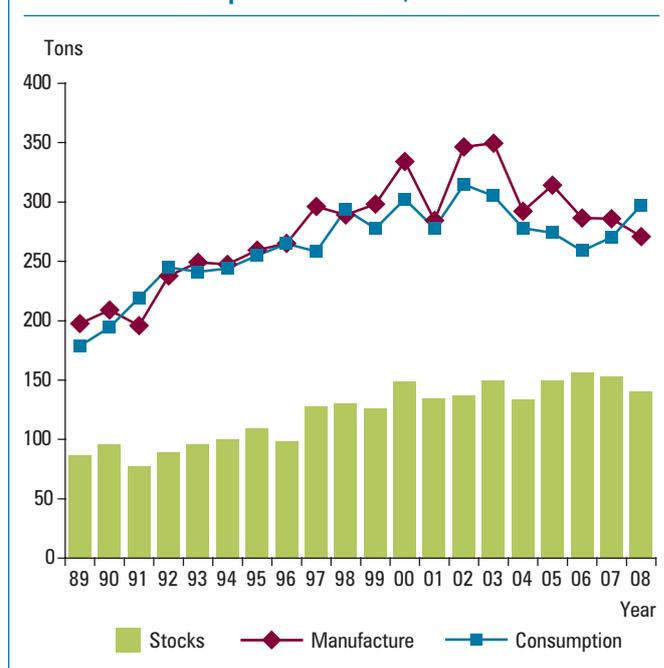
77. Global manufacture of pholcodine fluctuated between about 5.1 tons and 9.8 tons per year during the period 1989-2008 (see figure 24). In 2008, global manufacture stood at 6.7 tons, up from its lowest recorded level of 5.1 tons in 2006. The main manufacturers were France and the United Kingdom (3.2 tons and 1.4 tons respectively), followed by Hungary (768 kg); together, these three countries accounted for 81 per cent of the world total. Total exports of pholcodine reached 3.8 tons in 2008, with the main exporting countries being the United Kingdom (2 tons),<sup>21</sup> Hungary (766 kg) and Norway (503 kg). The main importers in 2008 were the Hong Kong Special Administrative Region of China (1 ton), Pakistan (840 kg), Australia (590 kg) and Algeria (550 kg). Further details on exports and imports of

**Figure 24. Pholcodine: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**



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

**Figure 25. Dextropropoxyphene: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**



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

pholcodine are provided in tables XVI.3 (see pages 280-287 below) and XVI.4 (see pages 288-305 below).

78. Most pholcodine is consumed in the form of preparations listed in Schedule III of the 1961 Convention; in 2008, such preparations accounted for 96 per cent of total consumption. Global consumption of pholcodine reached 7 tons (140 million S-DDD) in 2008. The major user countries and territories in 2008 were France (2.9 tons, or 42 per cent of the world total), Pakistan (1.2 tons, or 17 per cent of the world total), Hong Kong Special Administrative Region of China (738 kg, or 11 per cent of the world total) and Australia (544 kg, or 8 per cent of the world total). Global stocks of pholcodine stood at 3.7 tons in 2008. Major stocks were held by France (1 ton) and China (425 kg).

## Synthetic opioids

79. 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 in English alphabetical order.

### Dextropropoxyphene

80. Manufacture of dextropropoxyphene followed a general upward trend, reaching a peak of almost

350 tons in 2003 (see figure 25). In 2008, global manufacture of dextropropoxyphene stood at 271 tons. India was the main manufacturing country, accounting for 50 per cent of the world total, followed by the United States (31 per cent), France (12 per cent) and Italy (6 per cent).

81. India, the principal exporting country of dextropropoxyphene in 2008, exported 29 per cent (39.4 tons) of its domestic manufacture, which represented 54 per cent of global exports. Italy exported 13.1 tons of dextropropoxyphene, making it the second largest global exporter. France was the main importing country of dextropropoxyphene in 2008 (14.2 tons), followed by Viet Nam (7.3 tons), Algeria (5.9 tons), Pakistan (5.1 tons) and the Syrian Arab Republic (4.9 tons).

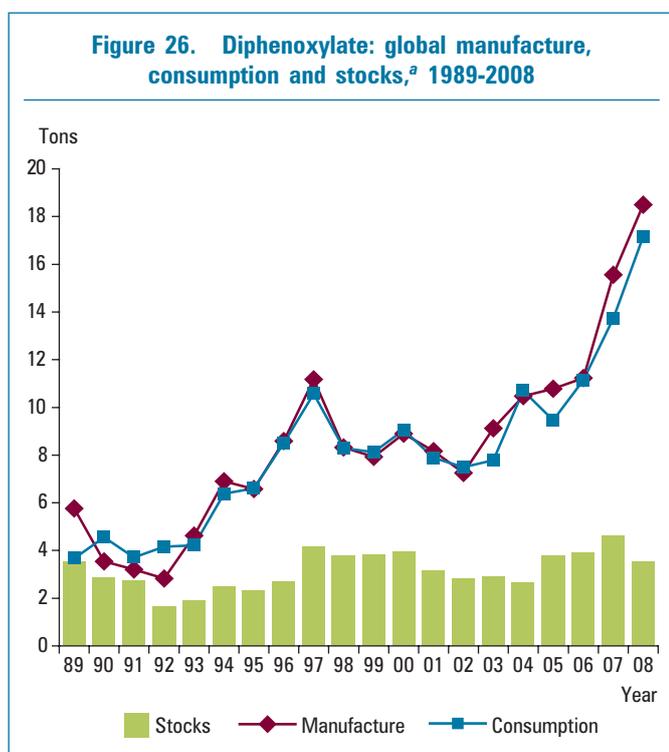
82. Dextropropoxyphene is consumed mainly in the form of preparations listed in Schedule III of the 1961 Convention (more than 99 per cent of the total quantity used in 2008). Countries that report the utilization of dextropropoxyphene for the manufacture of preparations listed in Schedule III may also export those preparations. Global use of dextropropoxyphene peaked in 2002 at 315 tons and has followed a downward trend since then. Global use amounted to 297 tons in 2008 (corresponding to 1.2 billion S-DDD). The countries reporting the highest levels of utilization were India (132 tons), the United States (68.7 tons), France (43.3 tons), Viet Nam (7.3 tons) and Pakistan (5.8 tons).

83. Global stocks of dextropropoxyphene in 2008 stood at 139 tons. The largest stocks were held by the

major manufacturing and importing countries: United States (49.4 tons), France (27.1 tons), Italy (21.1 tons), India (17.7 tons) and Pakistan (4.6 tons).

## Diphenoxylate

84. Manufacture of diphenoxylate has followed a generally rising trend since the 1980s, reaching a peak of 18.5 tons in 2008 (see figure 26). India has been the main manufacturing country of diphenoxylate, contributing 85 per cent of the 2008 global total; it is followed by China, with 11 per cent, and the United States, with 4 per cent. India was also the main exporting country, accounting for 98 per cent of world exports (3.9 tons). The Islamic Republic of Iran was the principal importing country of diphenoxylate (3.2 tons), followed by Pakistan (452 kg).



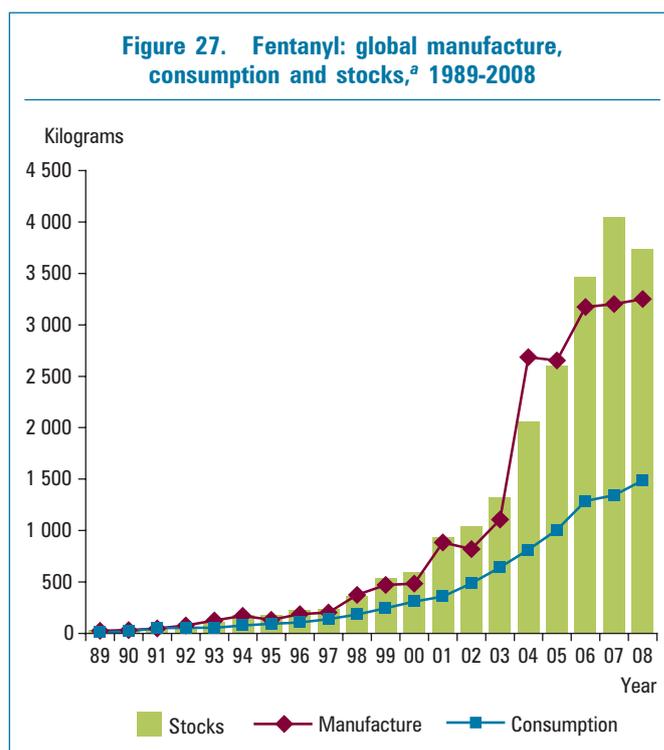
85. In 2008, more than 99 per cent of the diphenoxylate consumed was in the form of preparations listed in Schedule III of the 1961 Convention. Global use in 2008 (17.2 tons, corresponding to 1.1 billion S-DDD) increased by 24 per cent from the 2007 level. The countries reporting the highest use of diphenoxylate for the manufacture of preparations listed in Schedule III in 2008 were India (10.7 tons), the Islamic Republic of Iran (3.1 tons) and China (2.2 tons). Global stocks of diphenoxylate in 2008 amounted to 3.5 tons, 73 per cent of which were held by India.

## Fentanyl

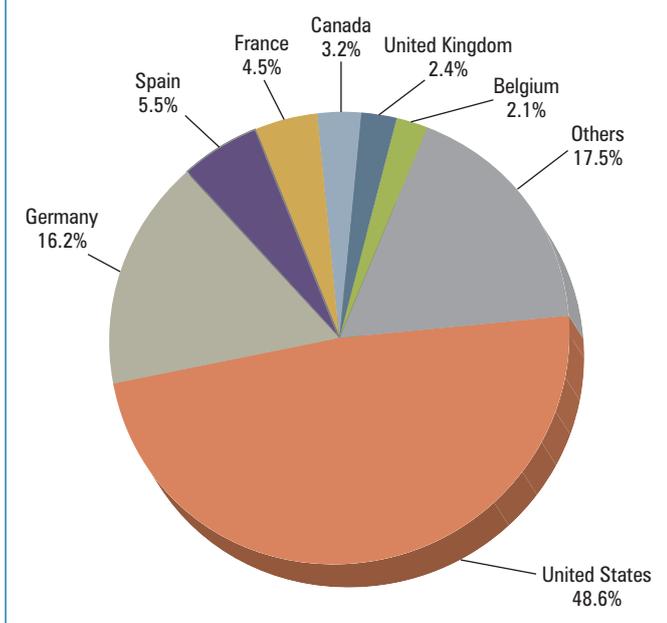
86. Fentanyl, when used as an analgesic, is about 100 times more potent than morphine and is therefore used only in very small doses (for example, 0.005-0.1 mg in injectable form). Until the 1980s, fentanyl was used mainly for the induction of anaesthesia and, in combination with other substances, for a 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.

87. Global manufacture of fentanyl increased slowly until 1992, when it reached a level of 77 kg, and then it grew more rapidly, reaching 3.2 tons in 2008 (see figure 27). The United States was the main manufacturing country of fentanyl in 2008 (65 per cent of global manufacture), followed by Belgium (19 per cent) and South Africa (13 per cent).

88. Belgium exported 1.3 tons of fentanyl in 2008, making it the principal global exporting country. It was followed by Ireland (836 kg), South Africa (180 kg), Germany (156 kg) and the United States (116 kg). In 2008, Ireland was the leading importing country of fentanyl (847 kg), followed by the United Kingdom (478 kg),<sup>22</sup> Belgium (420 kg), Germany (402 kg) and Spain (81 kg). Tables XVI.3 (see pages 280-287 below) and XVI.4 (see pages 288-305 below) provide further details respectively on exports and imports of fentanyl.



**Figure 28. Fentanyl: distribution of consumption, 2008**



89. Global consumption of fentanyl continued to increase, reaching 1.5 tons in 2008 (corresponding to 2.5 billion S-DDD). Fentanyl is the synthetic opioid with the highest consumption in terms of defined daily doses consumed. The United States, accounting for 49 per cent of the world total, continued to be the main consumer country of fentanyl in 2008, followed by Germany, Spain, France and Canada (see figure 28). In 2008, 68 countries reported consumption levels of fentanyl greater than 100 grams, compared with 38 countries in 1999. Ranked according to defined daily doses for statistical purposes consumed per million inhabitants per day, the main consumer countries and territories of fentanyl in 2008 were Belgium (13,601 S-DDD), Germany (13,341 S-DDD), the United States (11,194 S-DDD), Gibraltar (10,545 S-DDD) and Austria (10,143 S-DDD).

90. Global stocks of fentanyl stood at 3.7 tons in 2008 (see figure 27). The largest stocks were held by the United States (39 per cent of global stocks), followed by Germany (22 per cent), Belgium (21 per cent), Ireland (6 per cent), and South Africa (3 per cent).

### Fentanyl analogues

91. The manufacture of the fentanyl analogues alfentanil, remifentanil and sufentanil, which are used mainly as anaesthetics, is concentrated in a few countries. Global manufacture of alfentanil, which had reached a low of 7.4 kg in 2007, increased to 34.7 kg in 2008. Belgium, the major manufacturing country, accounted for 64 per cent of global manufacture; it was followed by the United States (20 per cent) and

the United Kingdom (11 per cent). In 2008, global manufacture of remifentanil reached a peak of 43.1 kg. Belgium, which started manufacturing remifentanil in 2008, accounted for 61 per cent of the global total. China, the United Kingdom, Germany and Switzerland together accounted for 32 per cent of the global total. Global manufacture of sufentanil increased to 8.7 kg in 2008, with the United States and Belgium accounting for 78 per cent and 20 per cent of global manufacture respectively.

92. Global consumption of alfentanil in 2008 (18.3 kg) was close to the average recorded during the preceding decade (18 kg). The United Kingdom consumed the largest amount of alfentanil (29 per cent of global consumption); it was followed by Belgium (18 per cent), Brazil (11 per cent), Germany (11 per cent) and France (8 per cent). The rising trend in global consumption of remifentanil continued, reaching 35.5 kg in 2008. Germany and Italy were leading consumer countries of remifentanil (accounting for 15 per cent and 12 per cent of the total respectively). They were followed by Japan (9 per cent), China (8 per cent) and Spain (6 per cent). Global consumption of sufentanil amounted to 2.5 kg in 2008. Germany, France, the United States, Belgium and China were the five largest consumers of sufentanil, together accounting for 76 per cent of the global total. Detailed information on the consumption of fentanyl analogues is provided in table XIII.1 (see pages 236-258 below).

93. Global stocks of alfentanil stood at 64.8 kg in 2008, most of which were held by Belgium (79 per cent of the global total). Global stocks of remifentanil in 2008 amounted to 58.3 kg, of which 26 per cent were held by Italy, 22 per cent by Belgium, 18 per cent by the United Kingdom, 6 per cent by China and 6 per cent by Germany. Global stocks of sufentanil in 2008 totalled 11.6 kg, most of which were held by the United States (61 per cent), Belgium (13 per cent) and China (11 per cent).

### Ketobemidone

94. Global manufacture of ketobemidone reached 507 kg in 2003, the highest level in 10 years, and then decreased to 284 kg in 2005; no manufacture was reported in 2006 and 2007 and less than 1 kg was manufactured (by Denmark) in 2008. Until 1999, Denmark was the only manufacturer of ketobemidone. The United Kingdom started manufacturing ketobemidone in 2000 and was the sole manufacturer of the substance until 2005. Germany remained the major exporting country of ketobemidone in 2008, accounting for 98 per cent of global exports (83 kg). The main importing countries were Denmark (38 kg), Sweden (32 kg) and Norway (17 kg).

95. Global consumption of ketobemidone, which takes place almost exclusively in the Scandinavian countries (99 per cent of the world total), amounted to 88 kg in 2008 (corresponding to 1.8 million S-DDD). Denmark (51 per cent of the global total) remained the main consumer country of ketobemidone, followed by Sweden (32 per cent) and Norway (16 per cent). Global stocks of ketobemidone dropped to 314 kg in 2008 from a peak of 663 kg in 2005. Germany continued to hold the largest stocks (83 per cent of the global total).

## Methadone

96. Global manufacture of methadone has increased steadily over the past 20 years and rose to its highest level in 2007, at 37.8 tons (see figure 29). In 2008, global manufacture of methadone totalled 35.2 tons. Three countries accounted for the majority of global manufacture: United States (50 per cent of global manufacture), Switzerland (27 per cent) and United Kingdom (13 per cent).

97. Global exports of methadone in 2008 stood at 13.1 tons, similar to the level in 2007. Switzerland remained the main exporting country (6.9 tons), followed by the United Kingdom (2.3 tons)<sup>21</sup> and the United States (1.4 tons). The Islamic Republic of Iran remained the principal importing country of methadone in 2008 (1.8 tons). The other major importers of methadone in 2008 were China (1.7 tons), Canada (1.4 tons), Italy (1.4 tons) and Germany (1.1 tons).

98. Although methadone is used in several countries for the treatment of pain, the sharp upward trend in

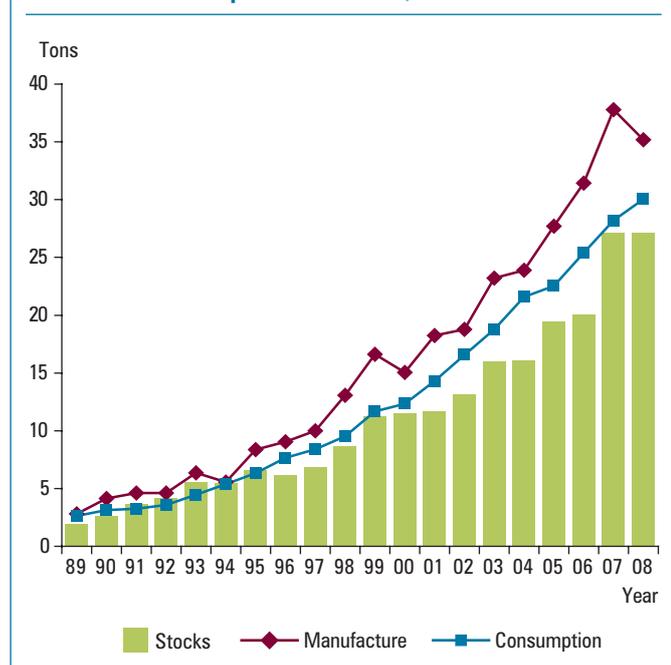
consumption is mainly attributable to its growing use in the treatment of opioid addiction. Global consumption of methadone rose to 30.0 tons in 2008. The United States remained the main consumer country (49 per cent of the global total), followed by the United Kingdom, the Islamic Republic of Iran, Germany and Spain (5-6 per cent of the global total each). In 2008, 49 countries reported consumption levels of methadone greater than 5 kg, compared with 33 countries in 1999. More details on the consumption of methadone can be found in table XII (see pages 208-235 below).

99. Global methadone stocks amounted to 27.1 tons in 2008. The countries holding the largest stocks were the United States (38 per cent of global stocks), Switzerland (29 per cent), the United Kingdom and Germany (5 per cent each) and Spain (4 per cent).

## Pethidine

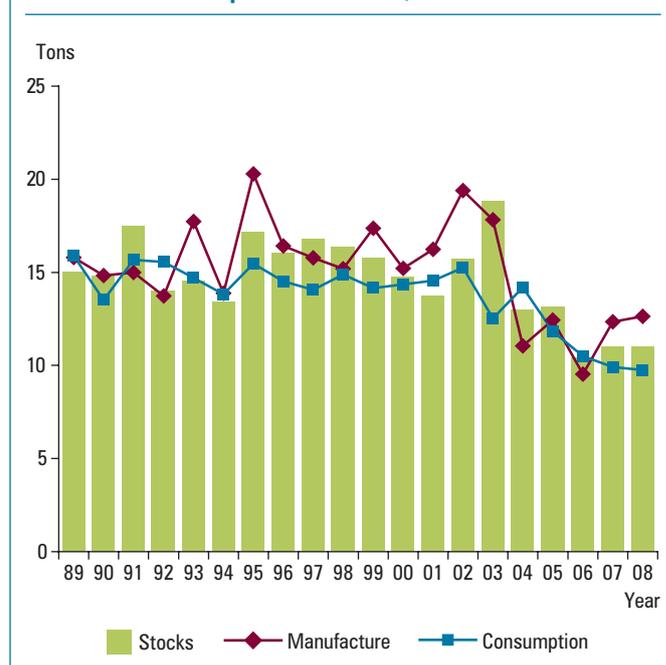
100. Global manufacture of pethidine stood at 12.6 tons in 2008, up from an all-time low of 9.5 tons in 2006 (see figure 30). The United States continued to be the main manufacturing country (5.6 tons), followed by China (2.7 tons), Spain (2.2 tons), Slovakia (980 kg) and the United Kingdom (790 kg). Global exports of pethidine remained stable, amounting to 4.5 tons in 2008. Spain, the principal exporting country, and Slovakia together accounted for about 50 per cent of global exports (1.5 tons and 850 kg respectively). Canada was the main importing country of pethidine in 2008 (677 kg), followed by South Africa (531 kg), Austria (348 kg), the Islamic Republic of Iran (219 kg) and Germany (156 kg).

**Figure 29. Methadone: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**



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

**Figure 30. Pethidine: global manufacture, consumption and stocks,<sup>a</sup> 1989-2008**



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

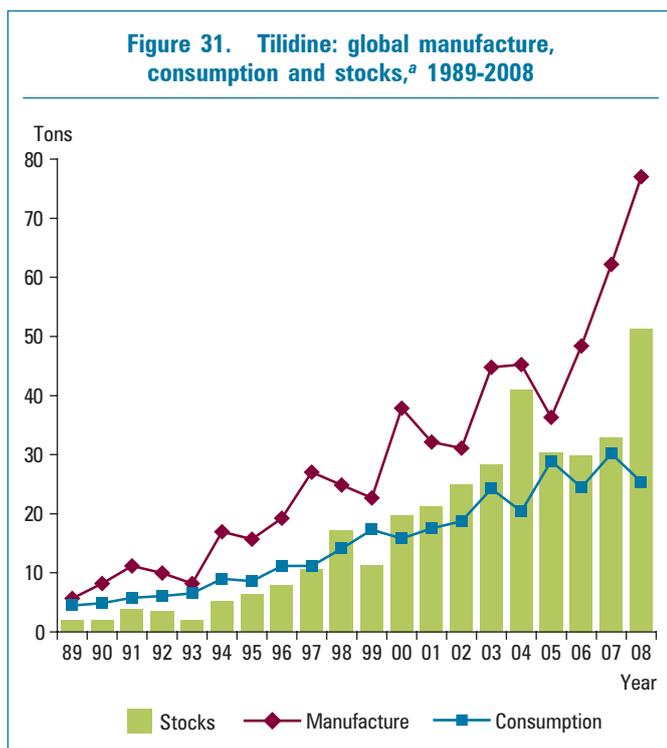
Table XVI.4 (see pages 288-305 below) provides further details on imports of pethidine.

101. Pethidine consumption followed the downward trend of the preceding four years (9.8 tons in 2008, corresponding to 24 million S-DDD). The United States was the main consumer country (4.0 tons), followed by China (1.8 tons), Canada (675 kg), Brazil (451 kg) and the United Kingdom (287 kg). In 2008, the countries with the highest consumption of pethidine, in terms of defined daily doses for statistical purposes consumed per million inhabitants per day, were the Bahamas (178 S-DDD), Canada (144 S-DDD), Trinidad and Tobago (105 S-DDD), the United States (93 S-DDD) and Saint Vincent and the Grenadines (86 S-DDD).

102. Global stocks of pethidine totalled 10.9 tons in 2008. The largest stocks were held by the United States (40 per cent of global stocks), Germany (14 per cent) and China (11 per cent).

### Tilidine

103. Global tilidine manufacture reached a peak of 77.0 tons in 2008 (see figure 31). Germany and Belgium accounted for 74 per cent and 26 per cent of the world total respectively. Tilidine exports totalled 12.9 tons in 2008. Belgium remained the principal exporting country (72 per cent of world exports), followed by Germany and Ireland (together accounting for almost 28 per cent of world exports). The main importing countries of tilidine in 2008 were Ireland (9.4 tons), Germany (1.7 tons) and Belgium (1.6 tons). Germany and Ireland import raw tilidine and



process it to extract and eliminate one of its isomers. This process largely accounts for the difference between the total quantities of tilidine manufactured and consumed.

104. Global consumption of tilidine reached a record level of 30.2 tons in 2007 and then decreased to 25.4 tons (corresponding to 127 million S-DDD) in 2008. Most tilidine is consumed in Germany, which accounted for 90 per cent of the world total in 2008. Belgium accounted for 9 per cent of global consumption. In 2008, 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 (3,785 S-DDD), Belgium (3,199 S-DDD) and Luxembourg (1,238 S-DDD). Global stocks of tilidine stood at 51.2 tons in 2008, the majority being held by Germany (74 per cent), followed by Belgium (13 per cent) and Ireland (9 per cent).

### Trimeperidine

105. The manufacture of trimeperidine reached a low of 70 kg in 2007 and then increased to 326 kg in 2008. India and the Russian Federation accounted for 93 per cent and 7 per cent of global manufacture respectively. India was the leading exporting country of trimeperidine in 2008 (308 kg), followed by Ukraine (16 kg). Most of the global consumption of trimeperidine in 2008 (279 kg, corresponding to 1.4 million S-DDD) took place in the Russian Federation (82 per cent). The countries with the highest consumption, expressed in defined daily doses for statistical purposes per million inhabitants per day, were Belarus (25 S-DDD), the Russian Federation (22 S-DDD), Latvia (17 S-DDD) and Kazakhstan (16 S-DDD). In 2008, global stocks amounted to 348 kg, with the Russian Federation reporting the largest share (86 per cent of the global total).

## Opioid analgesics controlled under the 1971 Convention

106. 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.<sup>27</sup>

### Buprenorphine

107. Buprenorphine is an opioid that has been used as an analgesic. However, the increasing consumption of buprenorphine in recent years is mainly the result of its use in detoxification and substitution treatment of

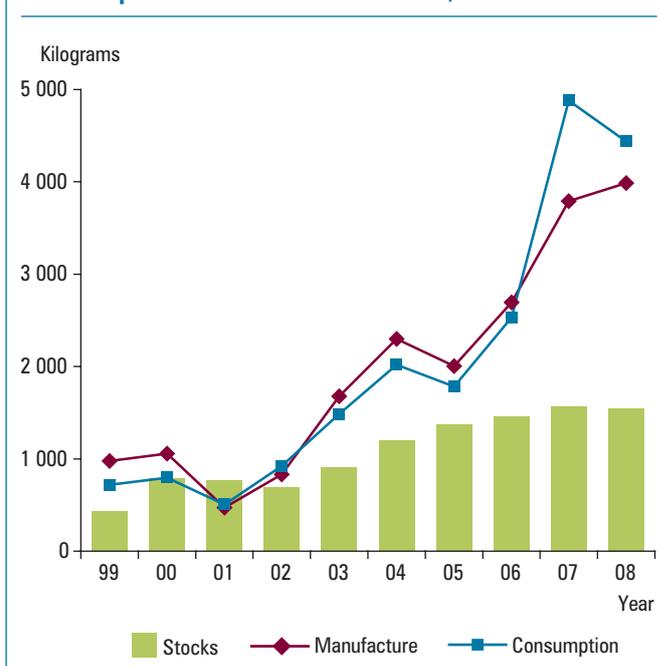
<sup>27</sup>Psychotropic Substances: Statistics for 2008—Assessments of Annual Medical and Scientific Requirements for Substances in Schedules II, III and IV of the Convention on Psychotropic Substances of 1971 (United Nations publication, Sales No. T.10.XI.3).

opioid dependence in a growing number of countries. At present, more than 40 countries use buprenorphine for that purpose. Since 1993, total manufacture of the substance increased steadily and significantly. In 2008, global manufacture reached a level of 4 tons, more than four times the amount manufactured 10 years earlier in 1999 (see figure 32). The United Kingdom accounted for 95 per cent of global manufacture, followed by Germany, India, the Czech Republic, the United States and China. The United Kingdom, Australia and Germany, in order of quantity exported, were the world's leading exporting countries of buprenorphine. The United States, Germany and France, in order of quantity imported, accounting for 74 per cent of global imports. In all three countries, buprenorphine is used mainly in substitution treatment.

### Pentazocine

108. Global reported manufacture of pentazocine averaged 4.5 tons per year during the period 1999-2008, India and Italy being the main manufacturing countries. In 2008, 4.3 tons of pentazocine were manufactured. A large part of the pentazocine manufactured in India is used for domestic consumption. Italy exports most of the pentazocine that it manufactures, making it the world's leading exporting country. The leading importing country of pentazocine is the United States. India,

**Figure 32. Buprenorphine: global calculated consumption,<sup>a</sup> reported manufacture and stocks,<sup>b</sup> 1999-2008**



<sup>a</sup>Approximate global consumption, calculated on the basis of the statistical data submitted by Governments.

<sup>b</sup>Stocks as at 31 December of each year; data are provided on a voluntary basis and may therefore be incomplete.

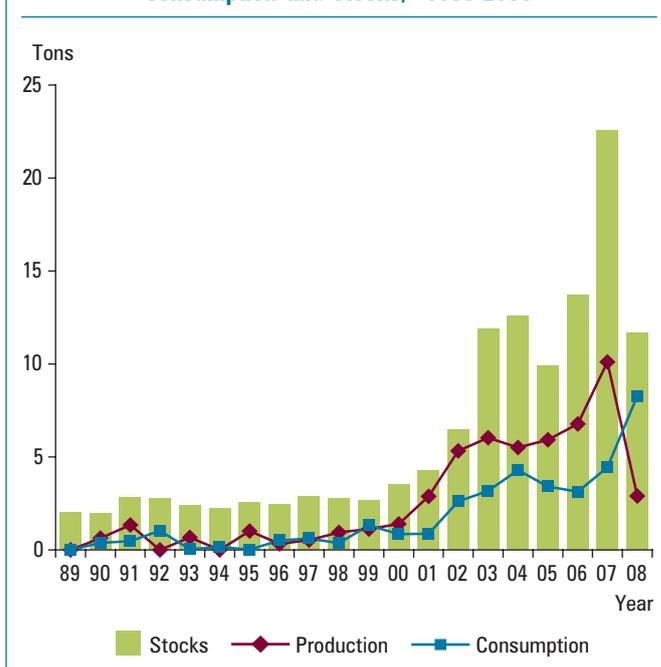
Pakistan and the United States are the main consumer countries of the substance. Some 40 other countries regularly report imports of pentazocine.

## Cannabis

109. Global licit production of cannabis grew steadily from 1.4 tons in 2000 to 5.3 tons in 2002, and then stabilized at a level of about 6 tons. After a sharp rise in 2007 (10.1 tons), global reported production of cannabis decreased in 2008 to 2.9 tons, of which the United Kingdom accounted for 2.7 tons, the Netherlands for 120 kg, Austria for 105 kg and the United States for 1.5 kg (see figure 33). The decrease from 2007 to 2008 was the result mainly of a decline of more than 50 per cent in cannabis production in the United Kingdom and the non-reporting of cannabis production in 2008 by Canada (3.7 tons of cannabis production reported in 2007).

110. Prior to 2000, the United States was the only country to report the use of cannabis solely for scientific purposes. Since then, other countries have used cannabis and cannabis extracts for scientific purposes. Cannabis has been consumed for medical purposes in Canada since 2001 and in the Netherlands since 2003. In the United Kingdom, cannabis is mainly used for the manufacture of cannabis extracts. Global use of cannabis and cannabis

**Figure 33. Cannabis: global production, consumption and stocks,<sup>a</sup> 1989-2008**



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

extracts<sup>28</sup> for medical and scientific purposes increased from 858 kg in 2000 to 4.3 tons in 2004. After declining in 2005 and 2006 to around 3 tons, global use increased again and reached a peak of 8.3 tons in 2008. The main user country in 2008 was Canada (5.2 tons), followed by the United Kingdom (2.6 tons), the Netherlands (330 kg), the Czech Republic (50.9 kg), Spain (22.8 kg) and the United States (11.1 kg). In addition, Sri Lanka has

<sup>28</sup>In statistical reports to INCB, data on cannabis extracts are expressed in cannabis, using the following conversion factor: 1 kg of cannabis extract = 7 kg of cannabis.

released seized cannabis for use for licit purposes (in Ayurvedic medicine); in 2006, the quantity released for that purpose was 140 kg. Global stocks of cannabis fell sharply from 22.6 tons in 2007 to 11.7 tons in 2008, mainly because of a large decrease in stocks held by the United Kingdom. The countries reporting significant cannabis stocks in 2008 were the United Kingdom (8.7 tons),<sup>29</sup> the United States (1.3 tons), Switzerland (872 kg), Canada (535 kg) and the Netherlands (170 kg).

<sup>29</sup>This figure is being clarified with the Government.

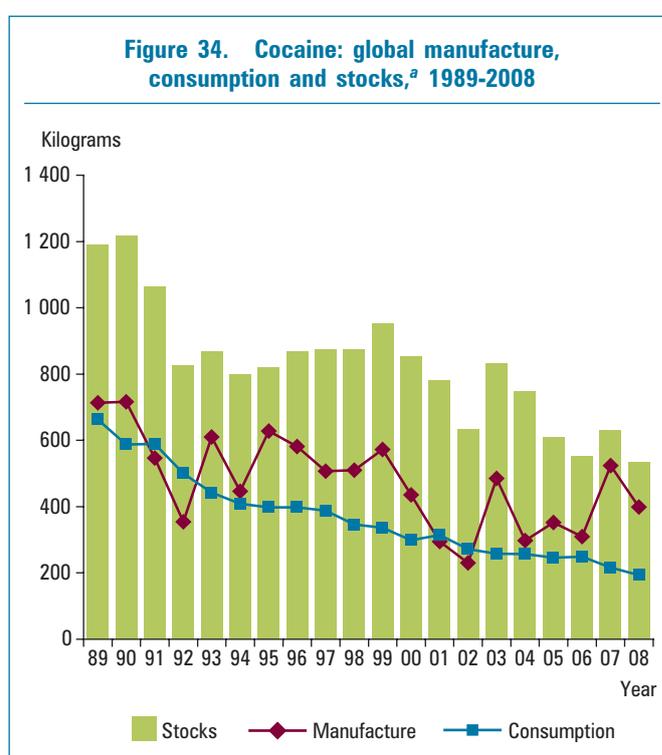
## Coca leaf and cocaine

### Coca leaf

111. Peru has been the only country exporting coca leaf for the global market since 2000. The United States is the leading importing country, accounting for 98 per cent of global imports. Imports by the United States declined from 175 tons in 2001 to 44.4 tons in 2008. 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 fluctuated in the period 1989-2008, following a general downward trend. In 2008, 109 tons of coca leaf were used in the United States. In Peru, the amount of coca leaf used for the manufacture of cocaine increased from 20.3 tons in 2002 to an average of 69 tons in 2007 and 2008, a quantity among the highest ever reported by that country. Small quantities of coca leaf are 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 2008, stocks held in that country amounted to 713 tons, or 81 per cent of the world total.

### Cocaine

112. Global licit manufacture of cocaine declined continuously from a yearly average of 850 kg in the period 1987-1990 to 398 kg in 2008 (see figure 34). The main manufacturing countries in 2008 were Peru (335 kg), the United States (60.8 kg) and China (2.5 kg). Until 2000, global exports of cocaine also followed a downward trend, totalling 211 kg in that year. Exports then picked up again, reaching 483 kg in 2008. Peru was the main supplier, at 334 kg, or 69 per cent of global exports in 2008. Exports from Peru in 2008 were destined mainly for the United Kingdom, where imported cocaine is purified and partly re-exported.



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

113. Global consumption of cocaine declined constantly during the period 1989-2008, from a yearly average of about 670 kg in the period 1987-1990 to 194 kg in 2008, the lowest level ever reported. In 2008, the United States remained the main consumer country of cocaine (67 kg, or 35 per cent of global consumption), followed by the United Kingdom (18.2 kg), the Netherlands (15.8 kg), Canada (15.7 kg) and Belgium (10.4 kg). Global stocks of cocaine stood at 533 kg in 2008. The countries holding the largest stocks were the United States (230 kg), the United Kingdom (110 kg), the Russian Federation (49.1 kg) and Japan (30.7 kg).