III. Extent of licit trade and latest trends in trafficking in precursors

80. The present chapter provides an overview of the major trends and developments in both licit trade and trafficking in precursor chemicals, by substance group, with a view to addressing gaps and weaknesses in precursor control mechanisms. It summarizes information on seizures and cases of diversion or attempted diversion from international trade, as well as activities associated with illicit drug manufacture. The chapter is based on information provided to the Board through various mechanisms, such as form D, the PEN Online and PEN Online Light systems, PICS, Project Prism and Project Cohesion, and through national reports and other official information from Governments. The analysis covers the period up to 1 November 2023.

81. A significant proportion of the present chapter presents information about substances not included in Table I or Table II of the 1988 Convention, which is reported to INCB pursuant to article 12, paragraph 12 (b), of the Convention. Governments also share such information through PICS. Data on non-scheduled chemicals are generally presented in dedicated subsections but may also be found in the sections providing details on trends with regard to substances in Table I and Table II of the 1988 Convention, especially in cases where the non-scheduled chemicals being discussed are part of a more complex development. **INCB once again wishes to thank Governments for the information received and to remind other Governments of their obligation under the 1988 Convention to submit form D annually in a timely manner. Likewise, Governments are encouraged**

to share information about precursor incidents in the most comprehensive and action-oriented way possible through PICS. Without the sharing of such information, new trends in precursor trafficking and illicit drug manufacture cannot be identified and addressed at an early stage, limiting operational cooperation with other countries concerned.

A. Substances used in the illicit manufacture of amphetamine-type stimulants

1. Substances used in the illicit manufacture of amphetamines

(a) Ephedrine and pseudoephedrine

82. Ephedrine and pseudoephedrine both have legitimate medical applications. Ephedrine is used in the manufacture of bronchodilators (cough medicines), while pseudoephedrine is used in the manufacture of bronchodilators and nasal decongestants. Accordingly, both of these products are widely traded internationally. However, they are also used in the illicit manufacture of methamphetamine. The other way to manufacture methamphetamine is by using P-2-P, which can itself be manufactured from phenylacetic acid or a range of recently scheduled designer precursors, such as APAA, APAAN and MAPA (see also annex VIII), or as yet unscheduled chemicals.

Licit trade

83. Between 1 November 2022 and 1 November 2023, exporting countries sent 5,630 pre-export notifications through the PEN Online system for planned shipments of ephedrine and pseudoephedrine in bulk and in the form of pharmaceutical preparations. The notifications were for a total of approximately 1,180 tons of pseudoephedrine, which represents a slight decrease in trade compared with the previous reporting year, and almost 87 tons of ephedrine. The shipments originated in 41 exporting countries and territories and were destined for 179 importing countries and territories.

84. Table 2 below presents the 10 countries with the largest volume of proposed imports of ephedrine and pseudoephedrine, in all forms, ranked in terms of the volume notified through the PEN Online system, in the reporting period.

Table 2. The 10 countries with the largest proposed imports of ephedrine and pseudoephedrine, in all forms, by volume, 1 November 2022–1 November 2023

Ranking	*Ephedrine*	*Pseudoephedrine*
1	Republic of Korea	United States
2	Ghana	Türkiye[a]
3	Nigeria	Switzerland
4	Egypt	Egypt
5	Denmark	Saudi Arabia
6	Uganda	Republic of Korea
7	France	Indonesia
8	China, Hong Kong SAR	France
9	United States	Chile
10	Switzerland	Canada

[a] Since 31 May 2022, "Türkiye" has replaced "Turkey" as the short name used in the United Nations.

Trafficking

85. Global seizures of ephedrines (i.e. ephedrine and pseudoephedrine) have declined drastically over the course of the last decade, from over 43 tons in 2013 to just 6.1 tons – the lowest ever reported – in 2021. There was a slight increase in 2022, with 36 countries reporting seizures of nearly 6.7 tons. The overall decline in seizures of ephedrines over the last decade is in stark contrast with the increase in global seizures of methamphetamine over that period (see figure 6) and is only partly explained by the increase in seizures of designer precursors of P-2-P (see also paras. 110 and 111).

86. In contrast with the overall declining trend in seizures of ephedrines, seizures of preparations containing pseudoephedrine have grown steadily since 2018.[15] This trend marginally reversed in 2022, with about 1.1 tons of preparations containing pseudoephedrine reported seized by 21 countries, the largest number of countries reporting such seizures in the last 10 years (see figure 7). Although less than the 1.4 tons of preparations containing pseudoephedrine seized in 2021, the seizure of 1.1 tons in 2022 is still over twice the quantity seized in 2018. The continued high level of reported seizures of preparations of pseudoephedrine and the increase in the number and

[15] INCB report on precursors for 2022 (E/INCB/2022/4), para. 64.

Figure 6. Seizures of ephedrine and pseudoephedrine, as reported by Governments on form D, and of methamphetamine, as reported on the United Nations Office on Drugs and Crime annual report questionnaire, 2013–2022

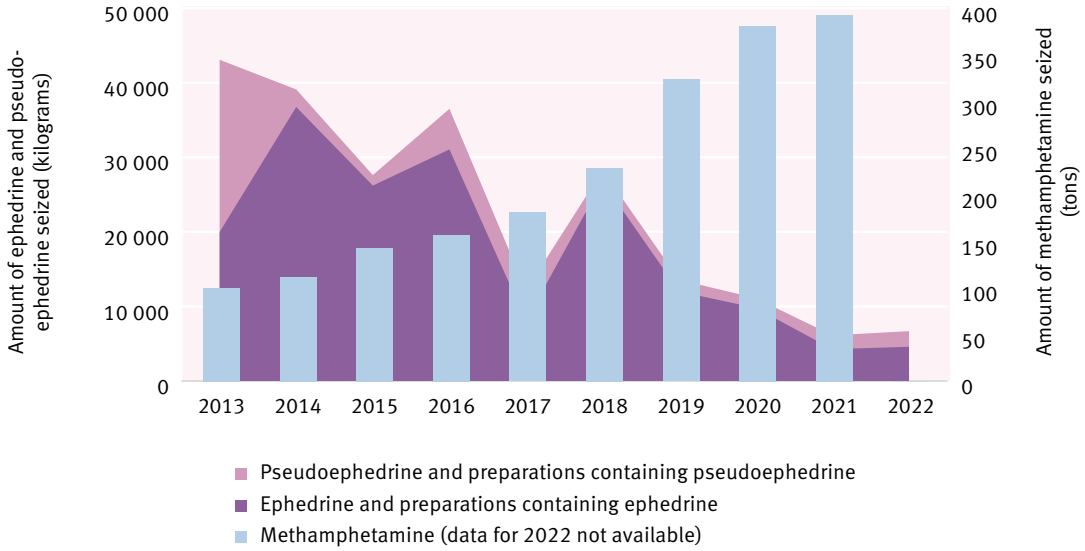
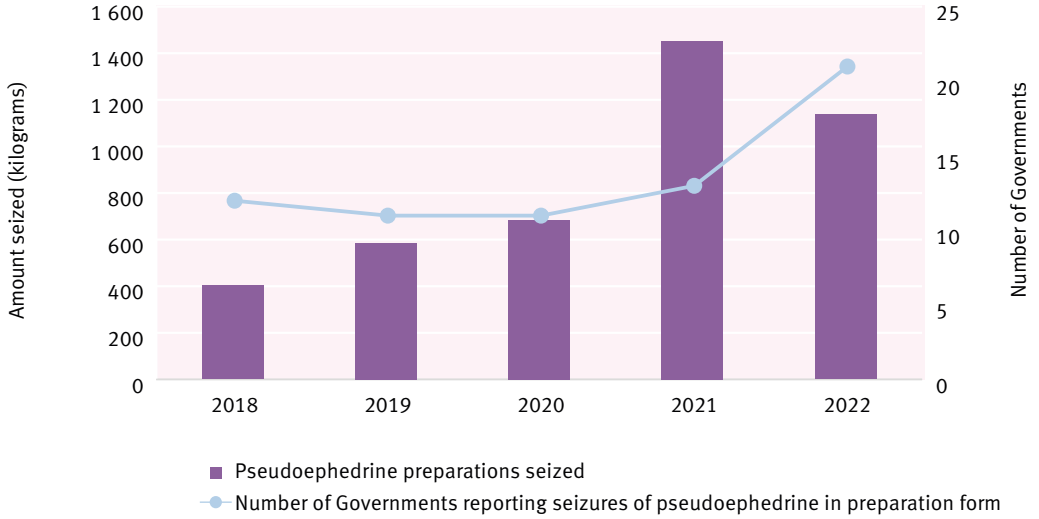


Figure 7. Seizures of pseudoephedrine preparations, as reported by Governments on form D, 2018–2022



geographical spread of countries reporting such seizures[16] points to the need for Governments to take concrete steps to address the misuse of such preparations for illicit purposes. **The Board, accordingly, reiterates the need for Governments to put in place adequate mechanisms to prevent the diversion of preparations containing chemicals listed in Tables I and II of the 1988 Convention, in particular those containing ephedrine and pseudoephedrine, and to control them in the same way as the substances themselves.**

87. Globally, China reported the largest seizures of ephedrine, totalling over 2.1 tons in the form of raw material and 1 ton in the form of preparations. The total of more than 3.1 tons accounted for nearly 70 per cent of global seizures of ephedrine. The country's seizures of ephedrines, which predominantly comprise ephedrine, have declined steeply since 2018, when nearly 26 tons were reported seized. That decline accounts for the global fall in seizures witnessed since that time. Furthermore, on the basis of the seizures

[16] In 2022, four countries (Argentina, Latvia, the United Arab Emirates and the United Republic of Tanzania) reported seizures of pharmaceutical preparations containing pseudoephedrine for the first time. The seizure in the United Arab Emirates and the earlier seizure by Austria in 2021 were destined for North Macedonia, a country that has never reported such seizures.

of propiophenone reported by China in recent years (see also para. 141), it appears that the ephedrine seized in the country is typically illicitly manufactured from propiophenone, and is not the result of the diversion of ephedrine from licit channels.

88. India reported the second highest amount of seizures of ephedrines globally in 2022, with seizures of over 1 ton of ephedrines, comprising 676 kg of ephedrine in 6 cases and 325 kg of pseudoephedrine in 25 cases. The entire quantity seized, which was in the form of raw material in all cases, originated within the country. The largest seizure was of 662 kg of ephedrine that had been illicitly manufactured in a clandestine factory in the north of India using domestically sourced propiophenone and tartaric acid.[17] The case points to the need for the Government of India to cooperate with the industries that manufacture non-scheduled chemicals that can be used to illicitly manufacture drugs or precursors. **Furthermore, given increasing reports of illicitly manufactured ephedrine, Governments are encouraged to forensically profile seized ephedrine to determine whether it has been illicitly manufactured or diverted from legitimate sources. Greater forensic profiling analysis of the methamphetamine end product would also serve the same purpose.**

89. Twenty-three seizures, involving a total of 152 kg of ephedrines, were made at mail, parcel and airport (including air cargo) facilities, with the shipments being intercepted at the point of being trafficked to other countries. As in the past, the majority of shipments (14) were destined for Australia (45 kg of ephedrine and 15 kg of pseudoephedrine), followed by New Zealand (six cases involving a total of 41 kg of pseudoephedrine), and the Philippines (one case involving 49 kg of pseudoephedrine). While no seizures of pharmaceutical preparations of either substance were reported by India in 2022, as at 1 November 2023, the country had communicated 16 incidents through PICS, 13 involving pseudoephedrine and 3 involving ephedrine. Two incidents involved nearly 7.9 million pseudoephedrine tablets. In both cases, the tablets were intended to be trafficked to other countries; 3.9 million tablets seized in the north-eastern part of the country were destined for Myanmar and another 3.9 million were being trafficked to South Sudan in a shipping container.

90. While information on the origin of the ephedrines seized in India (i.e. diversion or illicit manufacture) is mostly not available, the seizure trend appears to indicate that when ephedrine is seized in the form of raw material, it is illicitly manufactured, and that seizures of pharmaceutical preparations, whether of ephedrine or pseudoephedrine, represent diversion from licit trade. Furthermore, the route used to traffic ephedrine and pseudoephedrine in the form of raw material from India to Australia and, to a lesser extent, New Zealand, is well established and has been regularly reported in the past.[18] Trafficking in pseudoephedrine preparations to Myanmar for use in the illicit manufacture of methamphetamine in that country has also been noted in the past.[19] The Board has taken up these issues with the Government of India in order to better understand the origin of the products and diversion points, and awaits the Government's response. **The Board encourages all Governments to identify and address possible weaknesses in their regulatory systems that enable the diversion from licit trade of, in particular, pharmaceutical preparations containing pseudoephedrine.**

91. New Zealand reported the third highest amounts of ephedrines seized globally, with over 800 kg of the substances seized in 86 cases. Pseudoephedrine in the form of raw material accounted for the majority of seizures (27 cases involving a total of 482 kg, 452 kg of which originated in India). After a prolonged period of no seizures at the start of 2022, quantities of raw ephedrine and pseudoephedrine seized returned to previous levels later in the year. India was identified as the predominant source country. INCB is also aware of the conviction and sentencing of a businessman from Fiji in New Zealand in August 2023 for the alleged import of notable amounts of pseudoephedrine since 2017. Investigations are ongoing in Fiji.

92. Australia emerged as the country that reported the next highest seizures of ephedrines, with 443 kg of the substances seized. The majority – 384 kg – were preparations of pseudoephedrine, 300 kg of which related to 72 cases originating in India. Where the country of origin was known, Brunei Darussalam (17 kg in two cases) and Nepal (11 kg in one case) were the sources accounting for the next highest quantities. As at 1 November 2023, Australia had communicated eight incidents through PICS, five involving pseudoephedrine and three involving ephedrine, amounting to 332 kg. Again, the pseudoephedrine in two of the incidents originated in India; however, the largest seizure, made at a seaport, involved 240 kg of pseudoephedrine originating in Malaysia. India therefore continues to be a major source of ephedrines for Australia, although new points of origin such as Brunei Darussalam and Nepal have also been noted. **The Board encourages the Governments of Australia, India, Malaysia and New Zealand to jointly investigate both established and emerging routes used to traffic ephedrines to Oceania and dismantle the criminal networks involved**.

[17] INCB report on precursors for 2022 (E/INCB/2022/4), para. 75.

[18] Ibid., para. 104.

[19] Ibid., para. 72.

Use of pharmaceutical preparations containing ephedrine in illicit methamphetamine manufacture in Europe

In 2022, customs authorities in Czechia requested the Board's assistance in facilitating an investigation into seizures in their country of a pharmaceutical preparation containing ephedrine that had allegedly originated in Romania. Three seizures were made at land border crossings and on inland roads, involving a quantity of 50,000 tablets in two cases and 2 kg of ephedrine in the third. A fourth incident involved the seizure of the preparation in an illicit methamphetamine laboratory in Czechia. The preparation was not registered for medical use in the country and, accordingly, no Czech companies had been registered in relation to its trade and distribution. The Board contacted the authorities in Romania to seek confirmation of the purchase of the preparation by the Czech companies identified during investigations.

Subsequently, in 2023 an organized criminal group responsible for the manufacture and distribution of at least 4.7 tons of methamphetamine in Europe was dismantled by the authorities of Czechia, Poland, Romania and Slovakia with the support of the European Union Agency for Criminal Justice Cooperation and the European Union Agency for Law Enforcement Cooperation (Europol).[a] Sixteen suspects were arrested and over 3.3 million tablets containing ephedrine intended for the manufacture of methamphetamine were seized.

The methamphetamine was believed to have been illicitly manufactured in Czechia and Poland from pharmaceutical products manufactured by a Romanian pharmaceutical company. The tablets produced in Romania were shipped to companies without marketing authorizations in several countries in the European Union and re-routed to illicit laboratories.

Legal framework

Pharmaceutical preparations containing ephedrine and pseudoephedrine are not internationally controlled. However, the Board has encouraged the parties to the Convention to control ephedrine and pseudoephedrine in the form of pharmaceutical preparations in the same way as the substances themselves.[b] Under European Union regulations, the export of pharmaceutical preparations containing ephedrine or pseudoephedrine to countries that are not members of the European Union requires the submission of a pre-export notification, but that is not necessary for trade within the European Union.

In the case described above, Romania was not pre-notified of any shipments of the two substances through the PEN Online system after June 2020. This suggests that the ephedrine and pseudoephedrine required to manufacture the pharmaceutical preparations that were diverted into illicit channels were likely sourced from within the European Union.

In the absence of any pre-notifications of trade in precursors within the European Union, the understanding of changes in licit trade patterns involving Romania and other countries in the European Union remains limited. This also limits the ability of competent national authorities exporting precursors to countries in Europe to effectively verify the legitimacy of shipments.

[a] www.eurojust.europa.eu/news/crackdown-criminal-network-produced-and-distributed-methamphetamine-europe.
[b] www.incb.org/incb/en/precursors/precursors/recommendations/introduction.html.

93. In 2022, for the first time ever, the United Arab Emirates reported seizures of ephedrines, with a single case of 310 kg (2.58 million tablets) of pharmaceutical preparations of pseudoephedrine. The information shared by the country through PICS indicates that the seizure was of Decancit SR tablets and was made in Dubai. The shipment had originated in Egypt and was believed to be destined for North Macedonia via Jordan and the United Arab Emirates (the Jebel Ali FTZ). The consignment was wrongly declared in general terms as "human pharmaceutical products" and the Harmonized System code used was not the one related to pharmaceutical preparations of pseudoephedrine. The case was identified during the course of follow-up investigations into the seizure of 2.16 million tablets (259 kg) of Decancit SR made in Austria in December 2021, which had also originated in Egypt and been destined for North Macedonia via the United Arab Emirates.[20] The Board subsequently organized a closed information-sharing meeting (see para. 66) to discuss this and other cases involving preparations of pseudoephedrine. The case also provides evidence of the possible exploitation of FTZs for trafficking in precursors, the raison d'être of Operation Insight (see also paras. 61–63), indicating the need for Governments to review and, if necessary, strengthen the control measures put in place in such areas.

94. Myanmar reported seizures of 305 kg of pseudoephedrine in the form of pharmaceutical preparations, but no further details were provided. The Board is aware of one case that involved the seizure of 1.3 million pseudoephedrine tablets that originated in India. The reported precursor seizures, however, do not fit with the record quantity of 23 tons of crystal methamphetamine seized in Myanmar in 2022.[21] This may indicate a possible shift towards the use of non-scheduled chemicals in illicit methamphetamine manufacture, although information on trafficking in and the use of alternative chemicals in the region remains scarce (see also para. 119).

95. Seventeen countries in Europe reported seizures of ephedrine and pseudoephedrine on form D, a decline from

[20] INCB report on precursors for 2022 (E/INCB/2022/4), paras. 81 and 115.

[21] UNODC, Regional Office for Southeast Asia and the Pacific, *Synthetic Drugs in East and Southeast Asia: Latest Developments and Challenges* (Bangkok, 2023).

the 20 that did so in 2021. The total quantity reported seized was 357 kg, significantly less than the seizures of about one ton reported in each of the previous two years. The majority of the seizures (295 kg) were of pharmaceutical preparations containing ephedrine, with the largest quantities reported by Czechia (179 kg), Slovakia (51 kg) and Ireland (50 kg). The predominant trend in Europe in 2022 was towards preparations of ephedrine rather than pseudoephedrine (see also the box above). Through PICS, INCB is aware of a seizure of two tons of ephedrine at Rotterdam seaport in January 2023. The shipment, which originated in Afghanistan and transited Pakistan, had been misdeclared as talcum powder. Subsequent forensic analysis confirmed that the ephedrine seized was of natural origin, from the *Ephedra* plant, which grows wild in Afghanistan (see also para. 99).

96. Authorities in Czechia reported having dismantled 250 methamphetamine laboratories in 2022, which had been using pharmaceutical preparations containing 50 mg of ephedrine. By the end of 2022, another pharmaceutical preparation, which was not legally approved and had a higher pseudoephedrine content (120 mg), had been seized. In addition to 179 kg of pharmaceutical preparations of ephedrine seized in 20 cases, Czechia also seized 15 kg of ephedrine in the form of raw material (16 cases), 12 kg of pseudoephedrine preparations (54 cases) and 19 kg of pseudoephedrine raw material (14 cases). Slovakia reported the seizure of 51 kg of ephedrine preparations from a methamphetamine laboratory, as well as seizures of about 6 kg of pseudoephedrine preparations in over 100 cases involving methamphetamine laboratories.

97. Among other countries reporting seizures of ephedrines, Nigeria reported the seizure of 131 kg of ephedrine in the form of raw material in a single case. The consignment, concealed inside electrical appliances being shipped to the Democratic Republic of the Congo, was interdicted at Lagos airport. As at 1 November 2023, Nigeria had communicated five incidents involving a total of 127 kg of ephedrine through PICS. Three of these incidents occurred at airports and the shipments were destined for the Congo, South Africa and Zambia.

98. Türkiye reported two cases involving the seizure of a total of 41 kg of ephedrine in the form of raw material, the largest quantity reported by the country in the last 10 years. However, further details were not available.

99. Afghanistan, presently believed to be one of the major source countries for methamphetamine, has not submitted form D for the last two years, that is, for 2021 and 2022. The country last reported seizures of 440 kg of pseudoephedrine preparations in 2019. The last seizures of ephedrines in the country communicated through PICS date back to 2018. In the absence of official data and reports from the country, it is not possible to offer a conclusive analysis of the starting point of methamphetamine manufacture in the country. **The Board would urge the Governments effecting seizures of methamphetamine sourced from Afghanistan to conduct forensic profiling analysis of samples of the seized drugs in order to determine whether they have been manufactured using ephedrine from natural sources, that is, the *Ephedra* plant, or using pharmaceutical preparations containing ephedrines. This would further inform possible regulatory and enforcement action by the international community.**

100. In the Board's report on precursors for 2022, several instances were reported of seizures or shipments that were objected to and suspicious shipments of pharmaceutical preparations containing pseudoephedrine originating in Egypt and destined for countries in Africa, Europe and West Asia.[22] In response, an information-sharing meeting with the countries concerned was organized by the Board in June 2023 (see also para. 66). The Board notes with approval a series of measures, including regulatory changes, put in place by Egyptian authorities to secure international trade and prevent the diversion of precursors.

(b) Norephedrine and ephedra

Licit trade

101. Between 1 November 2022 and 1 November 2023, pre-notifications were processed through the PEN Online system by 13 exporting countries for 166 shipments of norephedrine to 32 importing countries, involving more than 27 tons of raw material and approximately 760 kg in the form of pharmaceutical preparations, which represents almost double the amount of preparations pre-notified in the previous year. Shipments amounting to 1 ton or more were pre-notified to the following importing countries, in descending order of the amounts shipped: United States, Denmark, Philippines, Myanmar and Mexico. Overall, international trade in norephedrine, a substance that can be used in the illicit manufacture of amphetamine, continued to remain at a low level compared with trade in other precursors of amphetamine-type stimulants. No shipments of ephedra were pre-notified.

Trafficking

102. The United States reported seizures of norephedrine, involving the small quantity of 1.1 kg, on form D for 2022. Australia was the only other country in the world to report seizures of the substance, having seized 80 grams of the substance in 15 cases. In the last five years, global seizures of

[22] INCB report on precursors for 2022 (E/INCB/2022/4), paras. 77, 78 and 88.

norephedrine have amounted to just 13 kg, with the United States accounting for 12 kg. Only six other countries have reported seizures of the substance, involving minor quantities, in the last five years, indicating the decreasing use of the substance for the illicit manufacture of amphetamine.

103. China was the only country that reported seizures of the *Ephedra* plant on form D for 2022, totalling 28 tons. This follows seizures of over 100 tons in both 2019 and 2020 and of nearly 30 tons in 2021. No further details of the seizures were provided.

(c) P-2-P, phenylacetic acid, APAAN, APAA and MAPA

104. Legitimate international trade in P-2-P is relatively small in scale and is limited to just a few countries, while phenylacetic acid is traded much more widely. Instances of the diversion of P-2-P from legitimate trade have been rare in recent years, and seizures often involve material that has been illicitly manufactured from one of its precursors. APAAN, APAA and MAPA are traded in very limited quantities or not at all. On the basis of available seizure data, the latter three substances have largely been replaced by as yet non-scheduled alternatives to P-2-P, namely, derivatives of P-2-P methyl glycidic acid (see figure 9 and subsect. (d) below).

Licit trade

105. Between 1 November 2022 and 1 November 2023, proposed international trade in P-2-P and phenylacetic acid remained at a level similar to that of previous years. Thirty-five proposed shipments of P-2-P, from five exporting countries to eight importing countries, and 731 proposed shipments of phenylacetic acid, from 17 exporting countries to 51 importing countries and territories, were pre-notified through the PEN Online system. There has been one pre-export notification for APAAN and two pre-export notifications for MAPA, involving only small amounts of the substances, since November 2022.

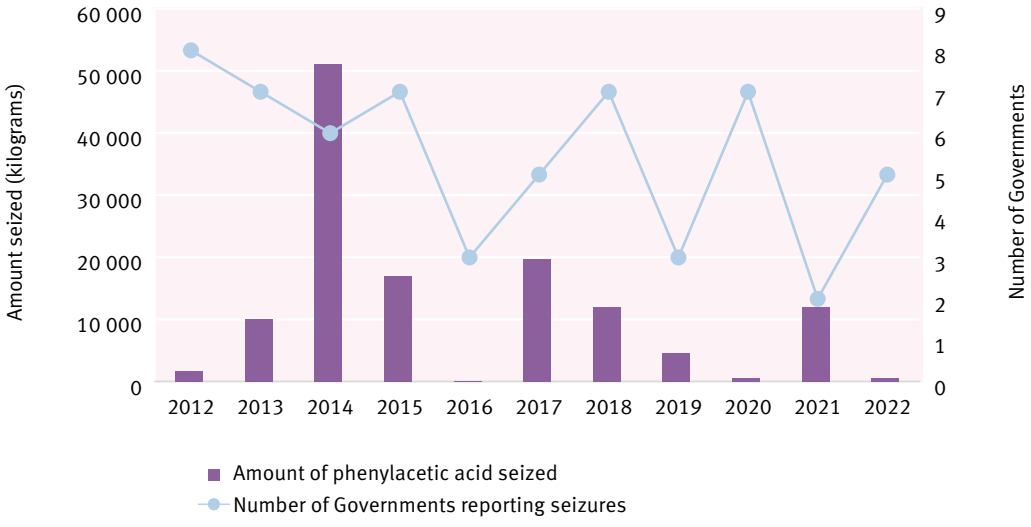
106. On form D, China reported that it had stopped two shipments of phenylacetic acid, amounting to a total of more than 36 tons. Unfortunately, no further details were provided.

Trafficking

107. For many years since the emergence of designer precursors, seizures of **P-2-P** have not been as a result of diversion from legitimate trade but rather an indication of the use of non-scheduled chemicals, including designer precursors, in the illicit manufacture of amphetamine and methamphetamine, with P-2-P being a chemical intermediate rather than the starting material. While most countries do not explicitly provide information about the origin of P-2-P on form D, namely, whether it was illicitly manufactured or diverted from legitimate channels, a significant share of P-2-P is reported as having been seized in clandestine laboratories, where it is encountered as a chemical intermediate. In 2022, 14 countries reported seizures of P-2-P amounting to a total of about 1,600 litres. The largest amount of the substance was seized in the Kingdom of the Netherlands (almost 850 litres), followed by Belgium (345 litres), Mexico (240 litres) and Poland (almost 140 litres).

108. With regard to **phenylacetic acid**, the amounts seized and the number of countries reporting seizures have fluctuated significantly over the years, with large seizures made in only a few countries (see figure 8). Seizures in 2022 amounted to about 600 kg, with the bulk having been seized

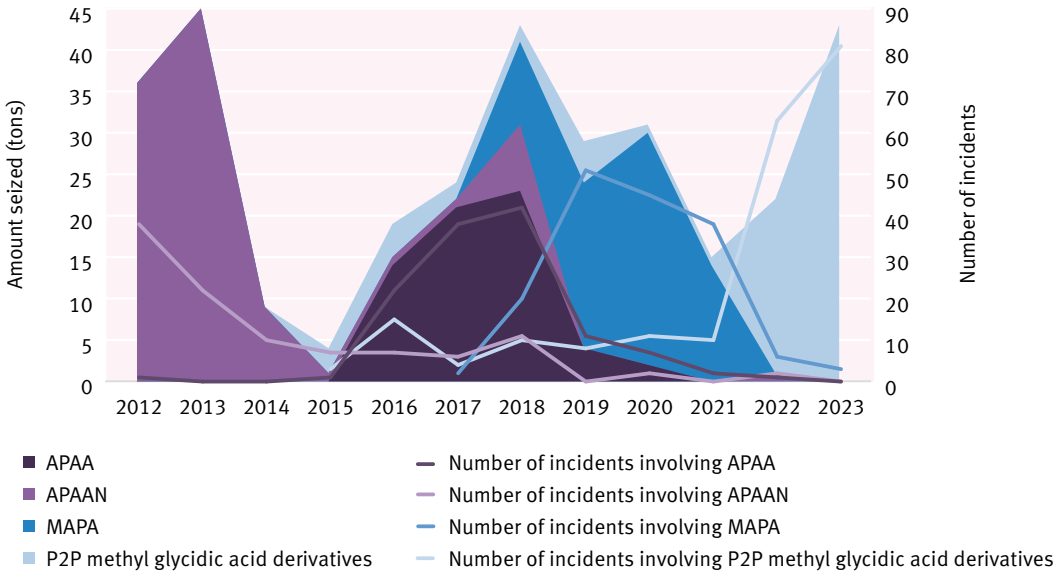
Figure 8. Seizures of phenylacetic acid, as reported by Governments on form D, and number of countries reporting seizures, 2012–2022



in Mexico. Similar to P-2-P, seized phenylacetic acid has nowadays often been illicitly manufactured rather than diverted from legitimate sources. This is especially the case in North America.

109. The seizure data for P-2-P and phenylacetic acid for 2022, when compared with the data for other amphetamine and methamphetamine precursors, confirm the continued declining importance to traffickers of the traditional, controlled precursors. Available data for MAPA, the amphetamine-type stimulant precursor most recently scheduled under the 1988 Convention, also confirm the tendency for seizures of a substance to decrease after the substance is placed under international control (see figure 9). In 2022, the Kingdom of the Netherlands was the only country to report seizures of notable amounts of **APAAN** (500 kg) and **MAPA** (nearly 350 kg). Total seizures of **APAA** amounted to less than 15 kg and were reported by four European countries. In the first 10 months of 2023, no seizures of APAA or APAAN were communicated through PICS; three seizures of MAPA communicated during the same period amounted to less than 30 kg. At the same time, there was an unprecedented increase in seizures of a particular series of alternative precursors, namely, P-2-P methyl glycidic acid derivatives, in terms of

Figure 9. Incidents involving APAAN, APAA, MAPA and P-2-P methyl glycidic acid derivatives communicated through PICS, 2012–2023[a]



[a] The data for 2023 cover only the first 10 months of the year.

Figure 10. Seizures of P-2-P methyl glycidic acid derivatives, as reported by Governments on form D, 2012–2022

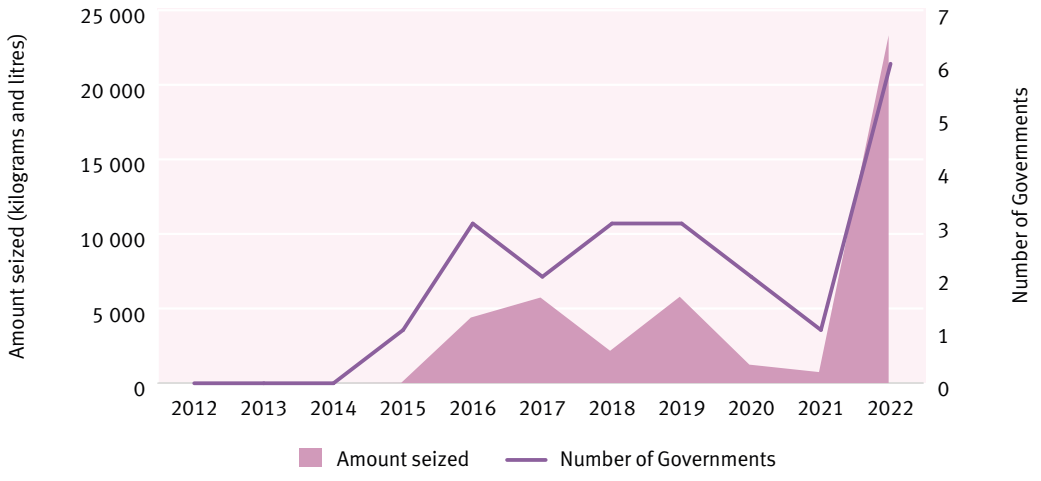
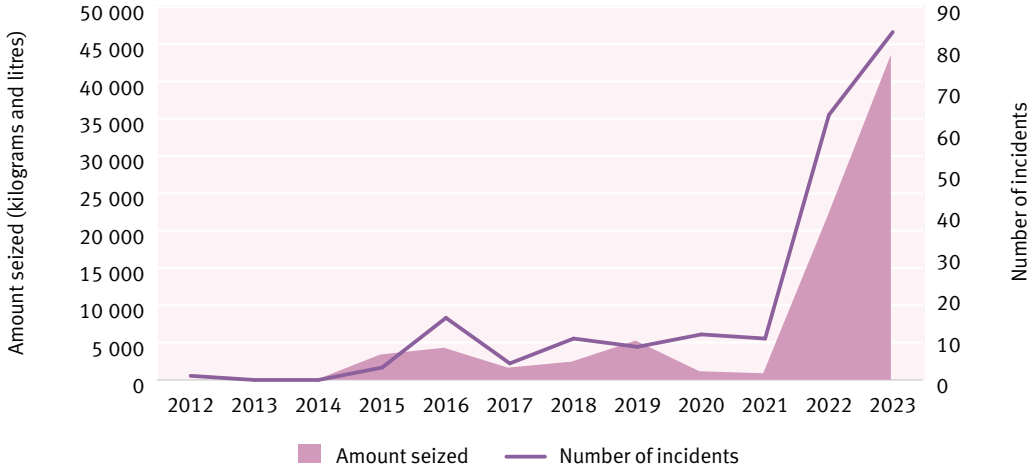


Figure 11. Incidents involving P-2-P methyl glycidic acid derivatives communicated through PICS, 2012–2023[a]



[a] The data for 2023 cover only the first 10 months of the year.

both the number of seizures and the amounts involved (see figure 11 and paras. 110 and 111 below).

(d) Use of non-scheduled chemicals and other trends in the illicit manufacture of amphetamine and methamphetamine

110. The most notable development in the reporting period was the increase in the number of seizures and amounts seized of **P-2-P methyl glycidic acid derivatives**, especially in Europe. A similar development, albeit with a wider geographical reach, was seen in relation to seizures of 3,4-MDP-2-P methyl glycidic acid derivatives, used in the illicit manufacture of MDMA and related "ecstasy"-type substances (see paras. 127 and 128 below).

111. The surge in seizures of P-2-P methyl glycidic acid derivatives is reflected in the data reported on form D for 2022 (see figure 10). However, it is more pronounced in the timelier communications made through PICS, which also provide a picture for the first 10 months of 2023 (see figure 11). The large majority of known incidents involving P-2-P methyl glycidic acid derivatives in 2022 and 2023 were communicated by countries in Europe, where the substances have been under control since December 2020. Most seizures were communicated by the Kingdom of the Netherlands (91), followed by the United Kingdom of Great Britain and Northern Ireland (29) and Germany (16). In September and October 2023, the United States and Australia, respectively, communicated incidents involving P-2-P methyl glycidic acid derivatives for the first time. The largest amounts were seized in the Kingdom of the Netherlands (more than 35 tons), followed by Hungary (almost 16 tons). The amounts of individual seizures ranged from less than 1 kg to more than 7.8 tons.

112. Where information about the origin of the substances was available, the country of origin was identified as China, including Hong Kong. In about 45 per cent of all incidents, shipments were misdeclared. About 30 per cent of seizures were made at airports and about 15 per cent in illicit laboratories. With 37 incidents involving more than 3.7 tons destined for the United Kingdom, about 30 per cent of which transited through Germany, and another 17 incidents involving more than 7.3 tons destined for the Kingdom of the Netherlands, about 30 per cent of which again transited through Germany, investigations in the three countries are ongoing. INCB has issued two Project Prism alerts on the commonalities between these incidents (see also para. 60 above).

113. As a result of increased attention by law enforcement authorities in the countries in which the majority of seizures of P-2-P methyl glycidic acid and its methyl ester have been made to date, there are now indications of an expansion of trafficking to more countries. For example, in January 2022, a controlled delivery between Türkiye and North Macedonia resulted in the seizure of more than 1 ton of P-2-P methyl glycidate. It is believed that the substance was destined for the Kingdom of the Netherlands.

114. In August 2023, the Kingdom of the Netherlands communicated the first incident involving **P-2-P ethyl glycidate** through PICS. The substance is one of the esters of P-2-P methyl glycidic acid that INCB proposed for international control in June 2023 (see para. 7 above), and its emergence provides further evidence supporting the Board's

call to address groups of substances that are closely related chemically. **The Board wishes to call the attention of Member States to the efficiency of extending control to entire groups of chemicals wherever possible, rather than controlling individual substances, which are often easily replaced by traffickers**.

115. In contrast to esters of P-2-P methyl glycidic acid, only a few seizures of other designer precursors of amphetamine and methamphetamine, such as **EAPA** and **DEPAPD**, were reported on form D for 2022. The most notable were two seizures of EAPA (315 litres) in Mexico for the first time. However, countries continued to report various common chemicals that are available off the shelf. These included:

(a) Benzaldehyde and nitroethane, associated with the nitrostyrene method of P-2-P manufacture;

(b) Iodine, hydriodic acid, red phosphorous, hypophosphorous acid and phosphorous acid, associated with the Nagai method of illicit methamphetamine manufacture;

(c) Benzyl chloride and sodium cyanide, or benzyl cyanide, used to manufacture P-2-P via APAAN or phenylacetic acid.

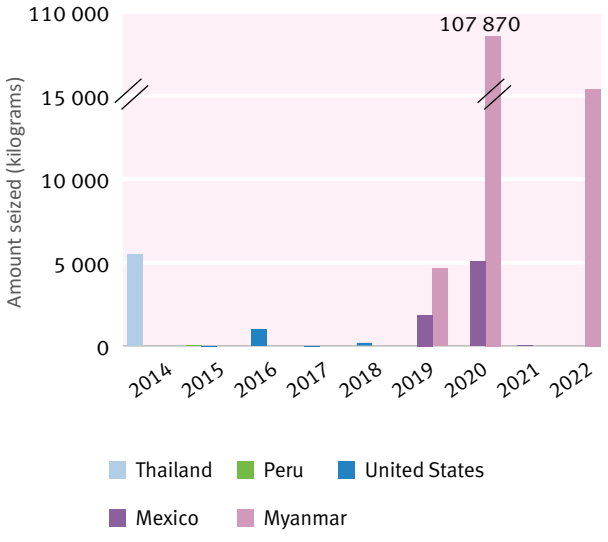
116. With a few notable exceptions, the amounts of the above-mentioned chemicals reported seized on form D for 2022 were indicative of smaller-scale illicit manufacturing operations. Seizures of chemicals associated with the nitrostyrene method were reported by eight European countries. The largest amounts were reported by the Russian Federation, where, compared with 2021, the amounts of **benzaldehyde** seized doubled to more than 2 tons in 2022, the second largest amount reported seized in the last five years. In addition, almost 1 ton of **nitroethane** was seized; both chemicals were alleged to have originated in China and transited through Ukraine.

117. With regard to chemicals associated with the Nagai method, the predominant ephedrine-based method for the illicit manufacture of methamphetamine in most parts of the world, including Africa, Europe, Oceania and West Asia, seizures were reported by 11 countries in 2022, of which 8 were in Europe. The chemical most frequently reported seized was **red phosphorous**, which has been controlled by the European Union since January 2021. Aggregated annual amounts reported seized ranged from less than 1 kg to about 80 kg.

118. Regarding the use of benzyl chloride and sodium cyanide via the intermediate benzyl cyanide for the illicit manufacture of phenylacetic acid and, subsequently, P-2-P, seizures of more than 4,300 litres of benzyl chloride, 1.45 tons of sodium cyanide and almost 5,700 litres of benzyl cyanide in Mexico confirm the continued use of this method in the country. This is also supported by forensic profiling analysis of samples of methamphetamine from Mexico seized at points of entry into the United States, which indicates the use of phenylacetic acid as the primary precursor of P-2-P.[23] Only two other countries reported seizures of the chemicals, with Myanmar reporting the largest seizures, amounting to about 15.4 tons of **sodium cyanide**, allegedly originating in China and Thailand.

119. The seizures in Myanmar are consistent with recurrent claims by government officials in East and South-East Asia of the use of the substance in illicit methamphetamine manufacture in that region. Thailand and Myanmar have, since 2014 and 2019, respectively reported significant amounts of sodium cyanide on form D (figure 12), yet these were mostly seized at borders, or the relevant circumstantial information was not provided. As a result, the Board is neither aware of any seizures of illicit laboratories in which sodium cyanide was used, nor of seizures of the other chemical required, namely, benzyl chloride, in the region. The overall picture with regard to the nature and sources of the chemicals used in the illicit manufacture of methamphetamine in South-East Asia therefore remains unclear. **INCB encourages the Governments concerned to continue gathering evidence of the actual use of sodium cyanide in illicit methamphetamine manufacture.** In addition, since sodium cyanide is traded and used for legitimate purposes, **the Board invites the Governments of countries that**

Figure 12. Seizures of sodium and potassium cyanide, as reported by Governments on form D, 2014–2022



[23] Seizures of more than 2.3 tons of lead acetate provide additional evidence of the illicit manufacture of P-2-P from phenylacetic acid in Mexico.

export sodium cyanide to use, on a voluntary basis, the Board's PEN Online Light system to notify the authorities of importing countries of any planned shipments of the chemical, with a view to establishing regular trade patterns and identifying any irregularities.

2. Substances used in the illicit manufacture of MDMA and its analogues

120. Of the internationally controlled precursors of MDMA (commonly known as "ecstasy") included in Table I of the 1988 Convention, only piperonal is widely traded in notable amounts. Instances of the diversion of any of these precursors from legitimate trade have been rare to none, as have seizures in recent years, with the exception of 3,4-MDP-2-P methyl glycidic acid derivatives. As with their P-2-P analogues (see paras. 110–113 above), the most notable development related to precursors of MDMA in the reporting period was the increase in the number of seizures and amounts seized of one particular, as yet non-controlled derivative of 3,4-MDP-2-P methyl glycidic acid, namely, its ethyl ester 3,4-MDP-2-P ethyl glycidate (see figure 13 and subsect. (c) below).

(a) 3,4-MDP-2-P, 3,4-MDP-2-P methyl glycidate, 3,4-MDP-2-P methyl glycidic acid and piperonal

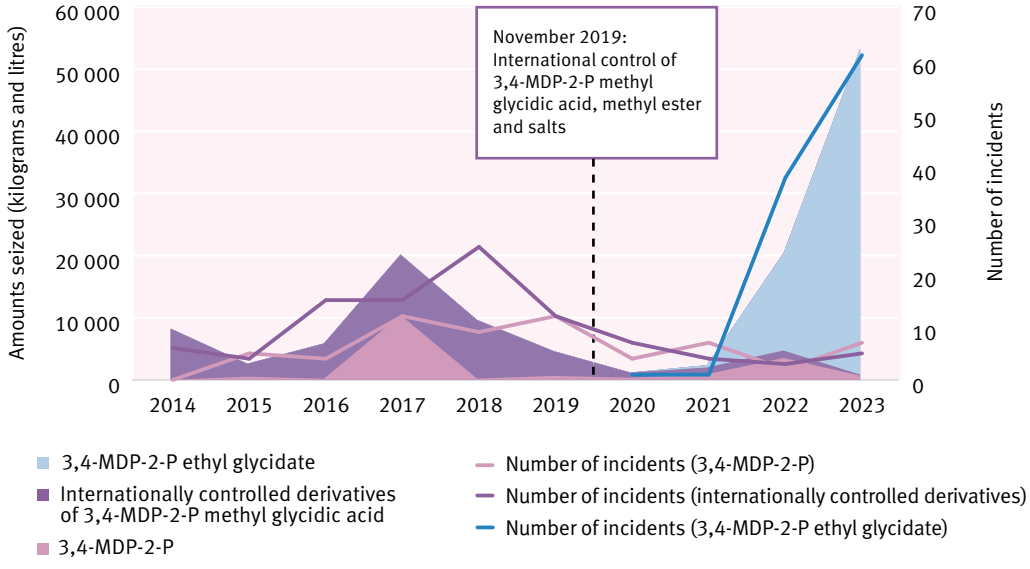
Licit trade

121. Between 1 November 2022 and 1 November 2023, 15 exporting countries and territories notified the authorities of 51 importing countries and territories of approximately 690 proposed exports of piperonal. The number of both exporting countries and importing countries in that period was about the same as in previous years. While there was one export of 3,4-MDP-2-P, involving a very small amount of the substance, pre-notified through the PEN Online system, no trade in the two designer precursors 3,4-MDP-2-P methyl glycidate and 3,4-MDP-2-P methyl glycidic acid was reported. On form D, China reported having stopped three shipments of piperonal, amounting to a total of 21 tons. Unfortunately, no further details were provided. **The Board wishes to remind all Governments of the importance of sharing operationally relevant information about shipments that were stopped because they were suspicious or were diversion attempts.**

Trafficking

122. Trafficking incidents involving **3,4-MDP-2-P** have been rare. Like P-2-P, seizures of 3,4-MDP-2-P are most typically made in clandestine laboratories where the substance is encountered as a chemical intermediate in the illicit manufacture of MDMA from one of its internationally non-scheduled precursors. In 2022, five countries reported seizures of 3,4-MDP-2-P. A seizure reported by Italy involved a record amount of about 3,500 litres of 3,4-MDP-2-P, the second largest amount reported seized in an individual incident in the last 10 years. The consignment was misdeclared and was part of a series of three controlled deliveries involving several non-scheduled amphetamine-type stimulant precursors from a particular Chinese company. Given that seizures of 3,4-MDP-2-P outside clandestine laboratories

Figure 13. Incidents involving 3,4-MDP-2-P and internationally controlled and non-controlled derivatives of 3,4-MDP-2-P methyl glycidic acid communicated through PICS, 2014–2023[a]



[a] The data for 2023 cover only the first 10 months of the year.

are very rare, **INCB reminds national authorities of the fact that 3,4-MDP-2-P may be identified incorrectly as the main component during the chemical analysis of some non-scheduled substitute chemicals, including salts of 3,4-MDP-2-P methyl glycidic acid, as a result of the seized substances decomposing during analysis (i.e. as analytical artefacts).**[24]

123. Seizures of internationally controlled **3,4-MDP-2-P methyl glycidic acid derivatives** amounted to a total of about 700 kg in 2022 and were reported by five countries, four of which were in Europe. This amount falls short of the more than 14.5 tons of 3,4-MDP-2-P ethyl glycidate, the as yet unscheduled derivative, seized. The almost complete replacement of 3,4-MDP-2-P methyl glycidic acid, its salts and methyl ester with the ethyl ester in a period of just two years is another illustration of the speed with which designer precursors evolve. This particular example has also been the trigger for INCB's proposal to the Secretary-General to initiate the scheduling process for a series of seven esters of 3,4-MDP-2-P methyl glycidic acid (see para. 7 above).

124. Incidents involving 3,4-MDP-2-P and internationally controlled derivatives of 3,4-MDP-2-P methyl glycidic acid continued to be communicated through PICS in 2023, with seizures of such substances totalling about 830 litres and 160 kg in the first 10 months of the year. However, those amounts are significantly lower than the amounts seen in the past, while at the same time, seizures of the internationally non-scheduled 3,4-MDP-2-P ethyl glycidate continued to increase (see figure 13 and paras. 127 and 128 below).

(b) Safrole, safrole-rich oils and isosafrole

Licit trade

125. Between 1 November 2022 and 1 November 2023, four exporting countries sent 21 pre-export notifications regarding safrole to the authorities of nine importing countries and territories through the PEN Online system, involving a total of approximately 50 litres. There were two pre-export notifications for safrole-rich oils totalling about 190 litres, a similar amount to that reported last year. Only one pre-export notification for isosafrole was sent, involving a very small amount of the substance.

Trafficking

126. Seizures of safrole, safrole-rich oils and isosafrole reported on form D or communicated through PICS confirm that the traditional, controlled precursors have become less relevant in illicit MDMA manufacture, with the emergence of designer precursors. Only two Governments reported seizures of safrole, safrole-rich oils and isosafrole on form D. This included seizures of 435 litres of safrole in the Kingdom of the Netherlands and of about 45 litres of isosafrole in the Russian Federation. In the first 10 months of 2023, only one incident involving a negligible quantity of safrole was communicated through PICS.

(c) Use of non-scheduled chemicals and other trends in the illicit manufacture of MDMA and its analogues

127. The single most notable development related to non-scheduled chemicals used in the illicit manufacture of MDMA is the increase in seizures of **3,4-MDP-2-P ethyl glycidate**, which is closely related to 3,4-MDP-2-P methyl glycidate and the corresponding acid, which have both been listed in Table I of the 1988 Convention since November 2019. The authorities of eight European countries reported seizures of more than 14.5 tons of the substance on form D in 2022, compared with just one country reporting seizures of 350 kg in 2021. Although they were not reported on form D or communicated through PICS, Canada and the United States provided information about 3,4-MDP-2-P ethyl glycidate seizures as part of the information-gathering process in support of the INCB assessment of the substance for possible international control. Specifically, Canada reported seizures of 641 kg in 2021, 8.1 tons in 2022 and 4.3 tons in the first nine months of 2023, with an observed shift in the mode of trafficking from predominantly air cargo to marine and highway ports of entry. The United States reported seizures of about 130 kg in 2022.

128. Incidents involving 3,4-MDP-2-P ethyl glycidate continued to be communicated through PICS in 2023 (see figure 13 above). A total of 85 per cent of the incidents occurred in Europe, 13 per cent in North America and 2 per cent in Oceania. Seizures in Europe often involved similar modi operandi that triggered bilateral and multilateral investigations among the countries concerned. China, including Hong Kong, was identified as the country of origin where such information was available. The amounts seized in the first 10 months of 2023 alone would have been sufficient to produce about 25 tons of MDMA.

129. Compared with 3,4-MDP-2-P ethyl glycidate, seizures of other alternative designer precursors of MDMA were negligible in 2022 and 2023. This included **MAMDPA**, the "ecstasy"-type analogue of MAPA that had emerged in mid-2021 and for which two countries in Europe, Belgium and Netherlands (Kingdom of the),

[24] INCB report on precursors for 2013 (E/INCB/2013/4), para.88.

reported combined seizures of less than 40 kg, while seizures in 2021 in the Kingdom of the Netherlands alone had amounted to almost 4.5 tons. It also included 450 kg of the sodium salt of **IMDPAM**, a new designer precursor seized in the Kingdom of the Netherlands in February 2023. Like most of the other designer precursors that have emerged recently, IMDPAM is included in the Board's limited international special surveillance list under the extended definitions. INCB issued an alert on the substance containing sufficient detail to allow Governments to carry out a risk analysis of shipments, thus helping to identify additional consignments with similar characteristics and enable countries of origin, transit and destination to cooperate on building cases to identify and prosecute those behind such trafficking.

3. Other trends in the illicit manufacture of amphetamine-type stimulants

130. A number of chemicals not included in the tables of the 1988 Convention but frequently reported on form D can be used in the illicit manufacture of different amphetamine-type stimulants, synthetic cathinones and other new psychoactive substances, and/or certain precursors, such as ephedrine and pseudoephedrine. They typically include a number of chemicals, solvents and reagents. Given their widespread legitimate applications, there is significant trade in these chemicals. Therefore, **the Board encourages Governments to be vigilant as to their possible diversion from both international trade and domestic distribution channels. The Board further encourages Governments to consider using the PEN Online Light system to notify the authorities of importing countries of planned shipments of these substances, thus aiding understanding of patterns of trade and possible vulnerabilities.**

Methylamine

131. Methylamine is required in the illicit manufacture of several amphetamine-type stimulants (e.g. methamphetamine and MDMA), synthetic cathinones, ketamine, and ephedrine and pseudoephedrine. It is also used widely for various legitimate industrial purposes, including in fine chemical synthesis and in the pharmaceutical industry.

132. In 2022, five countries reported seizures of methylamine, either as a solution or as the hydrochloride salt. With the exception of Mexico, all the countries were in Europe. The largest seizures were reported by the Kingdom of the Netherlands (almost 9 tons in 25 incidents, typically in illicit laboratories or warehouses). Mexico seized 1,600 litres in three incidents and Germany seized almost 1,200 litres in one incident, associated with the illicit manufacture of methamphetamine. There were no notable seizures of methylamine precursors, namely, ammonium chloride and formaldehyde, in 2022 (see also para. 168 below).

133. During the first 10 months of 2023, seizures totalling more than 10,800 litres of methylamine and 4.5 tons of methylamine hydrochloride were communicated through PICS. With the exception of one incident in Myanmar that involved the 4.5 tons of methylamine hydrochloride, all the seizures occurred in the Kingdom of the Netherlands, mostly in illicit laboratories or warehouses.

134. Given the widespread legitimate uses of methylamine, it is often diverted from domestic distribution channels or, within the European Union, from the internal market. Specific information about the origin is not frequently reported but when it is, Poland appears to be a source of common chemicals, including methylamine.

Hydrogen gas

135. Hydrogen gas can be used as a reducing agent in the illicit manufacture of several synthetic drugs. Seizures and thefts of gas cylinders containing the substance have regularly been reported on form D and since 2015, Germany has reported thefts of significant amounts from company premises. The amounts have consistently increased since 2018 and peaked in 2022, with about 33,000 litres stolen in 20 instances. German authorities reported that the stolen gas could have been used for the illicit manufacture of more than 49 tons of MDMA.

136. The Kingdom of the Netherlands has been identified as the key destination for the hydrogen gas stolen in Germany, and has accordingly and consistently reported significant seizures. In 2022, these amounted to about 6 tons.

137. Hydrogen gas thefts in Germany and seizures in the Kingdom of the Netherlands continued to be communicated through PICS in 2023. In the first 10 months of 2023, almost 10,000 litres of hydrogen gas were reported stolen in Germany, while seizures in the Kingdom of the Netherlands amounted to almost 7,800 litres, more than the amount reported seized in the whole of 2022.

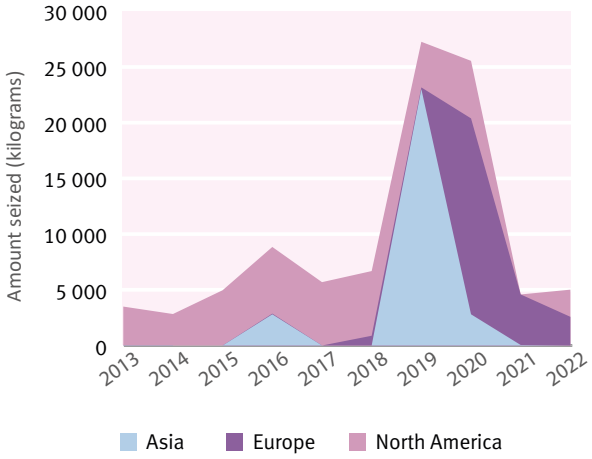
Tartaric acid

138. Tartaric acid is a separation agent that is used to increase the potency of methamphetamine manufactured using P-2-P-based methods. It is also used for similar purposes in the illicit manufacture of ephedrine from 2-bromopropiophenone, its precursor propiophenone, and other

pre-precursors.[25] Traditionally, tartaric acid is also associated with illicit heroin manufacture, namely, the extraction of morphine from opium. Given that tartaric acid is available off the shelf and has a variety of legitimate uses in different industries, **INCB encourages all Governments to be vigilant about the possible diversion of tartaric acid, including from domestic distribution channels.**

139. On form D for 2022, seizures of tartaric acid were only reported by Mexico (nearly 2.5 tons in five incidents), the Kingdom of the Netherlands (nearly 1.9 tons) and Germany (475 kg) (see figure 14). Through PICS, INCB is aware of additional seizures in North America (750 kg) and Europe (about 4.3 tons and 4,000 litres) in the first 10 months of 2023.

Figure 14. Seizures of tartaric acid reported by Governments on form D, by region, 2013–2022



AIBN, methyl thioglycolate, thioglycolic acid and dimyristyl peroxydicarbonate

140. While tartaric acid has long been associated with the process used to increase the potency of P-2-P-based methamphetamine, a further level of sophistication was observed in the Kingdom of the Netherlands in early 2020. The new method provides for the recycling of the previously discarded, less potent l-methamphetamine by-product that is produced when P-2-P-based methods are used.[26]

141. Before 2022, seizures of chemicals associated with this "recycling" process, including **AIBN, methyl thioglycolate, thioglycolic acid and dimyristyl peroxydicarbonate**, an alternative to AIBN, have been reported by Belgium and Netherlands (Kingdom of the). On form D for 2022, Mexico reported seizures of AIBN for the first time. The Kingdom of the Netherlands was the only other country to report such seizures in 2022. However, the combined amount of AIBN seized in the two countries was less than 85 kg. From open sources, INCB is aware of seizures of methyl thioglycolate made in Mexico since 2017.

142. Incidents involving chemicals associated with the process of enantiomeric enrichment and potency increase of P-2-P-based methamphetamine also continued to be communicated through PICS in the first 10 months of 2023, with seizures in the Kingdom of the Netherlands amounting to 100 kg of **AIBN**, 40 litres and 20 kg of **methyl thioglycolate**, and 20 kg of **dimyristyl peroxydicarbonate.**

The Board encourages Governments to share incidents involving non-scheduled substances that are identified as having been used in illicit drug manufacture through PICS or, as a minimum and pursuant to article 12, paragraph 12 (b), of the 1988 Convention, on form D, so as to help establish trends early and alert all Governments accordingly.

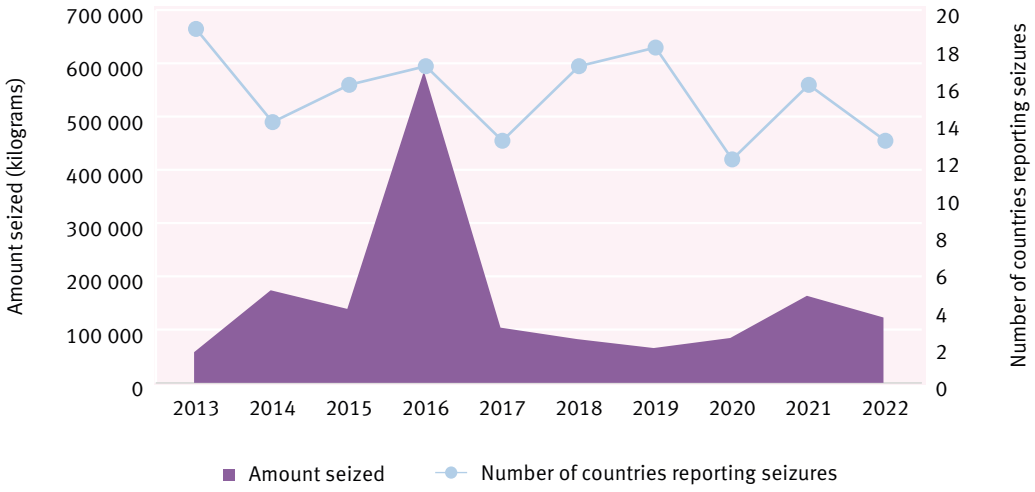
Cutting agents (adulterants and diluents) and tablet excipients

143. Seizures of cutting agents and tablet excipients continued to be reported. Analysis of them can provide valuable information for efforts to counter trafficking. In particular, countries in South-East Asia regularly report seizures of significant amounts of **caffeine**, a common ingredient in methamphetamine tablets, known as "yaba". The largest seizures in the last five years were reported by Myanmar, amounting to between 10 and 20 tons per year. In 2022, Myanmar and Thailand reported seizures amounting to more than 9 tons and 3 tons, respectively, with the substance seized in Thailand having been disguised in fertilizer bags. **INCB reminds Governments of the investigative value of monitoring cutting agents and tablet excipients and encourages them to consider taking action against cutting agents, in accordance with article 13 of the 1988 Convention.**

[25] INCB has been aware of such illicit manufacture in China for several years. In addition, INCB is aware of an incident involving the illicit manufacture of ephedrine from propiophenone, including with the use of tartaric acid, in India in July 2022. However, the quantities of the chemicals were not reported on form D for 2022 (see para. 90 above, and the Board's report on precursors for 2022 (E/INCB/2022/4, para. 115)).

[26] See the Board's report on precursors for 2020 (E/INCB/2020/4), paras. 112–114 and figure IX.

Figure 15. Seizures of potassium permanganate, as reported by Governments on form D, 2013–2022



B. Substances used in the illicit manufacture of cocaine

1. Potassium permanganate

144. Potassium permanganate is the principal oxidizing agent used in the illicit manufacture of cocaine, and most cocaine that is seized continues to be highly oxidized.[27]

Licit trade

145. Between 1 November 2022 and 1 November 2023, the authorities of 34 exporting countries and territories sent 1,806 pre-export notifications to 116 importing countries and territories relating to a total of approximately 35,000 tons of potassium permanganate, which represents about 24 per cent more trade in the substance compared with the previous reporting year. The main exporters were China, followed by India and the United States.

146. Imports of the substance by the three coca-producing countries in South America – Bolivia (Plurinational State of), Colombia and Peru – continued to account for a very limited proportion (less than 1 per cent) of the total global amount imported. Imports of the substance by other countries in South America decreased slightly to about 3 per cent, or about 1,035 tons, compared with the previous year. Of those countries, Brazil, Chile and Colombia had pre-notified exports of potassium permanganate, involving a total of 12.3 tons.

147. On form D for 2022, China and India reported having stopped exports of substantial quantities of potassium permanganate. China reported having stopped the export of a total of over 215 tons of the substance. India reported having stopped two exports involving a total of over 2 tons of potassium permanganate destined for two countries. Both shipments appear to have been stopped for administrative reasons, with no indication of a diversion attempt.

Trafficking

148. On form D for 2022, 13 countries and territories reported seizures of potassium permanganate amounting to more than 122 tons (see figure 15). As in previous years, Colombia reported the largest seizures, amounting to more than 117 tons (in 202 incidents). Although slightly smaller than in 2021 (when a total of more than 135 tons were seized in 307 incidents), seizures in Colombia accounted for around 96 per cent of all the amounts reported seized in 2022. The second largest seizures of the substance, amounting to over 2.5 tons, were reported by the Plurinational State of Bolivia. In the Andean region, Chile and Venezuela (Bolivarian Republic of) also reported seizures of the substance; however, the quantities were significantly smaller than in previous years.

149. Myanmar reported seizures of potassium permanganate for the first time, amounting to almost 1.3 tons and representing the third largest quantity reported seized in 2022. The origin of the substance was unknown. Countries in Europe also continued to report seizures of the substance. As in the past, very few details were provided to the Board, yet the available information suggests that the substance originated from within the country in which the seizure was made. In 2023, Germany reported having dismantled a cocaine extraction laboratory, the first such laboratory

[27] Continuing the trend identified in previous years, results from the Cocaine Signature Program of the United States Drug Enforcement Administration Special Testing and Research Laboratory indicate that less than 1 per cent of the cocaine samples examined, from seizures in 2022 in the United States, were moderately or not oxidized.

detected in the country. Spain also reported the seizure of a cocaine extraction laboratory that, according to the authorities, was one of the biggest cocaine extraction laboratories ever seized in Europe.

2. Use of non-scheduled chemicals and other trends in the illicit manufacture of cocaine

150. The illicit manufacture of cocaine has undergone notable changes since the 1988 Convention came into force, especially in relation to the sophistication and level of chemical knowledge employed to optimize the process. As a result, a range of non-scheduled chemicals are used in the processing of cocaine, substituting for or complementing traditional precursors. For example, there are a variety of common acids, bases and solvents that are used as alternatives to controlled acids, bases and solvents in the extraction of cocaine base from coca leaves and for the conversion of cocaine base into hydrochloride. Several of these internationally non-controlled chemicals have long been under national control, especially in countries in South America, and seizures are regularly reported. More countries than in the past reported on form D for 2022 that the origin of the chemicals was unknown; when information on the origin was provided, it indicated that the seized chemicals continued to be sourced domestically or from within the region.

Chemicals used to illicitly manufacture controlled precursors, or substitute for controlled precursors used in cocaine processing

151. With regard to precursors of potassium permanganate, the situation remained unchanged, with Colombia being the only country to report seizures of **manganese dioxide** (pyrolusite) and **potassium manganate** in 2022. The seizures involved amounts of more than 2.5 tons of each substance, in two and nine incidents, respectively. This ties in with information provided by the Colombian Drug Observatory, according to which 10 potassium permanganate laboratories were dismantled in 2022, compared with nine in 2021. In the first 10 months of 2023, six potassium permanganate laboratories were dismantled.[28] Compared with the amounts of potassium permanganate seized, the amounts of its precursors seized remained small, and the substance continues to be more typically diverted from domestic distribution channels than illicitly manufactured.

152. In addition to potassium permanganate, several other chemicals needed in cocaine processing, including ammonia, hydrochloric acid and sulphuric acid, may also be illicitly manufactured. Colombia provides such information through its Drug Observatory. In addition, the country, as well as several others, provides information about seizures of relevant non-scheduled precursor chemicals on form D. In 2022, four countries reported seizures of **urea**, a widely used fertilizer that can also be used in cocaine processing and the illicit manufacture of ammonia for such processing. The amounts reported in 2022 fall short of those reported in the past, although reported seizures have fluctuated significantly over the years (see figure 16). Cumulatively, the countries having reported the largest seizures have been Colombia and Venezuela (Bolivarian Republic of).

Chemicals that help to improve the efficiency of the cocaine manufacturing process

153. With regard to chemicals that help to improve the efficiency of the cocaine manufacturing process, six countries reported seizures of **sodium metabisulfite**[29] and five countries reported seizures of **calcium chloride**.[30] The Kingdom of the Netherlands was the only country outside South America to report notable seizures of those chemicals, a reflection of the existence of secondary extraction laboratories, or cocaine "washing" laboratories, in that country and the related technology transfer from South America to Europe. The amounts of both substances seized in the Kingdom of the Netherlands were orders of magnitude smaller than in countries in South America.

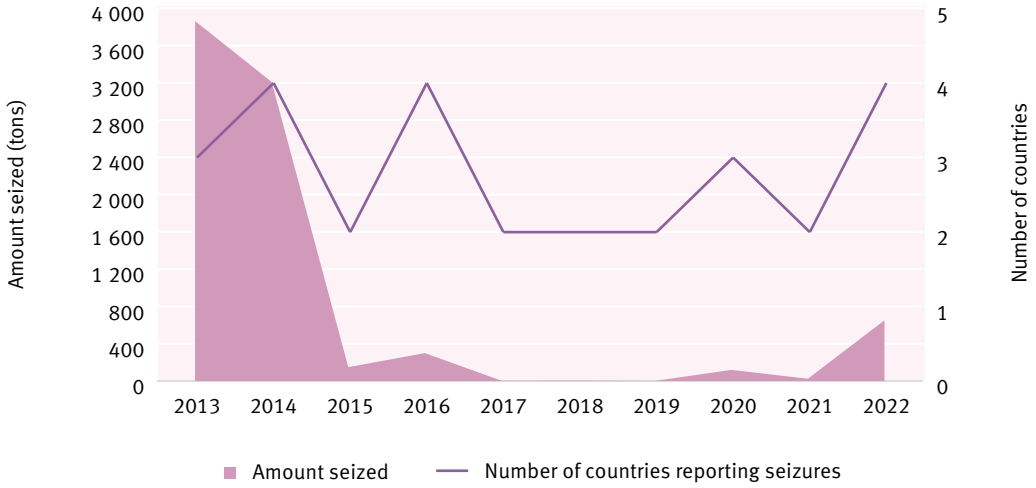
154. Unlike the information available for most other countries, where domestic diversion prevailed as a source, the chemicals seized in Chile were alleged to have originated in China and to be destined for the Plurinational State of Bolivia. Ecuador also reported stopped shipments involving notable amounts of calcium chloride destined for Colombia. To address the diversion of common chemicals with legitimate uses into illicit channels, and to overcome differences in controls applied to such chemicals in countries within a region and globally, **the Board encourages Governments to consider using the Board's recently launched PEN Online Light system to notify the authorities of importing countries of planned exports of calcium chloride and other chemicals used in the processing of cocaine, in particular when these chemicals are controlled domestically. This may aid understanding of trade patterns and address suspicious transactions before diversion occurs.**

[28] Colombian Drug Observatory (www.odc.gov.co/sidco/oferta/infraestructura-sustancias-quimicas) (in Spanish).

[29] Sodium metabisulfite is used to standardize the oxidation level of cocaine base sourced from multiple extraction laboratories prior to further processing.

[30] Calcium chloride is used as a drying agent for solvents, thus enabling them to be recycled and reducing the need for fresh solvents.

Figure 16. Seizures of urea, as reported by Governments on form D, 2013–2022



155. In terms of efficiency gains, a new trend that came to the Board's attention in 2022 was the use of **acetyl chloride** in the last step of the conversion of cocaine base to cocaine hydrochloride. Use of the chemical was said to increase both the yield and purity of cocaine hydrochloride. However, new evidence has emerged since then, and **the Board therefore reiterates its call for further research into the use of acetyl chloride in illicit cocaine manufacture and, when it is encountered in illicit settings, for investigations into the source of the chemical.**

C. Substances used in the illicit manufacture of heroin

1. Acetic anhydride

156. Acetic anhydride is one of the most widely traded substances in Table I of the 1988 Convention. It is used as an acetylating and dehydrating agent in the chemical and pharmaceutical industries for the manufacture of cellulose acetate, for textile sizing agents and cold bleaching activators, for polishing metals and for the production of brake fluids and dyes. It can also be used in the manufacture of explosives – a total of 11 countries have reported such use in the past. The substance is the key chemical in the illicit manufacture of heroin, and it is also required in the illicit manufacture of amphetamine and methamphetamine, namely, in instances where the manufacturing process starts with phenylacetic acid or phenylacetic acid derivatives (see annex VIII).

Licit trade

157. From 1 November 2022 to 1 November 2023, the authorities of 23 exporting countries and territories used the PEN Online system to submit 1,756 pre-export notifications for shipments of acetic anhydride. The shipments were destined for 85 importing countries and territories and involved a total of 1.2 billion litres of acetic anhydride, an increase of 9 per cent compared with the previous reporting period.

158. From 1 November 2022 to 1 November 2023, the competent national authorities of importing countries objected to a total of 69 of 1,756 shipments of acetic anhydride (3.9 per cent), mostly for administrative reasons. The objection rate was considerably lower than it was in the period 2018–2020, when approximately 7.6 per cent of proposed shipments were objected to. In recent years, a significant proportion of shipments that were objected to involved Mexico as the proposed export country.

Trafficking

159. On form D in 2022, 15 countries reported seizures of a total of 25,593 litres of acetic anhydride. This amount was the smallest since 2005, when 22,379 litres of acetic anhydride were seized worldwide (see figure 17).

160. The largest seizures of acetic anhydride in 2022 were reported by Türkiye (14,500 litres), followed by Pakistan (10,000 litres). Other countries that reported seizures of over 100 litres of acetic anhydride were China (571 litres) and India (308 litres).

161. The decrease in global seizures of acetic anhydride may not correlate with the developments concerning opium poppy cultivation in Afghanistan from 2021 to 2023. According to UNODC, in the cropping season of 2022 about 233,000 hectares were under opium poppy cultivation in Afghanistan, 56,000 hectares (32 per cent) more than in 2021, when the Taliban came to power in the country. [31]

[31] UNODC, "Opium cultivation in Afghanistan: latest findings and emerging threats" (2022), p. 4.

Figure 17. Seizures of acetic anhydride, as reported by Governments on form D, 2001–2022

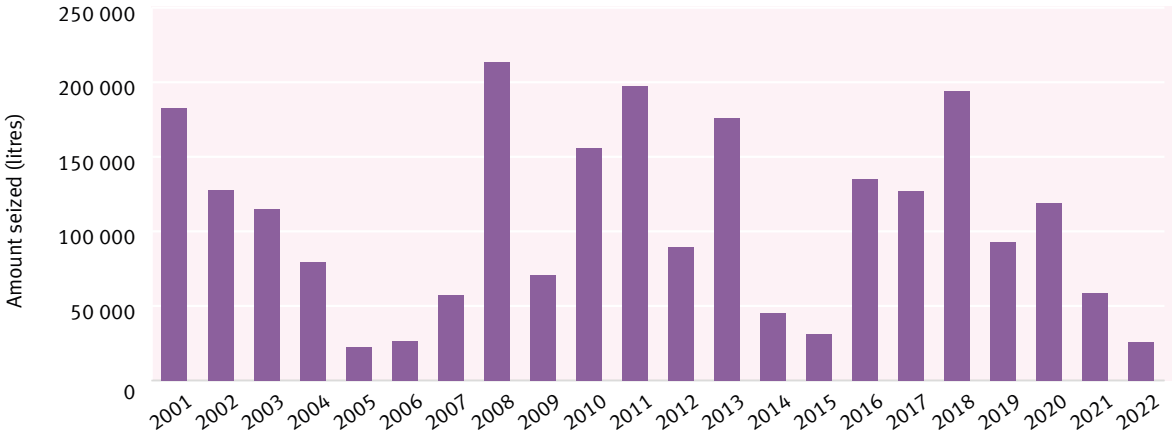
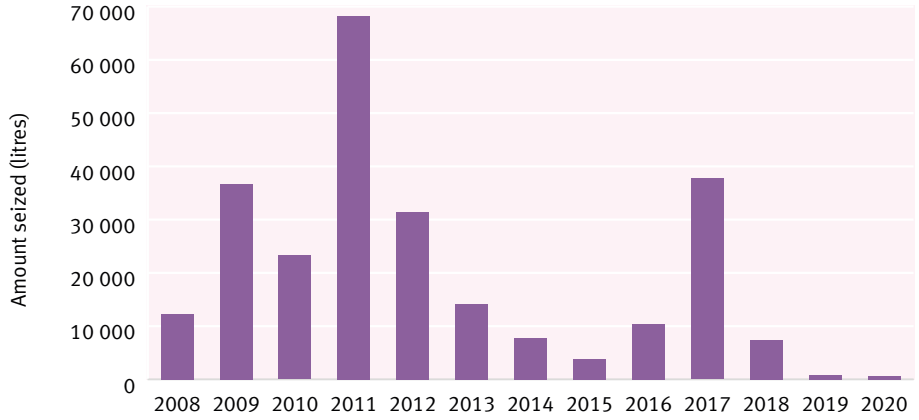


Figure 18. Seizures of acetic anhydride, as reported by the Government of Afghanistan on form D, 2008–2020



162. The opium harvest in Afghanistan in 2022 could be converted into some 240 to 290 tons of pure heroin. This would require between 240,000 and 725,000 litres of acetic anhydride.[32] However, given the absence of seizure information from Afghanistan since 2021, the magnitude of trafficking in acetic anhydride, as well as recent demand for the substance for use in the illicit manufacture of heroin, in the country is difficult to assess (see figure 18).

163. From 1 November 2022 to 1 November 2023, three countries communicated through PICS seizures of small amounts of acetic anhydride, namely, India (103 litres), Netherlands (Kingdom of the) (740 litres) and Pakistan (175 litres). In the Kingdom of the Netherlands, in one case, the acetic anhydride was seized from a warehouse together with non-scheduled chemicals that can be used in the illicit manufacture of amphetamine-type stimulants and new psychoactive substances, including the sodium salt of P-2-P methyl glycidic acid, 3,4-MDP-2P ethyl glycidate and 2-bromo-4'-methylpropiophenone (see para. 183 below).

2. Use of non-scheduled chemicals and other trends in the illicit manufacture of heroin

164. **Acetyl chloride** is a chemical known to be a possible substitute for acetic anhydride as an acetylating agent in the conversion of morphine to heroin. Acetyl chloride is therefore included in the INCB limited international special surveillance list and is also controlled in several countries, including Afghanistan, Iran (Islamic Republic of) and Pakistan.

165. In its previous reports, the Board expressed concern regarding the suspected partial replacement of acetic anhydride as an acetylating agent used in the illicit manufacture of heroin by acetyl chloride. From 2018 to 2021, acetyl chloride was seized in some countries in Asia and Europe

[32] INCB report on precursors for 2022 (E/INCB/2022/4), para. 167.

(Afghanistan, India, Iran (Islamic Republic of), Netherlands (Kingdom of the), Pakistan, Türkiye and the United Arab Emirates). In 2022 and 2023, seizures of acetyl chloride ceased, except for 12,500 litres of the substance seized in the Islamic Republic of Iran and less than one litre seized in Hong Kong, China.

166. Despite calls by expert groups, including those under the Paris Pact initiative, to undertake forensic profiling analysis of seized heroin samples with the aim of identifying the manufacturing methods to support operational activities, the conduct of such profiling analysis has not yet been reported. Therefore, the actual use of acetyl chloride as a substitute for acetic anhydride could not be confirmed.

167. **Glacial acetic acid** is a chemical that is included in the INCB limited international special surveillance list. In the past, it has been repeatedly reported as being used as a cover load or to otherwise conceal acetic anhydride. However, it may also be associated with the illicit manufacture of other drugs and precursors, including P-2-P and 3,4-MDP-2-P. On form D for 2022, the amounts of glacial acetic acid reported seized worldwide totalled less than 1,000 litres, including 840 litres of the substance seized in Germany.

168. **Ammonium chloride** is another non-scheduled chemical frequently associated with the illicit manufacture of heroin, in which it is used in the process of extracting morphine from opium. It is also required for the illicit manufacture of methylamine (see paras. 131–134 above). In 2022, three countries, namely, Belgium, Mexico and Netherlands (Kingdom of the), reported seizures of ammonium chloride, in small (kilogram) amounts, on form D.

D. Substances used in the illicit manufacture of other narcotic drugs and psychotropic substances

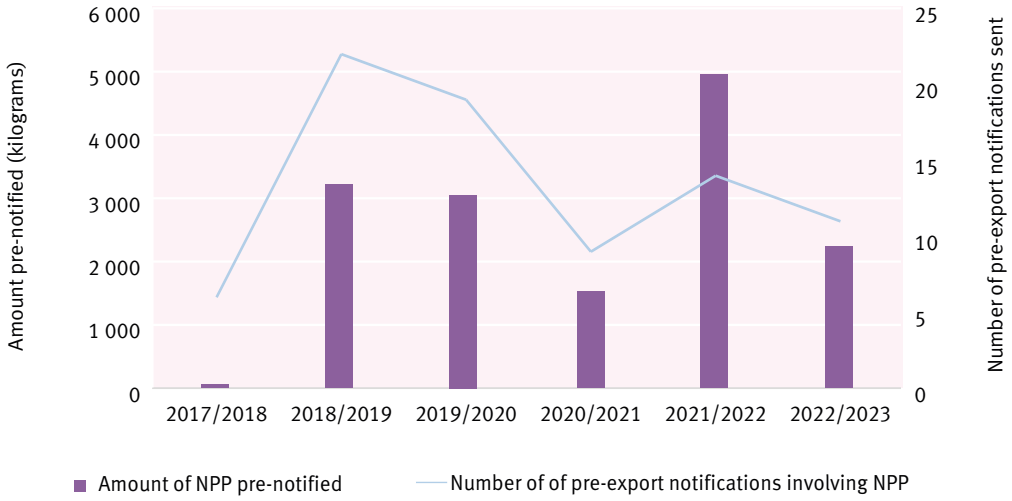
169. With the exception of precursors of fentanyl, fentanyl analogues and other synthetic opioids, there have been no notable developments related to precursors of other narcotic drugs and psychotropic substances. This applies to both licit trade in and seizures of precursors of methaqualone (i.e. acetyl anthranilic acid and *N*-acetylanthranilic acid) and of phencyclidine and other phencyclidine-type drugs (i.e. piperidine). With regard to precursors of LSD, as in the past, Australia was the only country to report notable seizures. In total, there were more than 400 individual seizures involving a total of about 200 grams of ergometrine, ergotamine and lysergic acid; the substances originated in 15 countries from all regions except Oceania.

Precursors of fentanyl, fentanyl analogues and other synthetic opioids, and alternative chemicals

Licit trade

170. Of the five fentanyl precursors now under international control, namely, NPP, ANPP, 4-AP, 1-boc-4-AP and norfentanyl, there is only notable trade in NPP, which is used as a starting material for the legitimate manufacture of fentanyl. Between 1 November 2022 and 1 November 2023, three exporting countries notified importing countries of 11 planned shipments, amounting to a total of more than 2.2 tons, through the PEN Online system (see figure 19). The

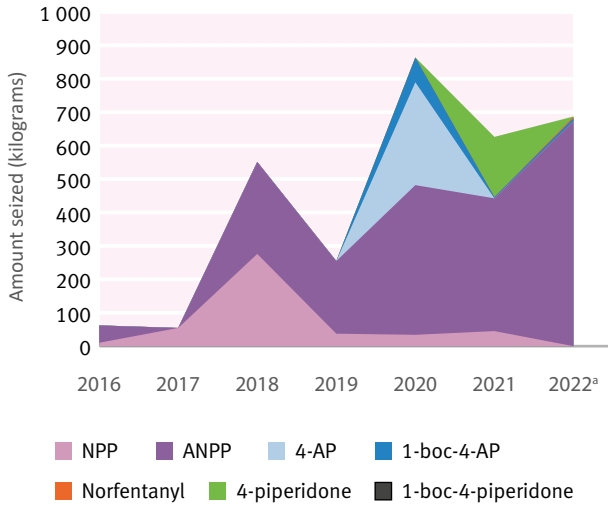
Figure 19. Proposed exports of NPP, pre-notified by exporting Governments through the PEN Online system, 2018–2022[a]



[a] Reporting periods are from 1 November of the first year to 1 November of the following year.

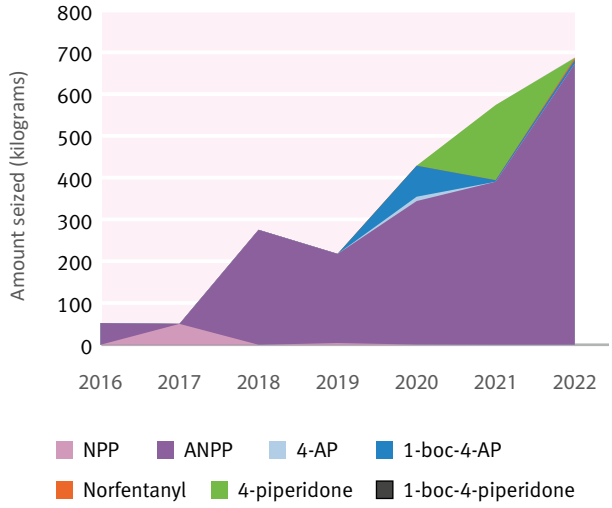
largest exporter was France, followed by India. The largest importer was the United States, followed by the United Kingdom, South Africa and the Russian Federation. All four countries have reported the legitimate manufacture of fentanyl to INCB. The quantities of 4-AP, ANPP and norfentanyl in shipments pre-notified during the reporting period were very small, consistent with amounts being used for limited research and laboratory analytical purposes; there were no proposed transactions involving 1-boc-4-AP.

Figure 20. Seizures of fentanyl precursors, as reported by Governments on form D, 2016–2022[a]



[a] Mexico reported a seizure of 855 litres of ANPP. As the concentration of the solution was not indicated, this amount could not be converted into a weight and is not reflected in the figure.

Figure 21. Seizures of fentanyl precursors, as reported by the United States on form D, 2016–2022



Trafficking

171. Mexico and the United States were the only countries that reported notable seizures of fentanyl precursors under international control on form D for 2022. In fact, since 2018, the amount of **ANPP** reported seized by the United States accounted for 75 per cent to 100 per cent of all seizures of the substance reported on form D (see figures 20 and 21). In addition, the United States was the only country to have consistently reported seizures of 1-boc-4-AP on form D for the past three years. In all cases where such information was provided by the United States, the amounts seized were reported to have been of domestic origin.

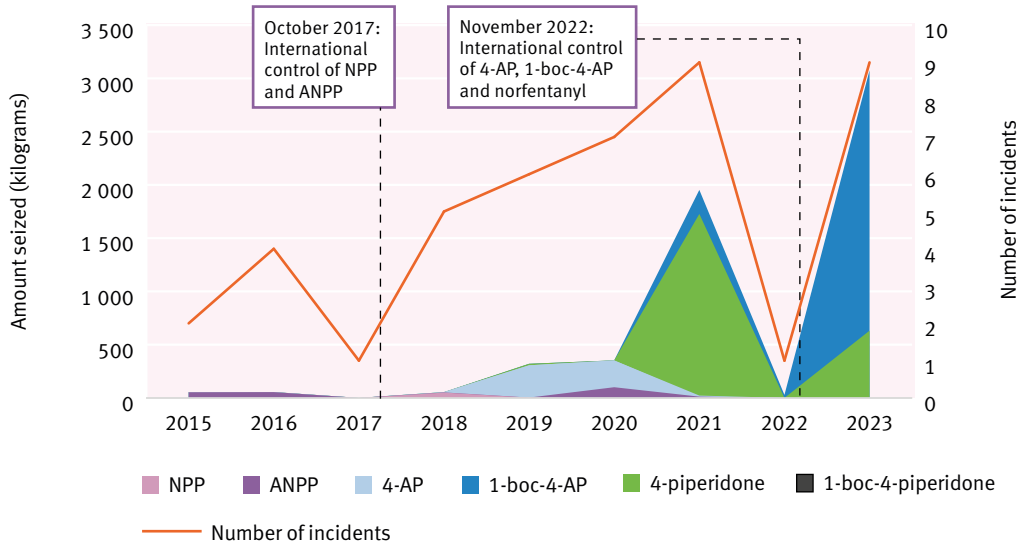
172. The United States also reported three incidents involving fentanyl laboratories in 2022. This was a major decline from the 28 incidents reported in 2021. Also in 2022, Mexico reported an unusual seizure of 855 litres of ANPP. This may have been a reaction mixture containing ANPP and hence an indication of an illicit laboratory. However, further details were not provided.

173. While no seizures of any fentanyl precursors under international control were communicated through PICS in 2023, there was an incident in Canada that involved more than 630 kg of **4-piperidone** in the form of its monohydrate hydrochloride salt (see figure 22). The seizure, which also involved large quantities of precursors of different drugs and was made in warehouses in several cities in British Columbia, was the result of an investigation following the interception at Vancouver International Airport of an air cargo container, the content of which had been misdeclared. Canada is also the country that has reported the largest seizure of 4-piperidone to date (1.5 tons), in August 2021. The substance is one of the fentanyl precursors that have been proposed for international control.

174. In the context of Operation Backup (see paras. 64 and 65 above), the United States communicated nine incidents involving a total of more than 2.4 tons of **1-boc-4-piperidone**, the other fentanyl precursor that was proposed for international control. Four of those incidents also involved the seizure of a total of about 660 kg of **2-phenethyl bromide**. The chemical, which is not under international control, is required together with other fentanyl precursors in a number of methods for the illicit manufacture of fentanyl. The majority of incidents occurred at mail and parcel facilities in Laredo, Texas.

175. While there is abundant media coverage, including official media releases from government authorities, of the smuggling of fentanyl precursors into countries in North America, the reports often lack actionable

Figure 22. Incidents communicated through PICS involving fentanyl precursors, 2015–2023[a]



[a] The data for 2023 cover only the first 10 months of the year.

details, including information about the specific chemical involved. As a result, such reports are neither reflected in the data available to INCB, nor do they allow timely investigation. **INCB therefore urges Governments to make greater efforts to communicate supporting evidence of trafficking in fentanyl precursors, including through the more active and timely use of PICS. It is only sufficiently detailed actionable information that enables the authorities of the countries concerned to launch backtracking investigations. INCB also requests Governments to respond to the Board's inquiries in a timely manner to assist the Board and the competent national authorities concerned in identifying and preventing cases of precursor trafficking using similar modi operandi in the future.**

176. Mexico and the United States reported seizures of precursors of fentanyl analogues on form D for 2022. Specifically, each country reported totals of about 10 kg of different precursors of *para*-fluorofentanyl. In addition, the United States communicated an incident through PICS that involved the masked derivative of a precursor of *para*-fluorofentanyl. The misdeclared shipment was seized at the international airport in Indianapolis. Given the overall scarcity of information on precursors of fentanyl and its analogues, the seizures in 2022 may suggest a diversification by traffickers into the illicit manufacture of more fentanyl end products.

E. Substances not listed in Table I or Table II of the 1988 Convention that are used in the illicit manufacture of other narcotic drugs and psychotropic substances or substances of abuse not under international control

1. Precursors of GHB

177. **GBL** is a chemical precursor of GHB and **1,4-butanediol** is a chemical precursor of GBL. Both substances may also be ingested directly, as they are metabolized into GHB in the body, that is, they are both prodrugs of GHB. Because of this, some countries control GBL as a precursor while others control it as a psychotropic substance. As a result, not all countries where GBL is encountered report seizures of the substance on form D. In 2022, Australia, the United States and seven countries in Europe reported seizures of GBL; the United States was the only country to report seizures of 1,4-butanediol. Following the launch of the PEN Online Light system in October 2022, the authorities of China started notifying importing countries of planned shipments of GBL as part of legitimate trade. In addition, China reported on form D that it had stopped 39 shipments involving a total of almost 575 tons of GBL in 2022.

178. GBL and 1,4-butanediol were also, among other substances, targets of the Board's Operation Knockout, which was aimed at identifying and dismantling illicit manufacturing operations, suspicious online marketing activities and distribution and redistribution points involving substances that had specifically been associated with reports of drug-facilitated sexual assault in the past. The Operation was conducted jointly under Project Ion, Project Prism and the Global Rapid Interdiction of Dangerous Substances (GRIDS) Programme between 20 November and 18 December 2022. Seizures during the operational period totalled 82 kg and 18 litres of GBL (in 61 incidents) and 46 kg and 200 litres of 1,4-butanediol (in 101 incidents). Those quantities were indicative of retail-level seizures of the substances for direct consumption rather than for use as a precursor chemical. The main consumer markets were in North America and Oceania; the main regions of origin were Europe and East Asia.

179. Seizures of GBL and 1,4-butanediol communicated through PICS in the first 10 months of 2023 amounted to a total of about 1,700 litres in nine incidents and more than 3,300 kg in two incidents, respectively. The largest amounts of both substances were communicated by Canada and were both seized as part of multi-precursor seizures involving amphetamine-type stimulants and fentanyl precursors. Given their dual nature, incidents involving both substances also continued to be communicated through IONICS, typically in retail-level quantities.

2. Precursors of ketamine

180. Although there have been major increases in seizures of ketamine in recent years, as well as increases in the size and sophistication of dismantled ketamine laboratories, information about the chemicals involved remains scarce. According to UNODC,[33] some of the largest operations, including illicit laboratory sites and storage locations, have been dismantled in South-East Asia, namely, Cambodia and Myanmar, resulting in the seizure of huge quantities of chemicals, in the range of several hundreds of tons. However, these chemicals were usually not specified. In cases where they were, they were mostly basic chemicals, solvents, acids and bases, but there was no information about the actual starting materials.

181. With only China reporting any seizures, in almost negligible amounts, of two of the primary ketamine precursors, **2-chlorophenyl cyclopentyl ketone** and **"hydroxylimine",**[34] in 2022, it is not possible to discern any trends in ketamine precursor trafficking. **The Board commends those Governments that voluntarily report seizures of specific ketamine precursors, their origin and, where available, related contextual information. Similarly, the Board commends those Governments that use forensic profiling analysis to determine whether seized ketamine was illicitly manufactured and from which chemicals. These efforts help provide the evidence to prevent illicit ketamine manufacture while protecting legitimate supply chains, thus ensuring the availability of ketamine and its precursors for legitimate purposes.**

3. Precursors of new psychoactive substances, including substances recently scheduled under the Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol or the Convention on Psychotropic Substances of 1971

182. As in previous years, a number of countries, especially countries in Europe, reported seizures of precursors of new psychoactive substances and substances recently placed under international control on form D. Such reporting, together with information communicated through PICS, provides an indication of the geographical spread of the illicit manufacture of these substances. As in previous years, most of the seizures made in the reporting period involved precursors of synthetic cathinones.

183. On form D for 2022, the Russian Federation reported the largest seizures of more than 2,800 litres of **valerophenone**, a precursor of *alpha*-PVP, and about 840 kg of **2-bromo-4'-methylpropiophenone**, a precursor of mephedrone. The latter substance was also reported by four other countries in Europe, in amounts ranging from less than 1 kg (Hungary) to almost 350 kg (Ukraine). Netherlands (Kingdom of the) and Poland also reported seizures of **2-bromo-4'-chloropropiophenone**, a precursor of 4-CMC (clephedrone) and of other 4-chloro-substituted cathinone derivatives.

184. In the first 10 months of 2023, six incidents involving precursors of new psychoactive substances were communicated through PICS. They included four illicit laboratory incidents in the Kingdom of the Netherlands involving *alpha*-PVP, mephedrone and clephedrone precursors, at least one of which was also associated with certain steps of illicit ketamine manufacture. Available information suggests that there is limited illicit manufacture of cathinones in Europe, predominantly mephedrone and clephedrone in

[33] UNODC, Regional Office for Southeast Asia and the Pacific, *Synthetic Drugs in East and Southeast Asia.*

[34] "Hydroxylimine" is an informal term used to refer to the substance known chemically as 1-hydroxycyclopentyl (2-chlorophenyl)-ketone-*N*-methylimine.

Western and Central Europe and mephedrone and *alpha*-PVP in Eastern Europe. Such manufacture is also occasionally reported in Central Asian countries. However, while significant amounts of precursors are seized, their type is not usually specified. For example, INCB is aware of the dismantling of an alleged mephedrone laboratory in Kyrgyzstan in June 2023 involving the seizure of 2.2 tons of unspecified precursors and related laboratory equipment. The Board is also aware of illicit mephedrone manufacture in Taiwan Province of China.