

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

57. 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 system, 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 2022.

58. The present chapter also provides 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.

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

### 1. Substances used in the illicit manufacture of amphetamines

#### (a) Ephedrine and pseudoephedrine

59. Ephedrine and pseudoephedrine, both of which have legitimate medical applications, can also be used in the illicit manufacture of methamphetamine. However, methamphetamine can alternatively be manufactured from P-2-P, phenylacetic acid, APAAN, APAA, MAPA or a number of non-scheduled chemicals (see subsects. (c) and (d) below, and annex VIII). Because of their licit uses, both ephedrine and pseudoephedrine are traded widely.

#### *Licit trade*

60. Between 1 November 2021 and 1 November 2022, exporting countries sent 5,426 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 1,290 tons of pseudoephedrine, which represents a slight increase in trade compared with the reporting years 2021 and 2020, and almost 73 tons of ephedrine. The shipments originated in 42 exporting countries and territories and were destined for 169 importing countries and territories.

**Table 2. The 10 countries with the largest proposed imports of ephedrine and pseudoephedrine, by volume, 1 November 2021–1 November 2022**

Ranking	Ephedrine	Pseudoephedrine
1	Republic of Korea	United States of America
2	Nigeria	Egypt
3	Egypt	Türkiye <sup>a</sup>
4	Indonesia	Indonesia
5	United States	Switzerland
6	United Kingdom of Great Britain and Northern Ireland	Pakistan
7	South Africa	Japan
8	Ghana	Republic of Korea
9	Switzerland	Italy
10	Singapore, Denmark	Singapore

<sup>a</sup>Since 31 May 2022, “Türkiye” has replaced “Turkey” as the short name used in the United Nations.

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

62. India stopped one shipment of 2,500 kg of ephedrine hydrochloride to Uganda. While the reasons for stopping the shipment were not available, it is noted that the annual legitimate requirements of Uganda for ephedrine amounted to only 1,000 kg.

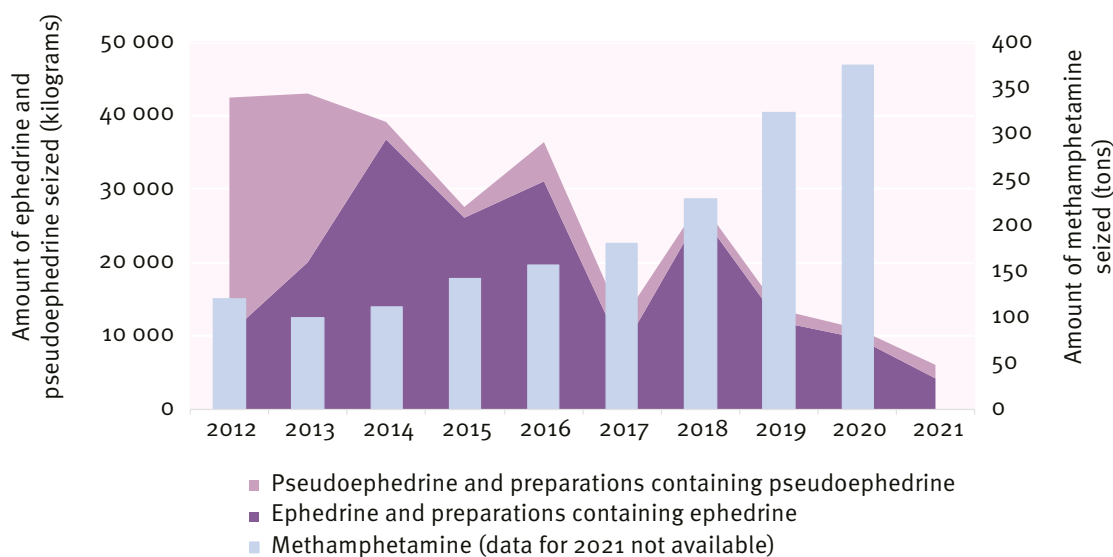
#### *Trafficking*

63. Seizures of ephedrine and pseudoephedrine, either in the form of raw material or in the form of preparations, were reported on form D by 33 countries, about the same number as in 2020. That was among the lowest numbers of countries reporting such seizures in the last 10 years and barely three quarters of the number of countries that reported such seizures in 2019. Correspondingly, the quantity of ephedrines seized globally totalled 6.1 tons, the lowest quantity seized in the last 10 years, and was almost half of the quantity seized in 2020 (see figure 5). The overall declining trend in quantities of ephedrines seized contrasts remarkably with the increasing trend in quantities of methamphetamine seized<sup>19</sup> and is partly explained by the greater use by traffickers of alternative precursors, some of them designer precursors. This trend is now well established in Europe and is becoming increasingly significant in other parts of the world (see also paras. 104–116).

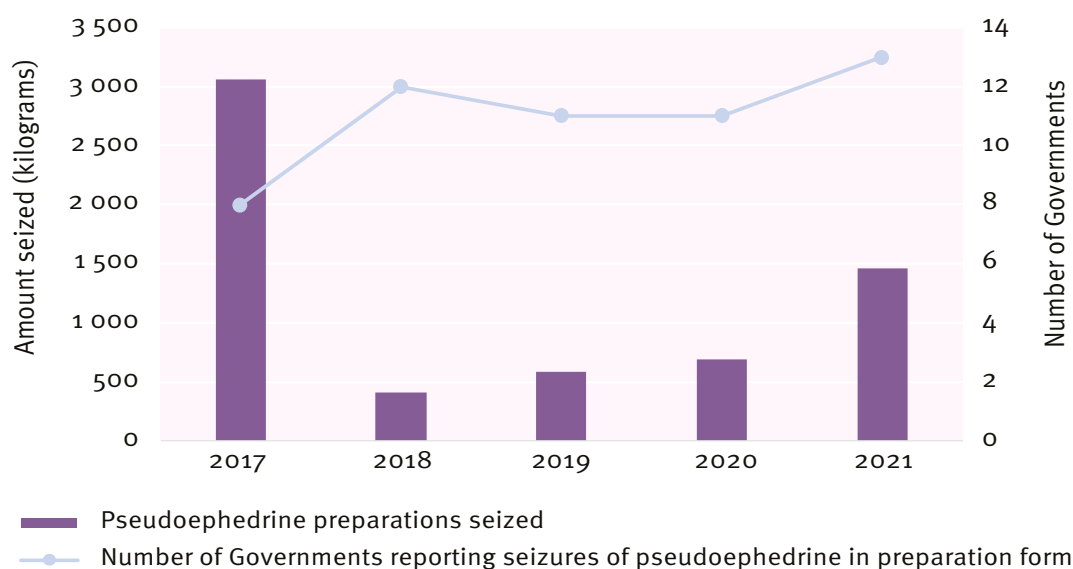
64. Of the total of more than 6.1 tons of ephedrines seized in 2021, seizures of ephedrine in the form of raw material accounted for more than 4 tons, a trend consistent with past years. China alone accounted for nearly 95 per cent of the quantity seized globally in 2021, having seized 3.8 tons. However, contrary to the overall declining trend in seizures of ephedrines, the quantity seized of pseudoephedrine in the form of preparations increased to more than 1.4 tons, which was more than twice the quantity seized in 2020. In fact, following a sharp decline after 2017, quantities seized of pseudoephedrine in the form of preparations have been growing consistently, and in 2021 more than tripled in comparison with the quantity seized in 2018 (see figure 6). While **medical preparations containing ephedrine and pseudoephedrine are not under international control, the Board encourages 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, as envisaged by the General Assembly in its resolution 59/162.**

<sup>19</sup>World Drug Report 2021, booklet 4, *Drug Market Trends: Cocaine, Amphetamine-type Stimulants* (United Nations publication, 2021).

**Figure 5. 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, 2012–2021**



**Figure 6. Seizures of pseudoephedrine preparations, as reported by Governments on form D, 2017–2021**



65. There are wide regional variations in the quantities of ephedrine and pseudoephedrine seized globally. A regional analysis, beginning with Oceania and proceeding from east to west, is presented in the following paragraphs.

### Oceania

66. Australia and New Zealand were the only countries in the Oceania region that reported seizures of ephedrines. Mirroring the global trend, the total of 578 kg of ephedrines reported seized in 2021 was only a fraction of the quantity of over 6.5 tons reported seized in 2017.

67. The bulk of the seizures occurred in Australia, which reported a total of more than 420 kg of pseudoephedrine

preparations seized in 295 cases, and an additional 8.5 kg of ephedrine preparations seized in 40 cases. India was reported as the country of origin of 355 kg of pseudoephedrine preparations seized in 48 cases and 2.6 kg of ephedrine preparations seized in 4 cases. Whereas in the past, India has been reported as the country of origin of ephedrine and pseudoephedrine trafficked to Australia, in the reporting period, Australia shared three cases through PICS involving shipments of over 10 kg each of pseudoephedrine in December 2021, January 2022 and February 2022; the first two shipments were reported as having originated in Nepal and the last in Brunei Darussalam.

68. New Zealand showed a consistently declining trend in seizures of ephedrine, which is believed to be the primary class of precursor chemicals used in the manufacture of methamphetamine in that country. On form D for 2021, New Zealand reported seizures totalling 114 kg of ephedrine and 35 kg of pseudoephedrine in 76 and 68 cases, respectively, indicating the small size of individual shipments. In one case shared by India through PICS in March 2022 involving 1.9 kg of pseudoephedrine, the substance had been hidden in 50 rolls of metallic yarn destined for New Zealand and intercepted in India.

69. The data on seizures seem to indicate a clear trend of trafficking in ephedrine and pseudoephedrine in the form of raw material from India to Australia, and more recently to New Zealand, via postal or air cargo routes by concealing the substances in other goods or packing materials.

**The Board encourages the Governments of Australia and India to jointly investigate such cases with a view to dismantling criminal networks in both countries.**

### East and South-East Asia

70. China was the only country in East and South-East Asia to report seizures of ephedrine on form D for 2021. Totalling 3.8 tons, the quantity of ephedrine seized by China accounted for nearly two thirds of the total quantity of ephedrine seized globally.

71. While China remained the country reporting the largest quantity of ephedrine seized in the world, the quantity of 3.8 tons reported seized by China was barely half the quantity reported seized by that country in 2020 and a quarter of the quantity reported seized in 2018. In addition, China reported the seizure of 74 kg of pseudoephedrine in the form of raw material. The information about the number of incidents to which these seizures pertained, or whether the seized quantities were a result of illicit manufacture or of diversion from licit channels, was not available. However, the seizure of non-scheduled chemicals known to have been used as starting materials in the illicit manufacture of ephedrine in China (see para. 114 below) indicates that the ephedrine seized was likely a result of illicit manufacture. There were no reported seizures of preparations containing either ephedrine or pseudoephedrine. That contrasts with the period 2012–2019, when China reported seizures of ephedrine preparations in amounts ranging between 2 tons and more than 5.7 tons each year.

72. No other country in the region reported any seizure of ephedrine or pseudoephedrine in 2021. However, in its annual report for 2021, the Philippine Drug Enforcement Agency recorded seizures totalling 6.2 kg of ephedrine in

2021.<sup>20</sup> Furthermore, from media reports, the Board is aware of the purported seizure of 1.3 million pseudoephedrine tablets from a car and a truck in Sagaing, Myanmar, in August 2022. The country of origin in that case is believed to be India.

73. The decline in seizures of ephedrine and pseudoephedrine in the South-East Asian region corresponds with the decline in the number of methamphetamine laboratories reported dismantled in the region in recent years. These indicators are, however, contradicted by the overall increase in the quantity of methamphetamine seized in the region,<sup>21</sup> possibly pointing to a geographical shift in methamphetamine manufacture.

### South Asia

74. India remained the only country in South Asia reporting seizures of ephedrine and pseudoephedrine. On form D for 2021, India reported five cases involving seizures totalling 79 kg (and 4 litres) of ephedrine in the form of raw material, representing less than a fifth of the quantity reported seized in 2020. The entire quantity seized had been sourced domestically. India also reported 19 cases involving seizures totalling 246 kg of pseudoephedrine. The majority of those cases were also shared by the Government through PICS. Analysis of PICS data for 2021 indicates that there were 27 cases involving a total of nearly 300 kg of ephedrine and pseudoephedrine. Of those cases, 13 involved attempted trafficking through postal, express courier or air cargo routes, and 3 involved quantities seized in illicit laboratories. Where the destination was known, 14 of the cases involved a total of 106 kg of pseudoephedrine destined for Australia (10 of which involved shipments on postal or air cargo routes and 4 of which involved seizures from commercial or industrial buildings) and 1 case involved a shipment of 24 kg of pseudoephedrine destined for Malaysia. In 2022, information was also shared through PICS about 14 incidents in India involving shipments of ephedrine and pseudoephedrine totalling 759 kg of the two substances; eight of the shipments were destined for Australia, four for New Zealand (see also para. 69 above) and one for the United Arab Emirates, the latter two countries being reported as destinations for the first time. Eight of the incidents involved postal or air cargo routes.

75. Information about the origin of ephedrine and pseudoephedrine seized in India, in particular whether it was diverted from licit manufacture or illicitly manufactured, is seldom available. In one case, official reports of a seizure

<sup>20</sup>Philippine Drug Enforcement Agency, *2021 Annual Report* (Quezon City, 2021), p. 32.

<sup>21</sup>World Drug Report 2021, booklet 4, *Drug Market Trends: Cocaine, Amphetamine-type Stimulants*, p. 53.

of nearly 662 kg of ephedrine in liquid form in India in July 2022 indicated that the substance had been illicitly manufactured in a closed pharmaceutical unit in the north of India that had been rented by traffickers (see also para. 115 below).

### West Asia

76. In West Asia, the only reported seizures of ephedrines in 2021 were reported by Türkiye. The seizures were effected in 46 cases and amounted to a total of 2.13 kg of ephedrine raw material, indicating the small size of the individual amounts seized. In all of the cases, the country of origin was not known. In the last five years, among the countries in the region, only Afghanistan and Pakistan have reported seizures of ephedrines in excess of 1 kg; Afghanistan reported the seizure of 50 kg of pseudoephedrine in 2018 and of 440 kg of pseudoephedrine preparations in 2019, and Pakistan reported the seizure of 80 kg of ephedrine in 2019.

77. Jordan, which reported no seizures of pseudoephedrine hydrochloride, objected to three shipments containing a total of 972 kg (324 kg each) of the substance in preparation form, which was intended to be imported from Egypt, in October 2021. In each case, the importing company had not requested the shipment. That was the first time that any proposed export of pseudoephedrine from Egypt destined for Jordan had been pre-notified. Given the large quantities involved, the fact that the importing company had never requested the shipment made the attempted transaction suspicious and worthy of investigation by both the exporting country and the importing country. Another case involved a proposed shipment of 120 kg of pseudoephedrine in the form of a pharmaceutical preparation (1 million tablets), from Egypt to Georgia. Following the Board's inquiry, undertaken on the basis that that single proposed shipment had exceeded the annual legitimate requirements of Georgia, the authorities of Georgia confirmed that the importing company was not licensed to import the substance. However, since the objection had been conveyed after the time period mentioned in the pre-export notification, the shipment was allowed to proceed. The matter was still under investigation. The aforementioned instances provide continued evidence of the effectiveness of the PEN Online system in preventing the diversion of precursors from licit international trade.

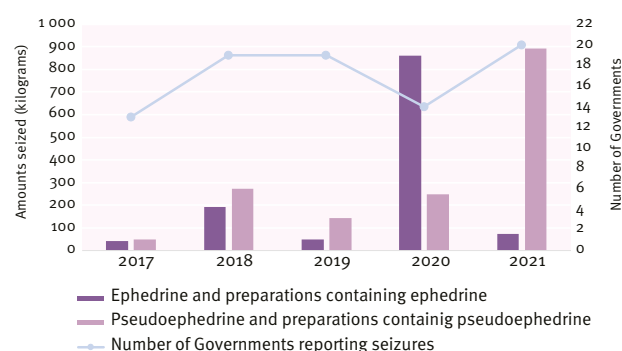
78. Pre-notifications of planned shipments in excess of annual legitimate requirements indicated by importing countries also involved the United Arab Emirates. While having an annual legitimate requirement of 2,418 kg for pseudoephedrine preparations, the country was pre-notified of shipments totalling more than 3 tons by Egypt

during the period September–December 2021. The three shipments of 324 kg each contained the same pharmaceutical preparations that had been objected to by Jordan (see para. 77 above).

### Europe

79. Twenty Governments in Europe reported seizures of ephedrine and pseudoephedrine on form D, up from 14 that did so in 2020. Nearly 1 ton of ephedrines was reported seized, slightly less than the quantity of 1.1 tons seized in 2020 but far in excess of the quantities seized in the previous three years (see figure 7). The majority of the seizures, amounting to 894 kg of the total of 967 kg, were of pseudoephedrine and preparations containing pseudoephedrine. This contrasts with 2020, when ephedrine accounted for the majority of seizures (860 kg of the total of 1,108 kg). However, given that two cases in Poland together accounted for 808 kg out of the 860 kg of ephedrine seized in Europe in 2020, the trend in Europe in the last five years is predominantly of pseudoephedrine, more specifically, preparations of pseudoephedrine, which accounted for 869 kg out of the 894 kg of pseudoephedrine seized in Europe in 2021.

**Figure 7. Seizures of ephedrine and pseudoephedrine, as reported by Governments in Europe on form D, 2017–2021**



80. Bulgaria reported the largest quantity of pseudoephedrine preparations seized in Europe (317 kg), followed by Austria (259 kg), Ukraine (212 kg), Czechia (42 kg) and Poland (11 kg). The quantity seized in Bulgaria involved over 2.6 million tablets related to three cases, in all of which the country of origin was reported as Türkiye. **The Board encourages Governments to share details of the seizures reported, including the brand names of the seized preparations, as such details are helpful in follow-up investigations and in establishing possible linkages with other cases. Such information, if shared in a timely manner through PICS, can enable the detection of similar cases.**

81. For the first time in more than a decade, Austria reported the seizure of preparations containing pseudoephedrine, specifically, 2.16 million tablets under the trade name Decancit SR containing 120 mg of pseudoephedrine per tablet, corresponding to a total quantity of 259 kg of the substance. The shipment, whose last point of departure was Dubai, United Arab Emirates, was destined for a country in South-Eastern Europe. Investigations revealed that the stated recipient was a fake company and that its stated address did not exist. No documents or permits were provided. The Board became aware of seizures or stopped shipments of a pharmaceutical preparation containing pseudoephedrine under the same trade name in several countries in Eastern Europe, South-Eastern Europe, West and Central Europe and West Asia in the period 2021–2022. Investigations were ongoing.

82. Ukraine reported 367 cases involving the seizure of a total of 212 kg of pseudoephedrine preparations. The country of origin in 28 of those cases, involving a total of 71 kg of pseudoephedrine, was Israel, and in 29 of the cases, involving a total of 17 kg of the substance, was Egypt. Of those 17 kg, nearly 12 kg were seized in three incidents involving the seizure of tablets from passengers' luggage at an airport. The tablets had been removed from their original packaging and were suspected to have been diverted from legitimate channels in Egypt. In one case shared through PICS, over 100,000 tablets under the trade name Decancit SR were seized from a passenger's baggage. The Ukrainian nationals arrested in the case had flown to Egypt specifically for the purpose of purchasing pseudoephedrine. In addition, seizures of Decancit SR tablets at airports in Ukraine, from passengers arriving from Egypt, continued to be shared through PICS in 2022.

83. Czechia reported seizures totalling more than 42 kg of pseudoephedrine preparations in 59 cases. In seven of the cases, involving a total of about 4 kg of the substance, the country of origin was reported as Poland.

84. While seizures of non-scheduled chemicals are more frequently reported in relation to the illicit manufacture of amphetamine and methamphetamine in Europe, the increase in both the quantity of pseudoephedrine preparations seized and the number of countries reporting such seizures in 2021 may indicate that the interest among traffickers in the large-scale trafficking of pseudoephedrine preparations, a trend noted some 15 years ago, may have been renewed, including in countries not previously associated with such manufacture.

## Africa

85. Nigeria was the only country in the African region that reported seizures of ephedrines, reporting a single seizure of 25.6 kg of ephedrine raw material on form D. The

seizure was effected at the international airport in Lagos, Nigeria, and the substance was concealed in the false bottom of a suitcase. The destination was Johannesburg, South Africa. In 2018 and 2019, Nigeria reported seizures of ephedrine in excess of 300 kg, but since then seizures of the substance in the country have declined significantly. Furthermore, Ghana reported two instances of theft, one of 50 kg of ephedrine and the other of 25 kg of pseudoephedrine, both from a warehouse in a manufacturing facility. Investigations into both cases were ongoing.

86. In addition, the Board is following up on media reports of a seizure of 180 kg of ephedrine concealed in cornmeal bags in a warehouse in Mozambique.

87. Notwithstanding the negligible seizures of ephedrines reported by countries in Africa, the region is a major destination for imports of ephedrines, with four countries, namely, Nigeria, Egypt, South Africa and Ghana, in ranking order, appearing among the 10 countries receiving the most pre-export notifications for ephedrine worldwide in 2021 (see table 2 above). Egypt was also the second largest importer of pseudoephedrine in the world in 2021 and is also a major exporter of both substances in the form of pharmaceutical preparations.

88. Monitoring of the PEN Online system conducted by the Board with regard to pharmaceutical preparations containing pseudoephedrine resulted in the identification of suspicious shipments of preparations containing pseudoephedrine originating in a country in Africa and destined for countries in West Asia and East Africa. In one case involving six shipments totalling nearly 1 ton of pseudoephedrine preparations, the import certificate provided to the exporting country was later confirmed as having been forged. Following the case, the importing country requested that, as a matter of general practice, a copy of the import permit be attached with any pre-export notification in order to enable the importing country to verify the permit's authenticity. Further investigation was in progress in both the exporting and importing countries. The case points to the need for Governments to exercise due diligence before authorizing exports of scheduled precursors and to provide detailed information in the pre-export notifications. **The Board therefore encourages Governments in the region to remain vigilant about monitoring international trade in these substances in order to prevent their diversion for illicit purposes.**

## Americas

89. The United States reported seizures amounting to less than half a kilogram of ephedrine and 23 kg of pseudoephedrine in 2021. In the years since 2019, when 195 kg of pseudoephedrine and 6 kg of ephedrine were seized, the quantities seized of these substances have not exceeded 30 kg.

This supports the belief that the methamphetamine market in the United States is supplied from large-scale laboratories that use P-2-P-based methods. Mexico too follows a similar pattern, having reported practically no seizures of ephedrine or pseudoephedrine for the last five years. In the years since 2019, when Canada reported the seizure of 750 kg of ephedrine, the country has reported no significant seizures of ephedrines.

90. Of the countries in Central America and the Caribbean, Guatemala reported one case involving the seizure of 155 kg of ephedrine in the form of preparations and two cases involving the seizure of 162 kg of pseudoephedrine, also in the form of preparations.

91. Of the countries in South America, only Chile reported a small seizure of less than half a kilogram of ephedrine. No seizures, either of ephedrine or pseudoephedrine, were reported by any other country in the region, which follows the trend noted in 2020.

## (b) Norephedrine and ephedra

### *Licit trade*

92. Between 1 November 2021 and 1 November 2022, pre-notifications were processed through the PEN Online system by 13 exporting countries for 202 shipments of norephedrine to 33 importing countries, involving more than 37 tons of raw material and slightly more than 1.3 tons in the form of pharmaceutical preparations. Shipments amounting to 1 ton or more were pre-notified to the following importing countries, in descending order of the amounts shipped: United States, Myanmar, Philippines, Denmark and Japan. 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.

### *Trafficking*

93. Only Australia and Belarus reported seizures of norephedrine on form D for 2021. Australia reported eight cases involving a total of less than 150 grams of the substance and Belarus reported three cases involving a total of about 50 grams. The total quantity reported seized globally in 2021 was less than the total quantities reported seized in the last five years and the second lowest in the last 10 years, indicating the decreasing use of the substance for the illicit manufacture of amphetamine.

94. Only China reported seizures of *Ephedra* plant on form D for 2021. After having reported seizures of *Ephedra* plant in excess of 100 tons in 2019 and 2020, China reported seizures totalling about 30 tons of the plant in 2021. No further details of the seizures were provided. In

addition, one seizure of 10 kg of ephedra was shared by Czechia through PICS in December 2021. The seizure was effected at an airport, and the consignment, which had originated in China, had been misdeclared as green tea.

95. In recent years, there has been increasing concern about the use of ephedra as a starting material for illicit methamphetamine manufacture in Afghanistan. While no reliable data are available regarding the extent of such use, research and field studies suggest that enough ephedra to manufacture 220 tons of methamphetamine was traded at one of the major bazaars in south-western Afghanistan.<sup>22</sup>

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

96. As P-2-P and phenylacetic acid are traded legitimately, albeit with differences in the extent of their trade, instances of their diversion from legitimate trade have been rare in recent years. Seizures of the two substances often involve material that has been illicitly manufactured from one of their precursors. By contrast, APAAN, APAA and MAPA are considered to be designer precursors that are traded in very limited quantities or not at all. The availability of APAAN, APAA and MAPA on illicit markets is therefore typically the result of illicit demand and availability from dubious sources, including companies that may have been unknowingly targeted by traffickers as providers of customized synthesis.

97. There are a number of as yet non-scheduled alternatives to P-2-P and other controlled precursors that are used in the illicit manufacture of amphetamine and methamphetamine (see figure 8 and subsect. (d) below).

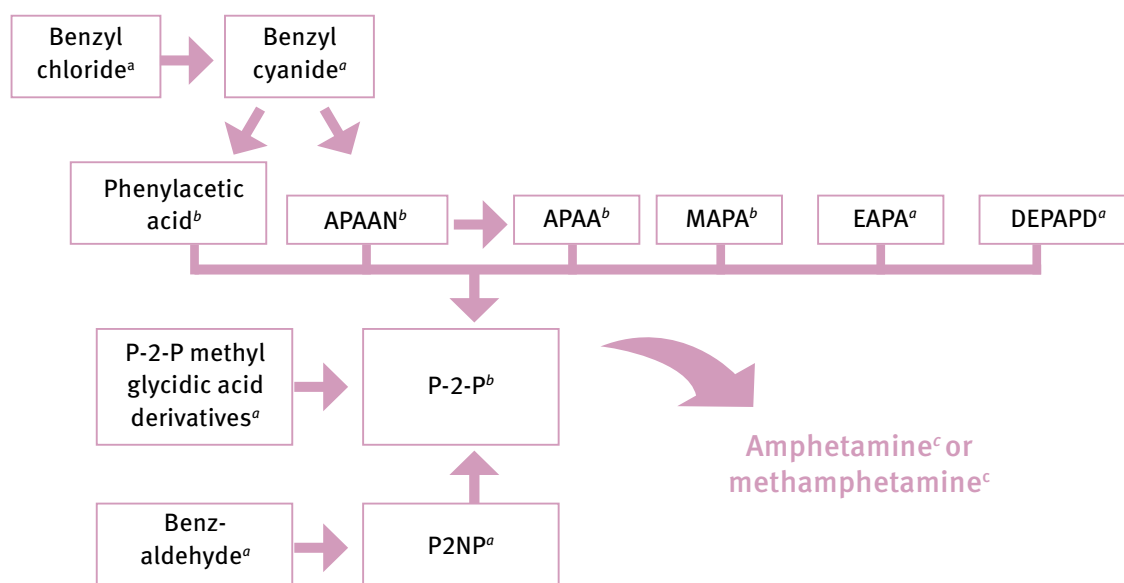
### *Licit trade*

98. Between 1 November 2021 and 1 November 2022, proposed international trade in P-2-P and phenylacetic acid remained at a level similar to that of previous years. Twenty-two proposed shipments of P-2-P, from three exporting countries to seven importing countries, and about 776 proposed shipments of phenylacetic acid, from 18 exporting countries to 45 importing countries and territories, were pre-notified through the PEN Online system.

99. By contrast, there have been no pre-export notifications for APAAN or APAA and three pre-export notifications for MAPA since November 2021. All of the transactions notified through the PEN Online system involved small amounts for reference and laboratory purposes.

<sup>22</sup>The conclusion is based on high-resolution satellite imagery of the Abdul Wadood Bazaar collected on 26 November 2021 (see David Mansfield, "Banning ephedra and bolstering the rural economy of Afghanistan", *Alcis*, 13 January 2022).

Figure 8. Alternative chemicals used in the illicit manufacture of amphetamine or methamphetamine



<sup>a</sup>Not under international control but included in the limited international special surveillance list.

<sup>b</sup>Included in Table I of the 1988 Convention.

<sup>c</sup>Included in Schedule II of the Convention on Psychotropic Substances of 1971.

### Trafficking

100. In 2021, 14 countries reported seizures of **P-2-P** amounting to a total of more than 11,800 litres on form D. Both the number of countries reporting seizures and the amounts reported were smaller than those in 2020. The largest total amount of the substance seized was reported by Türkiye (more than 4,200 litres), followed by the Netherlands (almost 4,000 litres), Mexico (more than 2,500 litres), Belgium (665 litres) and Germany (almost 300 litres). With regard to **phenylacetic acid**, China reported seizures on form D for 2021 amounting to 12 tons. That was the largest amount reported seized by any country since 2017, when Mexico alone reported the seizure of almost 19.5 tons of the substance in illicit methamphetamine laboratories. Unfortunately, neither country provided any information about the origin of the chemical, including whether it had been illicitly manufactured (see para. 110 below) or diverted from legitimate channels. **The Board encourages Governments to distinguish between the two scenarios and to investigate the source of seized precursors and share the relevant details through PICS and report them on form D, as this will enable the most appropriate follow-up to address the underlying weaknesses.**

101. On form D for 2021, six countries in Europe and Australia reported seizures of **MAPA**. The total amount of about 9.7 tons reported seized was only about 30 per cent of the amount reported seized in 2020. The decline confirmed the trend observed in relation to other designer chemicals, namely, the tendency for seizures of a substance

to cease after the substance is placed under international control. In 2021, the largest quantity seized of **MAPA** was reported by the Netherlands (more than 6 tons), followed by Belgium (more than 2.2 tons) and Germany (more than 1.3 tons). Where information was available, the country of origin was reported to be China, including Hong Kong, as in the past. The Republic of Korea and countries in Europe were used as transit countries. While shipments from Asia to Europe were dispatched by air, shipments within Europe, typically with the Netherlands as the final destination, were often dispatched by road. Most consignments of **MAPA** had been misdeclared. Some seizures were made after controlled deliveries had been conducted between the countries concerned.

102. The Netherlands was also the only country to report a seizure of **APAA** (50 kg) in 2021. There were no reported seizures of **APAAN**.

103. In 2022, additional seizures of these chemicals were communicated through PICS. The amounts were considerably smaller than in previous years, with seizures of **MAPA** in the first 10 months of 2022 involving about 350 kg, less than 3 per cent of the amount seized in the corresponding period in 2021. At the same time, seizures communicated through PICS in 2022 also indicated a significant increase in the number of incidents and the amounts involving non-scheduled alternative precursors (see subsect. (d) below).



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

104. As in previous years, in terms of volume, a significant amount of the non-scheduled chemicals encountered in connection with the illicit manufacture of amphetamine and methamphetamine consisted of purpose-made designer precursors, closely related in chemical structure to chemicals in Tables I and II of the 1988 Convention that can be converted into the related controlled chemical by readily applicable means. In addition, countries continued to report various common chemicals that were available off the shelf. The majority of chemicals in both categories have long been included in the limited international special surveillance list of non-scheduled substances, either listed by name or covered by the extended definitions, as well as in other regional or national watch lists, as substitutes for controlled precursors.

#### Derivatives of P-2-P methyl glycidic acid and *alpha*-phenylacetoacetic acid

105. On form D, the Netherlands was the only country to report notable seizures of non-scheduled designer precursors of amphetamine and methamphetamine, namely, **P-2-P methyl glycidic acid derivatives** (more than 730 kg) and **EAPA**, the ethyl ester analogue of MAPA (85 litres). Those amounts were a fraction of the amounts seized between 2017 and 2019.

106. In the first 10 months of 2022, 37 incidents involving P-2-P methyl glycidic acid derivatives were communicated through PICS, amounting to more than 10 tons. All of the incidents were communicated by countries in Europe. Fifteen incidents occurred in illicit laboratories or warehouses in the Netherlands and 21 incidents involved border seizures at airports or postal or parcel facilities in Czechia, Germany and the United Kingdom, of which seven were linked by a common *modus operandi*. Another six were linked by a common misdeclaration. In the majority of instances, China, including Hong Kong, was identified as the country of origin. Investigations in the countries concerned were ongoing. The resurgence of P-2-P methyl glycidic acid derivatives, which have been controlled in all States of the European Union since December 2020, is believed to be the result of enhanced law enforcement focus and risk profiling by customs authorities.

107. In early 2022, a new alternative precursor of amphetamine and methamphetamine emerged in the Netherlands. The substance is known as **DEPAPD**, or **diethyl (phenylacetyl)propanedioate**. While not under international control, it has been included in the Board's

limited international special surveillance list, under the extended definitions, as a derivative of P-2-P. In the first 10 months of 2022, there were two occurrences in the Netherlands, one in an express courier shipment with no labelling, and the second in an illicit laboratory where 12 litres of the substance were seized. Later in 2022, a derivative of DEPAPD was also encountered. The emergence of DEPAPD and its derivative 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.**

#### Benzaldehyde, nitroethane and 1-phenyl-2-nitropropene

108. Seizures of chemicals involved in the so-called nitrostyrene method for the manufacture of P-2-P and, subsequently, methamphetamine or amphetamine, continued to be reported on form D. In 2021, four countries reported seizures of **benzaldehyde**, **nitroethane** and/or **P2NP**, the chemical intermediate derived from the reaction between benzaldehyde and nitroethane. The seizures often occurred in illicit laboratories, which were typically of small scale. In 2021, the largest seizures were reported by the Russian Federation, amounting to more than 1 ton of benzaldehyde. The lack of notable seizures of these chemicals in Mexico confirms the continued decline in the use of the nitrostyrene method in the country since 2017. This is likely the result of the rising cost of the related chemicals and the availability of alternative chemicals for other methods of illicit methamphetamine manufacture, especially phenylacetic acid-based methods (see para. 109 below).

#### Benzyl chloride, sodium cyanide and benzyl cyanide

109. **Benzyl cyanide** is the chemical intermediate derived from the reaction between **benzyl chloride** and **sodium cyanide** and may also be encountered as a starting material in illicit laboratories. The reaction may then proceed by way of APAAN or phenylacetic acid to P-2-P and, subsequently, methamphetamine or amphetamine (see figure 8 above).

110. On form D, six countries in the Americas, Asia and Europe reported seizures of benzyl chloride, sodium cyanide and/or benzyl cyanide. The largest amounts of benzyl cyanide were seized in China (about 3,800 litres) and the Netherlands (about 2,000 litres), followed by Mexico (585 litres). Serbia reported a seizure of more than 16,500 litres of benzyl chloride – the third largest amount of the

substance ever reported seized – from a private property in a town in eastern Serbia. Mexico was the only other country to report seizures of benzyl chloride, however, the amount (more than 350 litres) was significantly smaller than the amounts reported by the country in the period 2017–2020. There were no reported seizures of phenylacetic acid or APAAN in Mexico (see paras. 100–103 above). However, forensic profiling analysis of methamphetamine samples seized at points of entry into the United States from Mexico continues to provide evidence of the use of P-2-P-based synthesis methods and of phenylacetic acid as the primary precursor of P-2-P.

### Other chemicals not under international control that were seized in relation to the clandestine manufacture of amphetamine or methamphetamine<sup>23</sup>

111. Seizures of **tartaric acid** in regions known for illicit methamphetamine manufacture are a strong indicator of the use of P-2-P-based methods. As a separating agent, tartaric acid is used to increase the yield of the desired “*d*” form of the drug.<sup>24</sup> Tartaric acid is also used for similar purposes in the illicit manufacture of ephedrine from 2-bromopropiophenone or its precursor propiophenone (see para. 115 below).

112. Seizures of tartaric acid have been reported by Mexico regularly since 2009, when manufacturing methods in the country shifted from ephedrines-based to P-2-P-based methods. Recently, the quantities of tartaric acid seized in Europe have surpassed the quantities seized in North America, although they remain at levels lower than those previously reported in Mexico. The seizures of tartaric acid in Europe coincide with the increase in illicit methamphetamine manufacture in that region.

113. On form D, the only notable seizures of tartaric acid were reported by the Netherlands (almost 4 tons) and Belgium (about 580 kg). Through PICS, the focal point in the Netherlands communicated seizures of tartaric acid amounting to almost 1.2 tons in the first 10 months of 2022.

114. Seizures of tartaric acid in countries in East and South-East Asia may provide supporting evidence for the spread of P-2-P-based methods for illicit methamphetamine manufacture in that region. However, tartaric acid has also been associated with illicit ephedrine manufacture, specifically with a manufacturing method that uses **2-bromopropiophenone** or its precursor **propiophenone**.

On form D, China reported seizures amounting to more than 1.9 tons of propiophenone.

115. INCB is also aware of an incident involving the illicit manufacture of ephedrine from propiophenone in India in July 2022. In addition to seizures of other chemicals required to convert propiophenone into ephedrine, the seizure of tartaric acid indicates that illicit operators had manufactured the form of ephedrine that would subsequently yield the more potent “*d*” form of methamphetamine. The level of sophistication of the manufacturing operation is also reflected by the fact that it took place in the premises of a closed pharmaceutical company that had been rented by traffickers. All chemicals and equipment needed for the operation appeared to have been procured domestically.

116. Seizures of chemicals involved in ephedrines-based methods of illicit methamphetamine manufacture, namely, the so-called Nagai method, were reported on form D by a number of countries in all regions but Africa. However, the seizures were usually indicative of smaller-scale manufacturing operations. Notable seizures of one or more of the chemicals, in particular **phosphoric acid**, were reported by Belgium and the Netherlands. In terms of the number of seizures, Czechia continued to be one of the countries reporting frequent seizures of **iodine**, **red phosphorous** and phosphoric acid. There were no seizures of **thionyl chloride**, a substance indicative of the so-called Emde method, which involves the use of chloropseudoephedrine as an intermediate and which used to be widely employed in East and South-East Asia. Since many of these chemicals are traded and distributed widely for legitimate purposes, **the Board encourages Governments of countries in which the illicit manufacture of methamphetamine or ephedrine has been encountered to consider determining whether trade in and distribution of the chemicals are commensurate with legitimate needs and/or whether there have been any recent suspicious increases in that regard. Also, the authorities of countries exporting any of the above-mentioned chemicals are invited to use, on a voluntary basis, the Board’s recently launched PEN Online Light system to notify the authorities of importing countries of any planned shipments of the chemicals.**

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

117. The relevance of the traditional precursors of MDMA (commonly known as “ecstasy”) included in Table I of the 1988 Convention (3,4-MDP-2-P, piperonal, safrole and isosafrole) for the illicit manufacture of MDMA has decreased significantly, in parallel with an increase in

<sup>23</sup>See also paras. 128–130, on methylamine.

<sup>24</sup>For details, see the INCB report on precursors for 2020 (E/INCB/2020/4), figure IX.

seizures of non-scheduled chemicals. Some of those chemicals, namely, 3,4-MDP-2-P methyl glycidic acid derivatives, have since been placed under international control. A schematic overview of the alternative chemicals used in the illicit manufacture of MDMA and related “ecstasy”-type substances is shown in figure 9.

### (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

118. Between 1 November 2021 and 1 November 2022, 16 exporting countries and territories notified the authorities of 54 importing countries and territories of approximately 800 proposed exports of piperonal. The number of both exporting countries and importing countries in that period remained about the same as in previous years. No trade in 3,4-MDP-2-P, 3,4-MDP-2-P methyl glycidate or 3,4-MDP-2-P methyl glycidic acid was reported. On form D, China reported having stopped three shipments of piperonal to three different countries, amounting to a total of more than 1,600 tons. Unfortunately, no further details were provided.

#### Trafficking

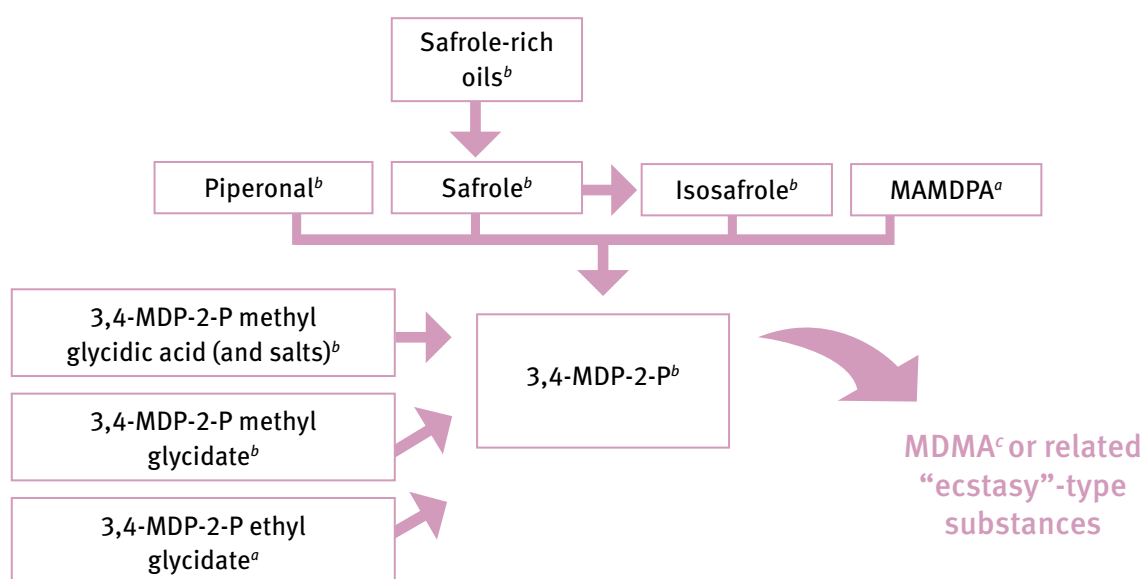
119. In 2021, the amounts seized of **3,4-MDP-2-P methyl glycidic acid derivatives** continued to be the

largest among all the precursors of MDMA under international control. However, comprising a total of about 1.2 tons, they were significantly smaller than the amounts seized during the period 2014–2019, that is, prior to the placing of those substances under international control. Seizures of **3,4-MDP-2-P** amounted to almost 900 litres. As in the past, the bulk was in the form of a chemical intermediate seized from illicit laboratory settings in which it had been manufactured illicitly from one of its precursors, and had not been diverted from legitimate channels. Most of the seizures occurred in the Netherlands.

120. On form D, Ukraine reported seizures of 150 kg of **piperonal**, the largest amount of the substance reported seized worldwide since 2016. No further details were provided.

121. Incidents involving 3,4-MDP-2-P methyl glycidic acid derivatives continued to be reported through PICS in 2022. INCB is aware of seizures of such derivatives totalling more than 1.4 tons in the first 10 months of 2022. In addition, new non-scheduled alternatives started to emerge and were seized in amounts exceeding those of the above-mentioned chemicals. All of the incidents occurred in Europe and often involved similar *modi operandi* that triggered bilateral and multilateral investigations among the countries concerned (see subsect. (c) below).

Figure 9. Alternative chemicals used in the illicit manufacture of MDMA and related “ecstasy”-type substances



<sup>a</sup>Not under international control but included in the limited international special surveillance list.

<sup>b</sup>Included in Table I of the 1988 Convention.

<sup>c</sup>Included in Schedule I of the 1971 Convention.

## (b) Safrole, safrole-rich oils and isosafrole

### Licit trade

122. Between 1 November 2021 and 1 November 2022, six exporting countries sent 27 pre-export notifications regarding safrole to the authorities of 12 importing countries and territories through the PEN Online system. The notifications concerned a total volume of approximately 17 litres, while pre-export notifications for safrole-rich oils concerned a total of approximately 192 litres. There were two pre-export notifications for isosafrole during that period, involving a total of about 280 litres, all destined for countries in South America.

### Trafficking

123. The trafficking situation regarding safrole, safrole-rich oils and isosafrole remained unchanged, with only three Governments reporting seizures of the substances on form D for 2021. All of the reported seizures involved safrole and totalled less than 50 litres. In the first 10 months of 2022, four incidents involving the substance were communicated through PICS. They amounted to a total volume of 480 litres, of which 375 litres were seized in a single incident in a warehouse in the Netherlands. Two of the other incidents also occurred in the Netherlands, and one in Cambodia, and did not involve any border seizures that produced actionable information.

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

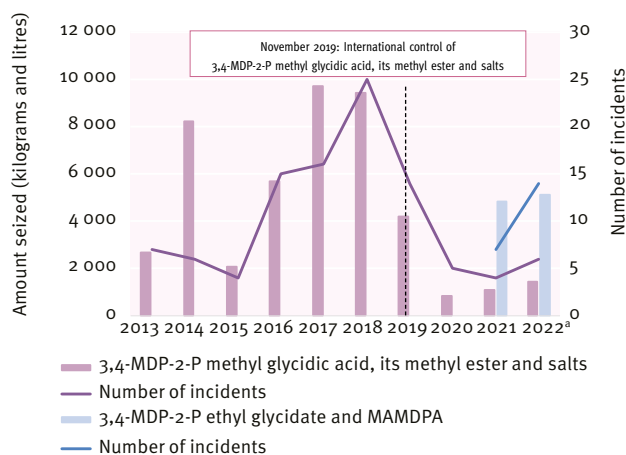
124. The evolution of precursors of MDMA and of related “ecstasy”-type substances is a reflection of the evolution of precursors of other synthetic drugs: soon after their international scheduling, or even around the time at which the scheduling process is initiated, there is a decrease in the amounts seized and the number of incidents involving the chemicals, accompanied by the emergence of alternative precursors that are often very closely related chemically (see figure 10).

125. On form D for 2021, authorities in the Netherlands reported seizures of almost 4.5 tons of **MAMDPA**, a substance that had emerged as an alternative to controlled precursors of MDMA in mid-2021 and was the subject of communications through PICS at that time. Chemically, MAMDPA is the “ecstasy”-type analogue of MAPA, a designer precursor of amphetamine and methamphetamine that was added to Table I of the 1988 Convention in November 2020. The close chemical relationship between

MAMDPA and MAPA is another reminder to proactively consider substance groups rather than individual substances in order to ensure an effective precursor control regime, as recommended in Commission on Narcotic Drugs resolution 65/3.

126. In late 2021, authorities in the Netherlands also started to encounter another alternative chemical, namely, **3,4-MDP-2-P ethyl glycidate**, which is closely related to 3,4-MDP-2-P methyl glycidate and the corresponding acid, which were both placed in Table I of the 1988 Convention in November 2019. Seizures of the substance occurred in several series of shipments, with each series having been characterized by a number of common features, such as the name under which the shipments were misdeclared, their routing, and/or details regarding the shipper or consignee. The Board issued a number of alerts related to the incidents, all but two of which had occurred in the Netherlands. Where such information was available, the country of origin was China. **The Board would like to reiterate its request formulated in the alerts, for Governments to be vigilant and to consider carrying out the risk profiling of shipments of non-scheduled chemicals using the information provided in the alerts. This practice would allow the identification of additional consignments with similar characteristics that may be on their way and would help to generate sufficient evidence of the illicit use of the substances, enabling countries of origin, transit and destination to act, seize relevant consignments and build cases to prosecute those behind such illicit use.**

Figure 10. Incidents communicated through PICS involving 3,4-MDP-2-P methyl glycidic acid derivatives under international control and non-scheduled alternatives, 2013–2022



<sup>a</sup> The data only cover the first 10 months of 2022.

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

127. 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 versatile chemicals, solvents and reagents that are often diverted from domestic channels.

#### Methylamine

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

129. In 2021, the largest quantity of methylamine seized was reported by the United States (approximately 24.5 tons of methylamine hydrochloride in a single incident), followed by the Netherlands (almost 12 tons in 18 incidents involving illicit laboratories or warehouses) and Mexico (more than 1,400 litres in 4 incidents). Poland reported seizures totalling more than 530 litres in 7 incidents, associated with the illicit manufacture of mephedrone and 4-CMC (clephedrone). The bulk of methylamine seized in Austria (125 kg) was also reported to have been encountered in an illicit mephedrone laboratory. There were no

notable seizures of precursors of methylamine in 2021 (see also para. 174 below). On form D, Panama referred to a seizure of 891 bags of methylamine hydrochloride in 2018. The Government was still in the process of ensuring the lawful disposal of the chemical.

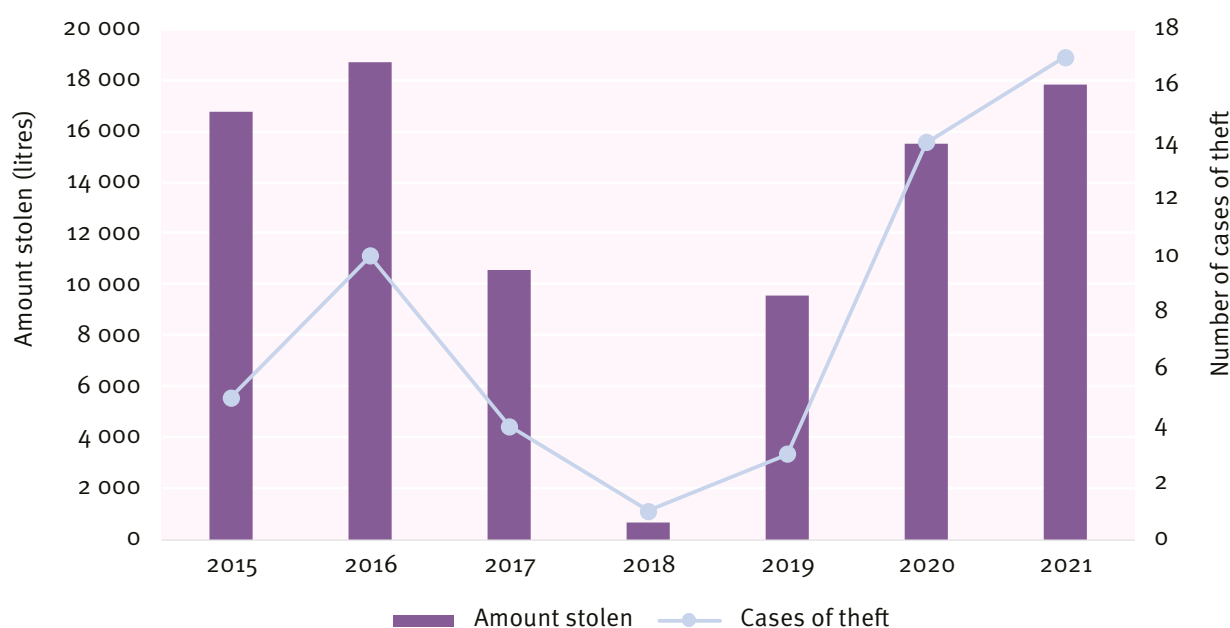
130. During the first 10 months of 2022, seizures totalling more than 4,800 litres of methylamine and more than 2 tons of methylamine hydrochloride were communicated through PICS. With the exception of one incident in Australia, all of the seizures occurred in the Netherlands, mostly in illicit laboratories or warehouses. **The Board encourages Governments to be vigilant as to the possible diversion of methylamine, including from domestic distribution channels.**

#### Hydrogen gas

131. Since 2015, Germany has regularly reported thefts of hydrogen gas from company premises (see figure 11). Hydrogen gas can be used as a reducing agent in the illicit manufacture of several synthetic drugs. The gas stolen in Germany is believed to be for use in the illicit manufacture of MDMA, mainly in the Netherlands but also in Belgium, as evidenced by empty gas cylinders found in illicit laboratories and warehouses in those countries.

132. Thefts in Germany and seizures in the Netherlands of hydrogen gas also continued to be communicated through PICS in 2022. The total amount of hydrogen gas reported stolen in the first 10 months of 2022 exceeded the total amount reported stolen on form D for 2021 by almost 50 per cent.

Figure 11. Thefts of hydrogen gas, as reported on form D by Germany, 2015–2021



## Other chemicals not under international control

133. On form D for 2021, five countries reported seizures of **formamide**, **formic acid** and/or **ammonium formate**, chemicals associated with the so-called Leuckart method of illicit manufacture. The Leuckart method can be used to manufacture amphetamine and methamphetamine from P-2-P or related designer precursors, or to manufacture MDMA and its analogues from 3,4-MDP-2-P or related designer precursors. As in previous years, the largest amounts of such chemicals were seized in illicit laboratories and warehouses in Europe. The Netherlands, Belgium, Spain and Germany, in descending order of amounts seized, reported the largest seizures of those substances. Overall seizures amounting to 26,000 litres and kilograms combined in 2021 continued a declining trend from a peak in 2019 (86,000 litres and kg combined).

134. During the reporting period, INCB also became aware of additional seizures of “masked”, or chemically protected, derivatives of synthetic drug end products, namely, amphetamine-type stimulants. While seizures of those derivatives had initially occurred in Australia around 2015, the substances were later also encountered in China, the Netherlands, New Zealand and the United States. The amounts seized were indicative of distribution at both the wholesale and retail levels. In 2022, Chile communicated an incident involving *t*-boc-MDMA through PICS.

## B. Substances used in the illicit manufacture of cocaine

### 1. Potassium permanganate

135. Potassium permanganate is the principal oxidizing agent used in the illicit manufacture of cocaine. Most of the cocaine that is seized continues to be highly oxidized.<sup>25</sup>

#### *Licit trade*

136. Between 1 November 2021 and 1 November 2022, the authorities of 35 exporting countries and territories sent 1,823 pre-export notifications to 115 importing countries and territories relating to a total of more than 28,300 tons of potassium permanganate, which represents about 20 per cent less trade in the substance compared with the previous reporting year. The main exporter was China, followed by India and the United States.

<sup>25</sup>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 2021 in the United States, were moderately or not oxidized.

137. There was a small increase in the share of imports of potassium permanganate reported by the three coca-producing countries in South America (Bolivia (Plurinational State of), Colombia and Peru), which together accounted for 1.3 per cent, compared with less than 1 per cent reported in the previous year. Imports of the substance by other countries in South America amounted to about 5 per cent, or about 1,400 tons. Of those countries, and similar to previous years, only Argentina, Brazil and Chile had pre-notified exports of potassium permanganate, in small amounts.

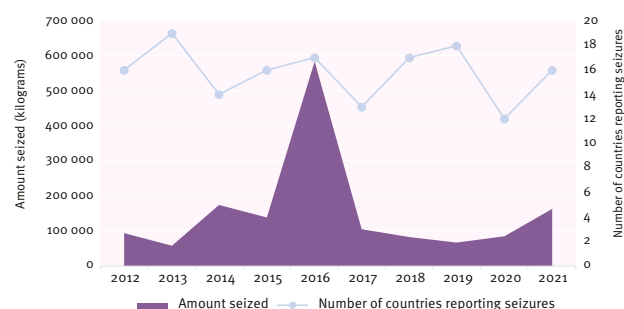
138. On form D for 2021, China reported having stopped 14 exports involving a total of almost 2,400 tons of potassium permanganate destined for 12 countries. The United Republic of Tanzania objected to four imports of a total of 5.6 tons of the substance, and Jordan to a total of about 95 kg, because no import authorization had been issued.

#### *Trafficking*

139. On form D for 2021, 16 countries reported seizures of potassium permanganate, including 6 countries in Europe. With the exception of an outlier in 2016, the amounts reported have remained at an average of approximately 100 tons per year for the past 10 years (see figure 12). For many years, Colombia has reported the largest amounts seized. In 2021, seizures in Colombia totalled more than 135 tons, more than twice the amount seized in the country in 2020. Seizures amounting to more than 1 ton were also reported by China (almost 18.6 tons, an amount more than 10 times the amount seized in the country in 2020), Chile (more than 5.8 tons) and Peru (almost 1.5 tons, which was almost twice the amount seized in the country in 2020). Seizures of potassium permanganate in Europe were also on the rise, albeit in smaller amounts, mirroring an increase in illicit cocaine laboratories and chemical warehouses in that region.<sup>26</sup> By contrast, the amounts seized in Bolivia (Plurinational State of) and Venezuela (Bolivarian Republic of) were significantly smaller than the amounts seized in 2020.

<sup>26</sup>These laboratories are known as secondary extraction laboratories, or cocaine “washing” laboratories, where cocaine is recovered after being mixed with, or incorporated into, other substances for the purpose of smuggling. In addition, there are laboratories for the conversion of cocaine base into hydrochloride salt. On the basis of the chemicals seized, cocaine laboratories have to date been identified in Belgium, Italy, the Netherlands and Spain. The required chemicals include acids and solvents listed in Table II of the 1988 Convention, non-scheduled substitutes, such as acetate solvents, and bases. Most of the chemicals are sourced from within the European common market.

**Figure 12. Seizures of potassium permanganate, as reported by Governments on form D, 2012–2021**



140. As in the past, countries in South America typically indicated diversion from domestic distribution channels as the source of potassium permanganate. In Colombia, illicit manufacture continued to be another notable source of the substance, as evidenced by seizures of precursors and substitutes of potassium permanganate (see para. 142 below).

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

141. Each year, chemicals not under international control represent a significant portion of the cocaine chemicals reported seized on form D. They can be classified in the following groups: (a) precursors of and substitutes for potassium permanganate; (b) chemicals that help to improve the efficiency of the manufacturing process, such as sodium metabisulfite and calcium chloride; (c) a variety of common acids, bases and solvents used in the extraction of cocaine base from coca leaves and for the conversion of cocaine base into hydrochloride; and (d) chemicals used to illicitly manufacture controlled precursors used in cocaine processing. Most of these chemicals are sourced domestically.

142. Countries in South America in particular have a number of additional substances under national control. For example, Colombia controls 25 substances in addition to those under international control, many of which are related to cocaine processing. Seizures involving 24 of them were effected in 2021. On form D, Colombia continued to be the only country reporting seizures of precursors of potassium permanganate. Specifically, there was one incident involving 250 kg of **manganese dioxide** (pyrolusite) and three incidents involving a total of more than 18.5 tons of **potassium manganate**. Since the latter is an intermediate in the manufacture of potassium permanganate from manganese dioxide, a proportion of the amount seized may have been manufactured illicitly.

143. Seizures of these chemicals in Colombia also corroborate information about the dismantling of sites for the

illicit manufacture of potassium permanganate in that country. According to the Colombian Drug Observatory,<sup>27</sup> in the period 2017–2021, between 7 and 10 such sites were dismantled in Colombia every year. In the first 10 months of 2022, eight potassium permanganate laboratories were dismantled.

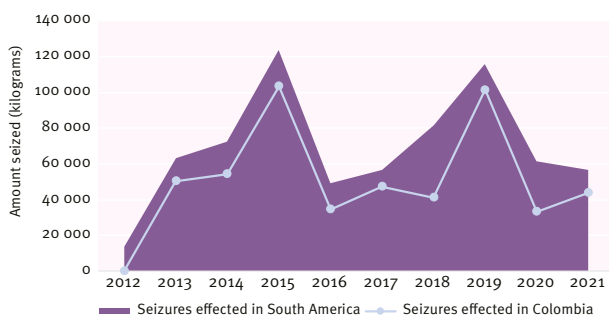
144. **Sodium hypochlorite** is another chemical associated with the illicit manufacture of potassium permanganate. Several countries, in particular in South America, have placed some kind of control over sodium hypochlorite and therefore regularly report seizures of the substance on form D. In 2021, notable seizures were reported by Argentina, in the form of a solution amounting to almost 10,000 litres, in relation to 25 incidents, and Peru (about 5 tons, up from around 3 tons in 2020 but not anywhere close to the amount of almost 14 tons seized in 2018).

145. In terms of efficiency gains, a relatively new trend that has come to the Board's attention is the use of **acetyl chloride** in the last step of the conversion of cocaine base to cocaine hydrochloride. Use of the chemical, which has long been associated with illicit heroin manufacture (see sect. C.2 below), appears to increase both the yield and purity of cocaine hydrochloride. **The Board encourages further research into the use of acetyl chloride in illicit cocaine manufacture and invites the countries concerned to also determine the sources of the chemical.**

146. **Sodium metabisulfite** is another chemical associated with efficiency gains in illicit cocaine manufacture, which are realized by using the substance to standardize the oxidation level of cocaine base sourced from multiple extraction laboratories prior to further processing. In the last 10 years, the largest seizures of sodium metabisulfite were reported by countries in South America, with Colombia accounting for almost 75 per cent of total amount seized in that region (see figure 13). In 2016, notable seizures started to be reported by countries in Europe and have been associated with an increase in cocaine laboratories, including the so-called secondary extraction, or cocaine “washing”, laboratories in the region. On form D for 2021, Belgium reported seizures totalling more than 1.4 tons of sodium metabisulfite. As in previous years, the largest amounts seized in 2021 were reported by Colombia (almost 45 tons) and Peru (almost 8.5 tons). Peru also reported five seizures totalling almost 5.6 tons of **potassium metabisulfite**, a possible substitute for sodium metabisulfite.

<sup>27</sup>Colombian Drug Observatory ([www.odc.gov.co/sidco/oferta/infraestructura-sustancias-quimicas](http://www.odc.gov.co/sidco/oferta/infraestructura-sustancias-quimicas)) (in Spanish).

**Figure 13. Seizures of sodium metabisulfite, as reported by Governments in South America on form D, 2012–2021**



147. **Calcium chloride** is another chemical associated with efficiency gains in illicit cocaine manufacture. Specifically, it is used as a drying agent for solvents, thus enabling them to be recycled and reducing the need for fresh solvents. Whereas Bolivia (Plurinational State of) and Colombia have regularly reported significant, multi-ton seizures of calcium chloride since 2013, trafficking of the substance through Ecuador appears to have started in 2016, and peaked in 2018 at more than 143 tons.<sup>28</sup> Since then, quantities of calcium chloride seized in Ecuador have decreased; in 2021, they decreased to about 12 tons (in four incidents). In Peru, notable seizures of the substance have been reported since 2018, and following its placement under control in the country in January 2020, amounts totalling almost 46 tons in 2020 and 34 tons in 2021 were reported. On form D, Peru also reported first-time seizures of more than 13 tons of a substitute chemical, **magnesium chloride**, in illicit cocaine laboratories. Both chemicals were reported to be used in the recycling of acetone used in the conversion of cocaine base into hydrochloride salt.

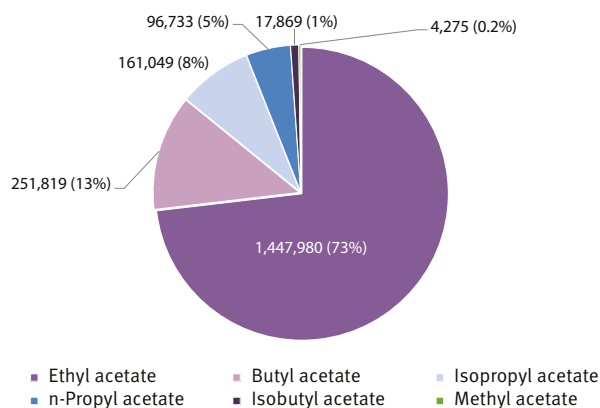
148. In July 2022, the Government of Ecuador, with technical support from UNODC, disposed of 27 tons of calcium chloride and sodium bicarbonate by burying the chemicals in an engineered landfill near the port of Guayaquil. The Board recognizes the importance of the lawful and environmentally safe disposal of seized chemicals. Given the significant quantities of some chemicals seized, the Board also recognizes the challenges that such disposal may present and commends all Governments for their efforts in this regard. The Board welcomes technical support from UNODC and encourages other international and regional organizations to continue to provide technical support to such efforts to prevent the re-entry of seized chemicals into illicit channels and reduce the risks to the

environment and neighbourhoods posed by stored chemicals.

149. While historically, acetone, ethyl ether, methyl ethyl ketone or toluene (all solvents included in Table II of the 1988 Convention) have been used for the conversion of cocaine base into hydrochloride, a variety of other common **solvents** can and are also being used. Most of them can be replaced by yet others with similar properties, and the preference for a particular solvent is often a result of its accessibility and the illicit operators' experience with it. Most solvents are obtained from domestic sources.

150. With regard to solvents required for the final conversion of cocaine base into cocaine hydrochloride, seizures of so-called **acetate solvents** (methyl, ethyl, n-propyl, isopropyl, butyl and isobutyl acetate and mixtures of them) have regularly been reported on form D. In the period 2017–2021, ethyl acetate accounted for almost 75 per cent of the total volume of acetate solvents seized worldwide (see figure 14). Seizures of **methyl acetate**, amounting to almost 4.3 tons, were reported for the first time, by Peru, in 2021.

**Figure 14. Proportion of seizures of acetate solvents, expressed in kilograms and litres, as reported by Governments on form D, 2017–2021**



151. On form D for 2021, 10 countries, 6 in South America, 3 in Europe and 1 in Asia, reported seizures of acetate solvents. As in previous years, the largest amounts were reported by countries in South America; seizures reported by countries in Europe may be another reflection of the cocaine “washing” laboratories that have emerged in that region. However, acetate solvents can also be used in the illicit manufacture of other synthetic drugs.

152. **Methyl isobutyl ketone** is another solvent that can be used in the final hydrochloride crystallization step in the manufacture of cocaine. Seizures of the substance, amounting to more than 23,500 litres, were only reported by Colombia in 2021.

<sup>28</sup>INCB report on precursors for 2021(E/INCB/2021/4), figure X and para. 160.



153. Forensic profiling analysis can provide an indication of the solvent, or solvent mixture, used in the cocaine hydrochloride crystallization step. Together with profiling methods that target the geographical origin of the coca from which the cocaine was extracted, forensic solvent analysis can thus provide valuable strategic information for law enforcement and regulatory authorities. The most recent forensic profiling results identified ethyl acetate as a prominent solvent in cocaine seized in Europe, while acetate mixtures were common in cocaine seized in the United States, and acetone was the most prominent solvent utilized in the crystallization step in the manufacture of cocaine seized in Peru. Since acetate solvents are available and widely used for a range of legitimate purposes, **the Board encourages Governments to monitor international trade in and domestic distribution of acetate solvents, as appropriate, with a view to identifying any changes in such trade or distribution, which may indicate their diversion into illicit channels. The Board's recently launched PEN Online Light system may provide a useful, voluntary tool for authorities in this regard.**

154. Some countries in South America also report the illicit manufacture of chemicals needed for cocaine processing, including ammonia, hydrochloric acid and sulphuric acid. On form D for 2021, Argentina, Honduras, Peru and Venezuela (Bolivarian Republic of) reported seizures of chemicals that can be used as precursors, including **urea, sulphur and sodium chloride**. Some of the seizures were made in illicit laboratories, indicating actual manufacture. Colombia did not report any such seizures but dismantled 15 sites used for the illicit manufacture of sulphuric acid in the period 2017–2019, according to the Colombian Drug Observatory.<sup>29</sup>

## C. Substances used in the illicit manufacture of heroin

### 1. Acetic anhydride

155. Acetic anhydride is one of the most widely traded substances in Table I of the 1988 Convention, with hundreds of millions of litres of the substance traded annually. It is used in the illicit manufacture of heroin, as well as in the illicit manufacture of methamphetamine or amphetamine in instances where the immediate precursor P-2-P is illicitly derived from phenylacetic acid or phenylacetic acid derivatives (see annex VIII).

<sup>29</sup>Colombian Drug Observatory ([www.odc.gov.co/sidco/oferta/infraestructura-sustancias-quimicas](http://www.odc.gov.co/sidco/oferta/infraestructura-sustancias-quimicas)) (in Spanish).

### *Licit trade*

156. From 1 November 2021 to 1 November 2022, the authorities of 24 exporting countries and territories used the PEN Online system to submit almost 2,300 pre-export notifications for shipments of acetic anhydride. The shipments were destined for 91 importing countries and territories and involved a total of almost 1.1 billion litres of acetic anhydride, an increase of 47 per cent compared with the previous reporting year.

157. In 2021, the competent national authorities of importing countries objected to approximately 2.8 per cent of pre-export notifications related to proposed exports of acetic anhydride, 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 of acetic anhydride were objected to.

158. In 2021, authorities in the United States objected, for administrative reasons, to about 50 per cent of pre-export notifications of acetic anhydride submitted by the authorities of Mexico. That objection rate was lower than the average objection rate in the period 2018–2020 (about 75 per cent). Nevertheless, in view of the continued high proportion of objections to shipments of acetic anhydride involving the two countries, **the Board reiterates its earlier call to the Governments of Mexico and the United States, as well as other Governments with high rates of objections, to analyse and address the root causes, and to take mutually acceptable remedial measures, as deemed appropriate, to increase the efficiency of administrative control over the trade in acetic anhydride, without compromising the capacity of the countries concerned to identify and address actual diversions of the substance from either domestic or international trade.**

159. In recent years, the number of suspected or actual diversions of acetic anhydride from international trade has declined considerably, with most of the reported cases now involving diversions from domestic distribution channels prior to smuggling. During the reporting period, about 80 per cent of the total amount of acetic anhydride traded internationally was destined for a very limited number of companies (so-called “tank farms”) in Belgium and the Netherlands. The ongoing domestic sale and distribution of large amounts of the substance has led traffickers to target the region for a number of years, as corroborated by continued reports of countries of the European Union being a source of the substance seized within the region and elsewhere.

160. Although none of the countries that objected through the PEN Online system to proposed shipments of acetic anhydride during the reporting period identified any shipment as being a suspected diversion attempt, some

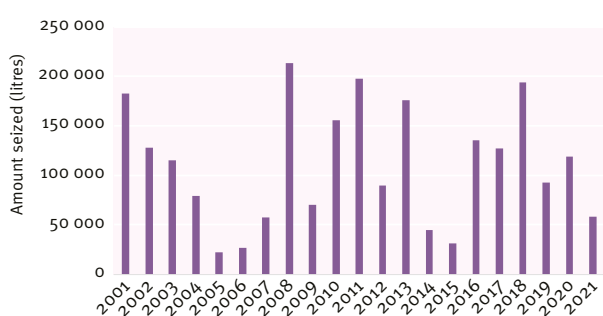
of the shipments that were objected to may have warranted follow-up law enforcement investigations into their legitimacy, in particular in cases where the proposed importer denied having ordered the shipment. To initiate such investigations, the national authorities may wish to use the dedicated INCB guide comprising practical tips for follow-up investigations into shipments of precursor chemicals that have been objected to through the PEN Online system and providing examples of best practices from a number of investigations into suspected diversion attempts. The guide was shared with Governments in 2019.<sup>30</sup>

### Trafficking

161. Since 2001, the amount of acetic anhydride seized globally each year has fluctuated significantly, ranging from 22,000 to 214,000 litres, with a peak in the period 2016–2018, when the amount seized globally averaged 152,000 litres per year. That period was also characterized by a significant number of suspicious orders and inquiries involving legitimate suppliers. The reason for the high demand for the substance in the period 2016–2018 has never been unambiguously clarified in the countries concerned.<sup>31</sup>

162. In the period 2019–2020, global seizures of acetic anhydride declined to an average of 106,000 litres per year. In the same period, trafficking in acetyl chloride, a possible replacement for acetic anhydride as an acetylating agent, which emerged around 2018, gained further importance (see figure 15 and para. 171 below).

**Figure 15. Seizures of acetic anhydride, as reported by Governments on form D, 2001–2021**



163. According to information provided by Governments on form D, the quantity of acetic anhydride seized globally declined even further in 2021, including in some countries that had previously reported seizures of sizeable amounts of the substance. In total, almost 58,600 litres of acetic anhydride were seized worldwide in 2021. In China, the total quantity seized of the substance dropped from

<sup>30</sup>INCB report on precursors for 2019 (E/INCB/2019/4), para. 189.

<sup>31</sup>INCB report on precursors for 2017 (E/INCB/2017/4), paras. 167–168.

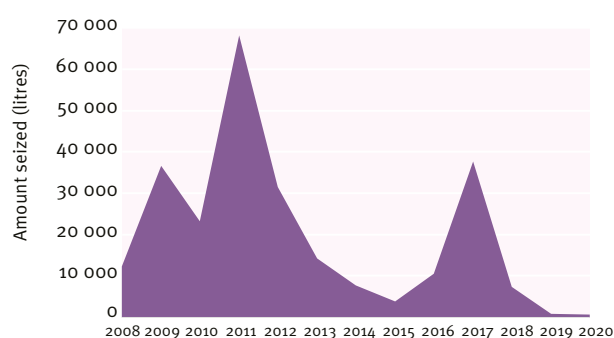
48,900 litres in 2020 to only 12,200 litres in 2021, representing a 75 per cent decrease. Iran (Islamic Republic of), the United Arab Emirates and Myanmar, which seized 15,000 litres, 13,300 litres and 12,200 litres of acetic anhydride, respectively, in 2020, did not report any seizures of the substance in 2021.

164. With a total amount of 36,300 litres, Türkiye reported the largest seizures of acetic anhydride in 2021, almost triple the amount reported seized in 2020 (see para. 168 below) and more than 60 per cent of the amount seized globally in 2021. Notable seizures of acetic anhydride were also reported by the Netherlands (5,600 litres) and Guatemala (4,400 litres). With regard to 2022, information communicated by Governments through PICS in the first 10 months of the year suggests a likely continued decline in the quantity of acetic anhydride seized worldwide.

165. Afghanistan remains the world's largest illicit producer of opium and heroin and is the main source of the heroin available in Europe. According to UNODC, in July 2021, opium poppy cultivation in the country was estimated at 177,000 hectares, representing 85 per cent of global illicit opium production. The opium harvest in 2021 potentially yielded between 270 and 320 tons of pure heroin, the illicit manufacture of which would potentially require between 270,000 and 800,000 litres of acetic anhydride, based on the Board's conversion figures (see annex VIII).

166. Despite the continued cultivation of opium poppy in Afghanistan, seizures of acetic anhydride in the country peaked in 2017 at 37,715 litres and have been in decline since then. In 2018, the quantity seized of the substance dropped by 80 per cent, to 7,364 litres, then to 786 litres in 2019 and further to 656 litres in 2020 (see figure 16 below).<sup>32</sup> In the same period, seizures of an alternative acetylation agent, namely, acetyl chloride, started to emerge in Afghanistan and other countries in West Asia.

**Figure 16. Seizures of acetic anhydride, as reported by the Government of Afghanistan on form D, 2008–2020**



<sup>32</sup>At the time of writing, Afghanistan had not submitted form D and hence did not provide information on amounts of acetic anhydride and/or acetyl chloride seized in the country in 2021.

167. In April 2022, the de facto authorities of Afghanistan issued a decree banning the cultivation of opium poppy and the manufacture of illicit drugs (see also para. 14 above). Nonetheless, according to UNODC, the opium harvested in 2022 could be converted into some 240–290 tons of pure heroin, the illicit manufacture of which would potentially require between 240,000 and 725,000 litres of acetic anhydride.

168. In 2021, Türkiye reported 13 seizures of acetic anhydride amounting to a total of 36,300 litres of the substance, an increase of 24,200 litres compared with the 12,100 litres reported seized in 2020. In two particular seizures, involving a total of 25,000 litres, the seized substance had purportedly originated in European Union member States. To facilitate backtracking investigations into the seized substance, the Board convened an intelligence-sharing meeting in 2022 that was attended by representatives of the countries associated with its trafficking.

169. In the Netherlands, the total quantity seized of acetic anhydride increased more than sixfold, from 910 litres seized in 2020 to 5,610 litres seized (in two seizures) in 2021. In one case, in addition to 2,010 litres of acetic anhydride seized in a warehouse, police also seized 180 litres of glacial acetic acid, 60 kg of sodium carbonate and a large quantity of heroin. The circumstances of the case indicated the possible use of the seized chemicals in the illicit manufacture of heroin in the country. Since 2017, more than 10 sites believed to be associated with illicit heroin manufacture have been identified in the Netherlands. In recent years, illicit heroin laboratories have also been identified in other European Union member States, including Belgium, Czechia and Spain.<sup>33,34</sup>

<sup>33</sup>NCB report on precursors for 2018 (E/INCB/2018/4), para. 190.

<sup>34</sup>EMCDDA, *European Drug Report 2022: Trends and Developments* (Luxembourg, Publications Office of the European Union, 2022), p. 24.

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

170. **Acetyl chloride** is a chemical substance 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 of non-scheduled substances and is also controlled in several countries, including Afghanistan, the Islamic Republic of Iran and Pakistan.

171. In the past, seizures of acetyl chloride were only rarely reported. However, from 2017 to 2021, Afghanistan, India, Iran (Islamic Republic of), the Netherlands, Pakistan, Türkiye and the United Arab Emirates shared through PICS information on a total of 12 seizures of acetyl chloride, amounting to a total of more than 100,000 litres. Where such information was available, China was identified as the source country. In 2022, one seizure, amounting to less than 1 litre of acetyl chloride, was communicated through PICS, by Hong Kong, China.

172. Communications shared through PICS on trafficking in acetyl chloride present an opportunity for the competent national authorities of the countries concerned, including of the reported country or countries of origin, to initiate backtracking investigations with a view to identifying *modi operandi* used by traffickers and preventing future trafficking attempts involving the same *modi operandi* and/or involving the same trafficking groups. **INCB reminds the Governments concerned of the value of investigating the circumstances of seizures of key non-scheduled chemicals, such as acetyl chloride, and encourages them to consider taking action against the diversion of and trafficking in such chemicals, in accordance with article 13 of the 1988 Convention.**

173. **Glacial acetic acid** is a chemical that is included in the INCB limited international special surveillance list. It has been repeatedly reported as being used as a cover load

### Box 4. Acetyl chloride and the international precursor control system

At the international level, concerns about use of acetyl chloride in illicit drug manufacture were articulated long before the adoption of the 1988 Convention, in Commission on Narcotic Drugs resolution 2 (S-V) of 1978, which focused on measures against the use of acetic anhydride or acetyl chloride in the illicit manufacture of heroin. In the resolution, reflecting the belief current at that time, the Commission recognized that there were practical considerations that made it difficult to place acetic anhydride or acetyl chloride under strict national control, particularly in countries where acetic anhydride or acetyl chloride was used in large quantities industrially. Nonetheless, acetic anhydride was eventually added to the list of internationally controlled precursor chemicals, whereas acetyl chloride is not yet internationally controlled.

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. In the past five years, significant seizures of the substance have been reported by countries in Latin America, where the chemical is under national control in a number of countries. On form D for 2021, the amounts of glacial acetic acid reported seized worldwide totalled 8,500 litres, including 7,600 litres of the substance seized in Peru.

174. **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. 128–130 above). In 2021, only three countries reported seizures of ammonium chloride. The total amount reported seized was negligible compared with the 16,600 kg reported seized in 2020, most of which was reported by Afghanistan and Mexico.

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

### 1. Ergot alkaloids and lysergic acid

175. On form D for 2021, three countries reported seizures of ergotamine and five reported seizures of lysergic acid; there were no seizures of ergometrine. As in the past and reflecting the potency of the end product, LSD, the amounts reported seized by each country were usually very small, in the range of a gram or less. Australia, which has regularly reported seizures of the two substances in notable quantities, seized about 360 grams of ergotamine and 240 grams of lysergic acid in 2021.

176. In July 2022, the Board became aware of an ergotamine diversion scheme in Paraguay. Investigations determined that between 2020 and 2022 at least 4.5 kg of the substance had been diverted through domestic purchases using two front companies. It is presumed that the scheme was dedicated to the diversion and that the ergotamine was sold onwards to organized criminal groups in the border area between Argentina, Brazil and Paraguay.

### 2. N-Acetylanthranilic acid, anthranilic acid and alternative precursors of methaqualone

177. On form D for 2021, China reported having stopped a shipment of anthranilic acid to Pakistan in response to a request made by the authorities in that country through the

PEN Online system. While no further information about the case was available to INCB, it does not appear that it was a diversion attempt but rather a shipment stopped for administrative reasons. Although there continue to be sporadic reports of the illicit manufacture of methaqualone, the reports rarely include any information about the specific chemicals involved or their sources. There were no notable seizures of any internationally controlled precursor of methaqualone reported on form D for 2021.

178. In terms of alternative precursors of methaqualone not under international control, South Africa reported a seizure of 200 litres of *ortho-toluidine* at O.R. Tambo International Airport in Johannesburg, South Africa. The consignment had been mislabelled and had allegedly originated in China.

179. In addition, through PICS, INCB is aware of the seizure in 2021 of a shipment of 1.7 tons of **acetantranyl** that had arrived at the international airport in Johannesburg from Kenya. That was the fourth incident involving the substance in South Africa since 2018 and the first with a link to Kenya. The Board has inquired with the authorities concerned and is awaiting feedback on the status of follow-up investigations.

180. The seizures of acetantranyl are important because they illustrate that, as in the case of other synthetic drugs, traffickers are seeking alternative precursors not under international control also for the illicit manufacture of methaqualone. The seizures of the substance might thus explain the absence of seizures of the traditional, controlled precursors of methaqualone and also the need for a shift in the focus of law enforcement in the African region.

### 3. Precursors of fentanyl, fentanyl analogues and other synthetic opioids, and alternative chemicals

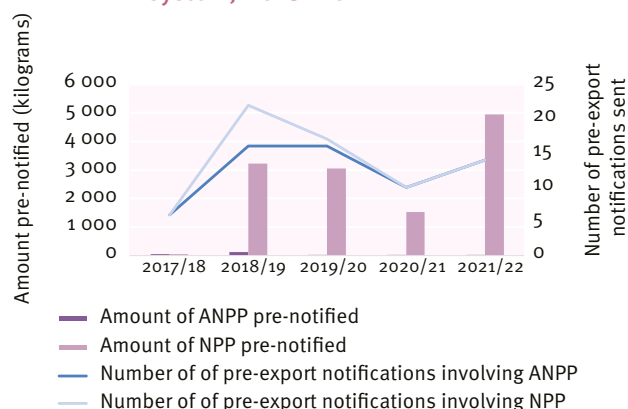
#### *Licit trade*

181. With the addition of 4-AP, 1-boc-4-AP and norfentanyl to Table I of the 1988 Convention, effective 23 November 2022, there are now five precursors of fentanyl and related substances under international control. While the extent of trade in the three chemicals remains to be seen, it is assumed that most shipments relate to trade in small amounts for limited research and laboratory analytical purposes.

182. International trade in NPP and ANPP, the other two precursors of fentanyl under international control, continued to be limited to a few exporting and importing countries. Between 1 November 2021 and 1 November 2022, 14 proposed shipments of NPP were pre-notified by the authorities of three exporting countries to five

importing countries. All of the importing countries are known to manufacture fentanyl legitimately. The total quantity involved significantly exceeded the quantities observed in the period 2019–2020 (see figure 17). The largest exporter of NPP was India, followed by France. International trade in ANPP continued to be negligible, involving less than 5 grams of the substance, in 14 proposed shipments, during the reporting period.

**Figure 17. Proposed exports of two fentanyl precursors, pre-notified by exporting Governments through the PEN Online system, 2018–2021<sup>a</sup>**



<sup>a</sup>Reporting periods are from 1 November of the first year to 1 November of the following year.

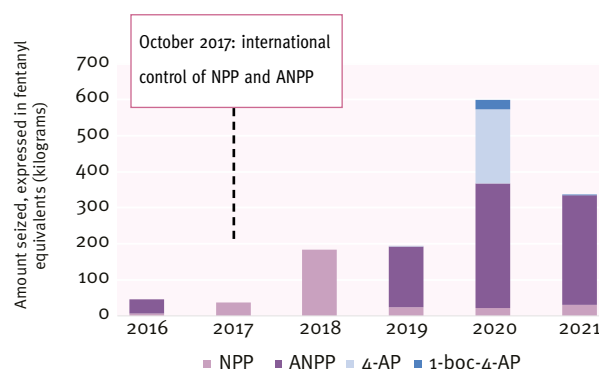
### Trafficking

183. Incidents involving fentanyl precursors were reported on form D for the first time in 2016 (see figure 18). On form D for 2021, only Mexico and the United States reported notable seizures of NPP and/or ANPP. While the seizures in Mexico predominantly involved NPP (about 45 kg) and were alleged to have originated in China, the

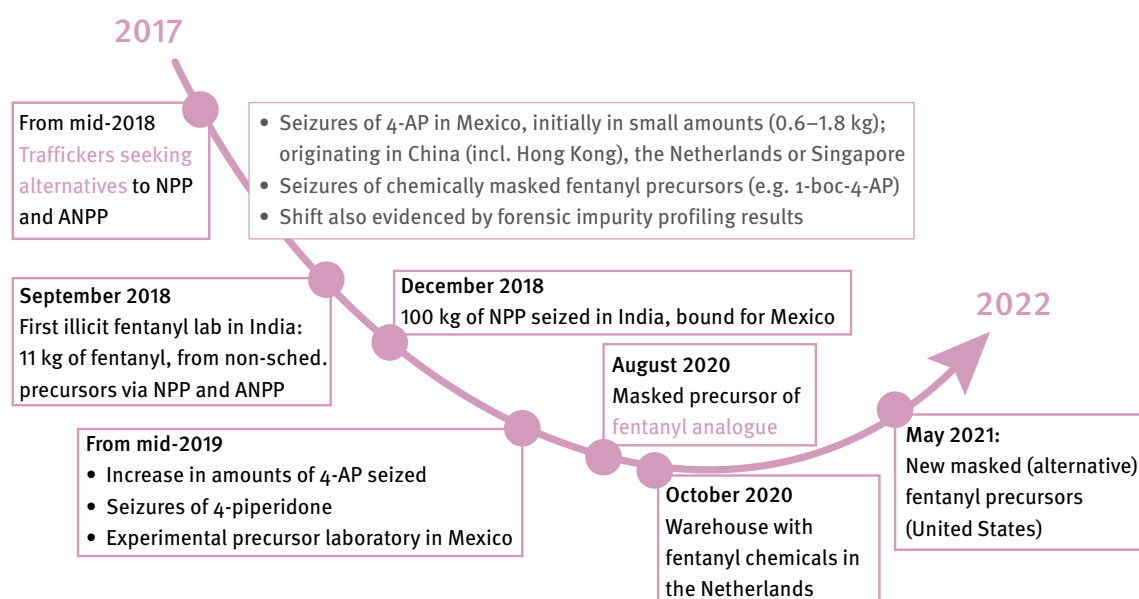
seizures in the United States involved 390 kg of ANPP, an amount reported to have been of domestic origin. The United States also reported 28 incidents involving fentanyl laboratories in 2021. Canada did not report any seizures of fentanyl precursors on form D, however, through PICS, the Board is aware of illicit fentanyl laboratories in the country, and of a seizure of about 12 kg of ANPP.

184. The United States was the only country to report seizures of other fentanyl precursors on form D. That included 4 kg of **1-boc-4-AP**, one of the three chemicals added to Table I of the 1988 Convention in November 2022, 180 kg of **4-piperidone** and 170 kg of **2-bromoethyl benzene**. The latter two chemicals were seized from a mislabelled shipment that had originated in China and was destined for an address in Texas, United States. The two chemicals are associated with different methods of illicit fentanyl manufacture; they also have numerous legitimate applications.

**Figure 18. Seizures of fentanyl precursors (expressed in fentanyl equivalents), as reported by Governments on form D, 2016–2021**



**Figure 19. Schematic overview of the evolution of fentanyl precursors, 2017–2022**



185. Soon after the international scheduling of NPP and ANPP, traffickers started to seek alternatives to those chemicals. The alternatives included stable chemical intermediates used in one or more of the several fentanyl manufacturing methods, as well as their chemically masked derivatives. Alternatives identified later also included pre-precursors and their masked derivatives (see figure 19). While much of the innovation with regard to these alternatives has been observed in North America, where most of the related seizures have been effected, there has also been some geographical diversification, as illustrated by incidents related to illicit fentanyl manufacture, namely, the seizure of an illicit laboratory in India in 2018 and of a warehouse containing several hundreds of litres of fentanyl chemicals in the Netherlands in 2020.

186. There were no seizures of precursors of fentanyl analogues reported on form D for 2021. However, in 2022, the United States communicated an incident involving the masked derivative of a precursor of *para*-fluorofentanyl through PICS. The misdeclared shipment was seized at the international airport in Indianapolis, United States. In that connection, the Board welcomes the scheduling approach taken by Canada (see para. 17 above) and **reiterates its call to Governments to consider taking measures, in accordance with national legislation, on groups of chemically related substances, that is, chemicals that are closely related to controlled precursors and that may be readily converted to or substituted for those precursors. Alternatively, or in addition, Governments may wish to consider taking specific measures with regard to chemicals that do not have any currently recognized legitimate uses.**

#### 4. Precursors of phencyclidine and other phencyclidine-type drugs

187. Seizures of precursors of phencyclidine, a dissociative anaesthetic that is often misused for its hallucinogenic properties, are infrequently reported on form D. The amounts reported seized are typically very small, rarely exceeding 2 litres per country and year. The United States has been an exception, both in terms of the frequency of reported seizures and the amounts involved. While the total amount of precursors of phencyclidine seized globally has rarely exceeded 100 litres per year, in 2021, the United States reported a single seizure of more than 1,800 litres of piperidine. The shipment originated in India and was destined for a consignee in Nevada, United States; an investigation revealed that the location of the consignee was a residential apartment complex.

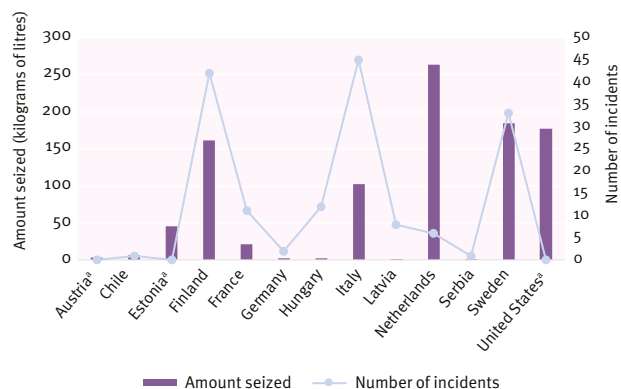
## E. Substances not listed in Table I or Table II of the 1988 Convention that are used in the illicit manufacture of other narcotic drugs and psychotropic substances or substances of abuse not under international control

### 1. Precursors of GHB

188. On form D for 2021, 14 countries reported seizures of **GBL**, a chemical precursor of GHB that may also be directly ingested, as it is metabolized into GHB in the body. Because of this “dual use”, 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 2021, the largest quantities seized of GBL were reported by Australia, totalling more than 3 tons of the substance seized in 429 incidents. Seizures were also reported by countries in Europe and North and South America. While the majority of incidents and the largest amounts of GBL seized in Australia could be traced to countries in East and South-East Asia, the GBL seized in Europe had originated from within Europe.

189. The total amount of GBL reported seized in 2021 was significantly smaller than that reported in 2020, when the Netherlands and Slovenia reported single seizures of more than 20,000 litres and more than 12,000 litres, respectively, and several other countries reported amounts between 100 and 300 litres. By contrast, the amounts reported seized in 2021 were much smaller and reflected a larger number of incidents, and were therefore indicative of retail-level seizures of GBL for direct consumption, with the likely exception of the seizures in the Netherlands (see figure 20).

**Figure 20. Seizures of GBL, as reported by Governments on form D for 2021**



*Note:* The figure excludes Australia, which reported seizures amounting to 3,145 kg in 2021.

<sup>a</sup>Austria, Estonia and the United States did not provide information on the number of incidents.

190. Seizures of GBL communicated through PICS in the first 10 months of 2022 amounted to a total of about 2,900 litres, in 93 incidents. In addition, 268 incidents involving a total of about 450 litres and kilograms were communicated through IONICS during the same period, again indicating retail-level incidents.

191. Seizures of **1,4-butanediol**, a precursor of GBL and a pre-precursor of GHB that is also readily converted to GHB upon ingestion, were negligible in 2021. In the past five years, only seven countries reported seizures of the substance; the largest amounts – five litres – were reported by two countries, Germany, in 2021, and Norway, in 2019. In the first 10 months of 2022, almost 170 incidents involving a total of more than 750 kilograms and litres were communicated through IONICS. Both GBL and 1,4-butanediol were target substances for Operation Knockout (see para. 41 above).

192. From other sources, INCB is aware of new methods for the illicit manufacture of GBL and/or GHB, possibly in response to controls placed on GBL in China in September 2021.<sup>35</sup>

## 2. Precursors of ketamine

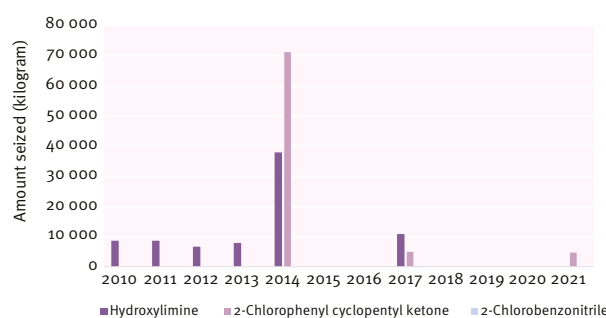
193. Although there is no systematic reporting of information about precursors of ketamine and the illicit manufacture of the substance, some countries submit such data to INCB. Reported seizures of ketamine have predominantly involved two substances, “**hydroxylimine**”<sup>36</sup> and **2-chlorophenyl cyclopentyl ketone**. Both substances are intermediates in the synthesis of ketamine and can be

<sup>35</sup> See INCB report on precursors for 2021 (E/INCB/2021/4), para. 28.

<sup>36</sup> “Hydroxylimine” is an informal term used to refer to the substance known chemically as 1-hydroxycyclopentyl (2-chlorophenyl)-ketone-*N*-methylimine.

readily converted into the substance; both can be considered designer precursors. On form D for 2021, China reported seizures totalling more than 4.7 tons of 2-chlorophenyl cyclopentyl ketone. No further details were provided. In the past, China has regularly reported seizures of “hydroxylimine”.<sup>37</sup> Seizures of both substances peaked in 2014 (see figure 21). INCB is also aware of illicit ketamine laboratories having been dismantled in Cambodia, Canada, China, India, Malaysia and the Netherlands in the past 10 years; some of the laboratories, in particular those in East and South-East Asia, were of industrial scale.

**Figure 21. Seizures of ketamine precursors, as reported by Governments on form D, 2010–2021**



## 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

194. While the reporting of seizures of precursors of new psychoactive substances and substances recently placed under international control continues to be unsystematic, several countries, especially countries in Europe, report such seizures on form D. As in the past, most of the seizures made in the reporting period involved precursors of synthetic cathinones. On form D for 2021, Austria and France reported seizures of mephedrone precursors, specifically 139 kg of **2-bromo-4'-methylpropiofenone** in Austria, and 105 kg of **4-methylpropiofenone** in France. The seizure in France concerned a transit shipment from China to Ukraine. Poland reported seizures of 20 kg of **2-bromo-4'-chloropropiofenone** (a precursor of 4-CMC (clphedrone) and other 4-chloro-substituted cathinone derivatives) and more than 290 kg (in 11 incidents) of **2-bromo-4'-methoxypropiofenone** (a methedrone

<sup>37</sup> “Hydroxylimine” has been under control in China since mid-2008 and 2-chlorophenyl cyclopentyl ketone since September 2012.

precursor). In addition, the Republic of Moldova referred to a seizure of hydrochloric acid made in connection with the illicit manufacture of *alpha*-pyrrolidinopentiophenone (*alpha*-PVP).

195. In the first 10 months of 2022, seven incidents involving precursors of new psychoactive substances were communicated through PICS. They included two incidents related to illicit laboratories in the Netherlands, involving 23 kg of a mephedrone precursor and 88 kg of a clephedrone precursor. In addition, seizures in the Russian Federation involving more than 8 tons of precursors of mephedrone and *alpha*-PVP were communicated during the same period. The internationally non-scheduled chemicals had allegedly originated in China and transited Kazakhstan before being seized in the Russian Federation.