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PREFACE

The *World Drug Report 2023* comes as countries are struggling at the halfway point to revive stalled progress towards achieving the Sustainable Development Goals (SDGs). Crises and conflict continue to inflict untold suffering and deprivation, with the number of people forcibly displaced globally hitting a new record high of 110 million. Peace, justice and human rights, which should be the birthright of all, remain out of reach for far too many.

The harms caused by drug trafficking and illicit drug economies are contributing to and compounding many of these threats, from instability and violence to environmental devastation. Illicit drug markets continue to expand in terms of harm as well as scope, from the growing cocaine supply and drug sales on social media platforms to the relentless spread of synthetic drugs – cheap and easy to manufacture anywhere in the world, and in the case of fentanyl, deadly in the smallest of doses.

Drug use disorders are harming health, including mental health, safety and well-being. Stigma and discrimination make it less likely that people who use drugs will get the help they need. Fewer than 20 per cent of people with drug use disorders are in treatment, and access is highly unequal. Women account for almost half the people who use amphetamine-type stimulants, but only 27 per cent of those receiving treatment. Controlled drugs needed for palliative care and pain relief, namely pharmaceutical opioids, are denied to those who desperately need them, with too little access in many countries – mainly low- and middle-income countries, where some 86 per cent of the world's population lives.

Drug challenges pose difficult policy dilemmas that cannot be addressed by any one country or region alone. The United Nations Office on Drugs and Crime publishes the World Drug Report every year to provide a global perspective and overview of the world drug problem, offering impartial evidence with the aim of supporting dialogue and shared responses.

This edition of the *World Drug Report* highlights the growing complexity of evolving drug threats. A special chapter explores how illicit drug economies intersect with crimes that affect the environment and insecurity in the Amazon Basin, with impoverished rural populations and Indigenous groups paying the price. Other sections of the report explore urgent challenges, including drug use in humanitarian settings, drugs in conflict situations and the changing dynamics of synthetic drug markets. The report also delves into new clinical trials involving psychedelics, medical use of cannabis and innovations in drug treatment and other services.

World drug problems may be global, but they do not affect all the world equally. It is the vulnerable, the poor and the excluded who pay the highest price, in the global South and in underdeveloped and underserved communities in all our countries, cities and villages. They suffer from the violence and insecurity fuelled by drug trafficking, as well as from insufficient access to and availability of controlled medicines. They are more likely

to progress to drug use disorders and live with related diseases such as HIV, and are less likely to receive evidence-based treatment and services. Impoverished people with uncertain access to opportunities, resources and the rule of law are more easily entrapped in illicit drug crop cultivation, production and trafficking.

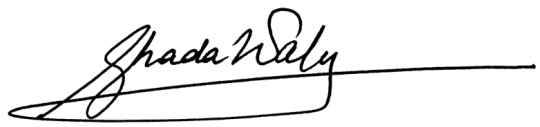
Breaking these vicious cycles requires transformative action to achieve the SDGs and integrated, comprehensive approaches to security to tackle drug threats as part of prevention, peacekeeping and peacebuilding.

Most of all, ending the exclusion compels us to expand the circle of care and compassion, to embrace the people being left behind and left out because of marginalization, discrimination and stigma.

Putting people first requires policymakers and service providers to actively protect the human rights of all by demolishing barriers to evidence-based, voluntary services across the continuum of care, dispelling gender, age and other biases and focusing on rehabilitation and reintegration instead of punishment.

Early prevention is crucial, and Governments must invest more in education to build resilience and give young people the information they need to make healthy, smart choices about their lives. Thoughtful regulation that prioritizes public health can help to ensure access and availability where needed, while keeping commercial pressures in check and reducing the risks of diversion and non-medical use.

Stigma and discrimination can be deadly, depriving people of the help they need and deserve and keeping problems in the dark until it is too late. Evidence can help shine a light on the challenges we can only face together, and it is with this in mind that I am proud to present to you the *World Drug Report 2023*. By increasing understanding of shared drug challenges, we can foster greater compassion and commitment to global action to protect lives.



Ghada Waly, Executive Director
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EXPLANATORY NOTES

The designations employed and the presentation of the material in the *World Drug Report* do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Countries and areas are referred to by the names that were in official use at the time the relevant data were collected.

For this edition of the *World Drug Report*, the Amazon Basin was defined as comprising the maximum area of the hydrographic basin, the Amazon biome and the administrative regions that are part of the Amazon, with boundaries provided by the Amazon Network of Georeferenced Socioenvironmental Information (RAISG).

Since there is some scientific and legal ambiguity about the distinctions between "drug use", "drug misuse" and "drug abuse", the neutral term "drug use" is used in the *World Drug Report*t. The term "misuse" is used only to denote the non-medical use of prescription drugs.

All uses of the word "drug" and the term "drug use" in the *World Drug Report* refer to substances controlled under the international drug control conventions, and their non-medical use.

The term "seizures" is used in the *World Drug Report* to refer to quantities of drugs seized, unless otherwise specified.

All analysis contained in the *World Drug Report* is based on the official data submitted by Member States to UNODC through the annual report questionnaire, unless indicated otherwise. Sex-disaggregated analysis has been included wherever possible.

The data on population used in the *World Drug Report* are taken from: *World Population Prospects: The 2019 Revision* (United Nations, Department of Economic and Social Affairs, Population Division).

References to dollars ($) are to United States dollars, unless otherwise stated.

References to tons are to metric tons, unless otherwise stated.

The following abbreviations have been used in the present booklet:

ADHD	Attention deficit hyperactivity disorder
AIDS	acquired immunodeficiency syndrome
API	active pharmaceutical ingredients
ATS	amphetamine-type stimulants
CBD	cannabidiol
COVID-19	coronavirus disease
CV	*Comando Vermelho*
DALYs	disability-adjusted life years
DMT	dimethyltryptamine
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ELN	*Ejército de Liberación Nacional* (National Liberation Army)
FARC-EP	*Fuerzas Armadas Revolucionárias da Colombia–Ejército del Pueblo* (Revolutionary Armed Forces of Colombia – People's Army)
FDA	United States Food and Drug Administration
FDN	*Família do Norte*
GACP	good agricultural and collection practices
GAP	good agricultural practices
GMP	good manufacturing practices
GBL	*gamma*-butyrolactone
GHB	*gamma*-hydroxybutyric acid
ha	hectares
HHC	hexahydrocannabinol
HIV	human immunodeficiency virus
HPPD	hallucinogen persisting perception disorder
INCB	International Narcotics Control Board
LSD	lysergic acid diethylamide
NPS	new psychoactive substances
MDMA	3,4-methylenedioxymethamphetamine
NMDA	N-methyl-D-aspartate
OCD	Obsessive-compulsive disorder
RAISG	*Rede Amazônica de Informação Socioambiental Georreferenciada* (The Amazon Geo-Referenced Socio-Environmental Information Network)
P-2-P	1-phenyl-2-propanone
PCC	*Primeiro Comando Capital*
PCP	phencyclidine
PTSD	post-traumatic stress disorder
PWID	people who inject drugs
SIMCI	Integrated Illicit Crops Monitoring System
THC	tetrahydrocannabinol
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNODC	United Nation Office on Drugs and Crime
UNHCR	Office of the United Nation High Commissioner for Refugees
VRAEM	Valle de los Ríos, Apurímac, Ene e Mantaro
WHO	World Health Organization

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THE SYNTHETIC DRUG PHENOMENON

THE SYNTHETIC DRUG PHENOMENON

Global overview of synthetic drug markets

The illicit manufacture, trafficking and non-medical use of synthetic drugs are not new global challenges. Developments in the pharmaceutical and chemical industries have contributed to the continued discovery and proliferation of synthetic drugs.[1] Since the early twentieth century, new pharmaceuticals, such as synthetic tranquillizers, stimulants and anaesthetics, have advanced medicine but also expanded opportunities f or the non-authorized supply and use of new mind-altering substances. The adoption of the Convention on Psychotropic Substances of 1971, in which Member States agreed to extend controls over some new synthetic drugs, many of which were pharmaceutical in origin, was testimony to the harm caused by the non-medical use of synthetic drugs in the twentieth century.[2, 3]

Synthetic drugs have proliferated in drug markets in the last decade. However, only a few synthetic drugs – mainly ATS, in particular methamphetamine and MDMA – have established robust global markets. Methamphetamine is probably the most widely used and supplied synthetic drug worldwide, and its manufacture and use continue to expand in South-East Asia, North America, South-West Asia, Africa and Europe.[4] Synthetic cannabinoids encompass a wide class of ever-changing compounds, which continue to be found in drug markets across the globe.[5, 6, 7]

Markets for other synthetic drugs are concentrated regionally, including synthetic opioids such as fentanyl in North America and tramadol in North and West Africa and parts of Central Asia.[8] In Eastern Europe and Central Asia, a multitude of synthetic drugs (including internationally controlled drugs and NPS that are not subject to control) have reshaped a drug market once dominated by heroin.[9] Amphetamine in the form of "captagon" is the drug of main concern in the Near and Middle East.[10] Meanwhile, drug markets in South America have witnessed the growing distribution of synthetic drugs, including ketamine and other NPS stimulants and hallucinogens.[11]

Profit-maximizing criminals

In general, the illicit trade in drugs operates much like that in other commodities, with supply dominated by profit-driven individuals and organizations. However, one critical difference is that the activities involved in the drug trade are prohibited and subject to criminal penalties. Drug suppliers face not only standard business risks (e.g. lost investments and inventory), but also risks that stem from the nature of the illegal activity (e.g. risk of arrest and prosecution and risk of violence). They compensate for these risks by increasing markups at each transaction level, ultimately leading to substantially higher prices than if the manufacture of the commodities were legal.[12] From an operational and financial standpoint, trafficking organizations, like other businesses, seek to reduce operating costs and are therefore motivated by finding means of reducing risk or improving production efficiency. If successful, that cost saving, coupled with competitive market pressures, can translate over time into reductions in the price of drugs sold at the retail level. Declining retail prices are associated with increasing quantities consumed, as existing users consume more and new initiates enter the market, expanding the overall pool of consumers.[13, 14]

Compared with plant-based drugs, some synthetic drugs offer greater means of reducing the risks and operational costs faced by criminal actors. Manufacture involves chemicals that, for some synthetic drugs, are readily available or substitutable, and improved synthesis methods can reduce the scale or nature of manufacture, boost yields or lead to the development of new compounds that are more potent than traditional drugs or can escape existing controls and detection capabilities. Additionally, suppliers can benefit by processing or distributing synthetic drugs as retail formulations, e.g. tablets, which may be appealing to new users or those averse to injection.[15, 16]

The manufacture of synthetic drugs can offer two other important advantages for suppliers: timeliness and geographical flexibility. The large-scale production of most plant-based drugs requires so much space that it cannot easily be hidden, and can therefore only be pursued in places where State control is compromised or severely limited. In contrast, synthesizing illegal drugs usually requires little space, and so can be done almost anywhere. Furthermore, crops take time to grow – particularly coca, which comes from a bush that can take several years to mature to peak productivity. Illicit crops can be destroyed by eradication or natural factors, such as drought or blight, resulting in substantial product loss in the course of a season. Large quantities of plant-based drugs seized through interdiction may represent considerable investment losses in the form of the time and labour involved in producing, for example, cocaine or heroin. Conversely, synthesizing drugs usually takes hours or days, so sudden unexpected shortages can be made up for comparatively quickly.

The advantages offered by synthetic drugs have not gone unnoticed by criminal suppliers. When fentanyl and several of its analogues first emerged on heroin markets in parts of the United States as early as 1979, some posited that suppliers were exploring cheaper "designer" drugs that could be made from readily available inputs and circumvent drug laws.[17] However, the supply of synthetic drugs has, until more recently, been constrained by knowledge of chemical synthesis being limited to a handful of trained chemists, restricted access to precursor chemicals or related equipment and connections to existing distribution networks to get products to market. Many of those barriers have been drastically reduced in recent decades.

Defining drugs of natural and synthetic origin

Organic or naturally derived

- Occur naturally, often in plants (but also in fungi and animals)
- Alkaloid concentrations generally limited by rudimentary extraction/refinement procedures
- May be altered by humans to generate new (semi-synthetic) compounds of greater potency
- Discovery of new compounds occurs in nature and is slow

Synthetic

- Manufactured artificially by humans using chemicals (although some can be made from plant-based inputs)
- Producers can manufacture products of higher purity given improvements to synthesis and refinement processes
- Potency can vary but is often much higher than in naturally occurring alternatives
- New compounds are discovered rapidly in the laboratory or on the computer

Increasing availability of inexpensive inputs needed for synthetic drug manufacture

The global pharmaceutical and chemical sectors have developed very rapidly in the last four decades, in particular in Asia,[18, 19] where industry growth since the end of the twentieth century has resulted in the proliferation of firms and an increase in the number of individuals with the requisite knowledge of chemical synthesis and pharmacology.[20, 21] WHO estimates that China is the world's largest single producer of active pharmaceutical ingredients by volume, manufacturing over 2,000 products and comprising a quarter of global output, with annual production close to 2 million tons.[22] Industry analysis indicates that the share of production of active pharmaceutical ingredients by India is slightly smaller.[23] The extent of these sectors and their rapid growth makes it challenging for regulators to ensure that manufacturers and vendors abide by handling restrictions and other regulations aimed at limiting the diversion of psychoactive substances and related precursor chemicals.[24, 25, 26, 27]

Limited oversight of large industries or the absence of specific regulations covering the advertising and distribution of precursors increases the accessibility of a wide range of inputs needed to manufacture drugs.[28, 29] The manufacture and sale of basic chemicals, sometimes called pre-precursors, are difficult to control given the variety of legitimate uses of such chemicals. Additionally, some firms manufacture "designer" or masked precursors that are intended to fall outside of control or trade restrictions.[30] Many of those chemicals are inexpensive. Prior analysis by UNODC has shown that the total value of all legal sales of controlled precursors and other chemicals needed in the manufacture of drugs is very small, at $9 billion globally in 2012.[31] The prices of some non-controlled precursor chemicals advertised by vendors in Asia are extremely low, and orders can be placed online and fulfilled by commercial shipment or post.[32]

The illegal manufacture of synthetic drugs is also facilitated by access to other equipment needed to manufacture substances at an industrial scale (e.g. from bespoke commercial-grade reaction vessels to off-the-shelf glassware and commercial-grade automated tableting machines).[33] Although international conventions call on Governments to adopt appropriate measures to prevent the diversion of materials and equipment to facilitate illegal drug manufacture, few countries have put in place effective regulations on the sale, transfer or possession of tableting machines or other similar apparatus.[34] Criminals have been found to use such equipment, sometimes finding vendors on the Internet, to illegally manufacture tablets containing synthetic drugs such as ATS, unapproved benzodiazepines or fentanyl.[35, 36, 37, 38]

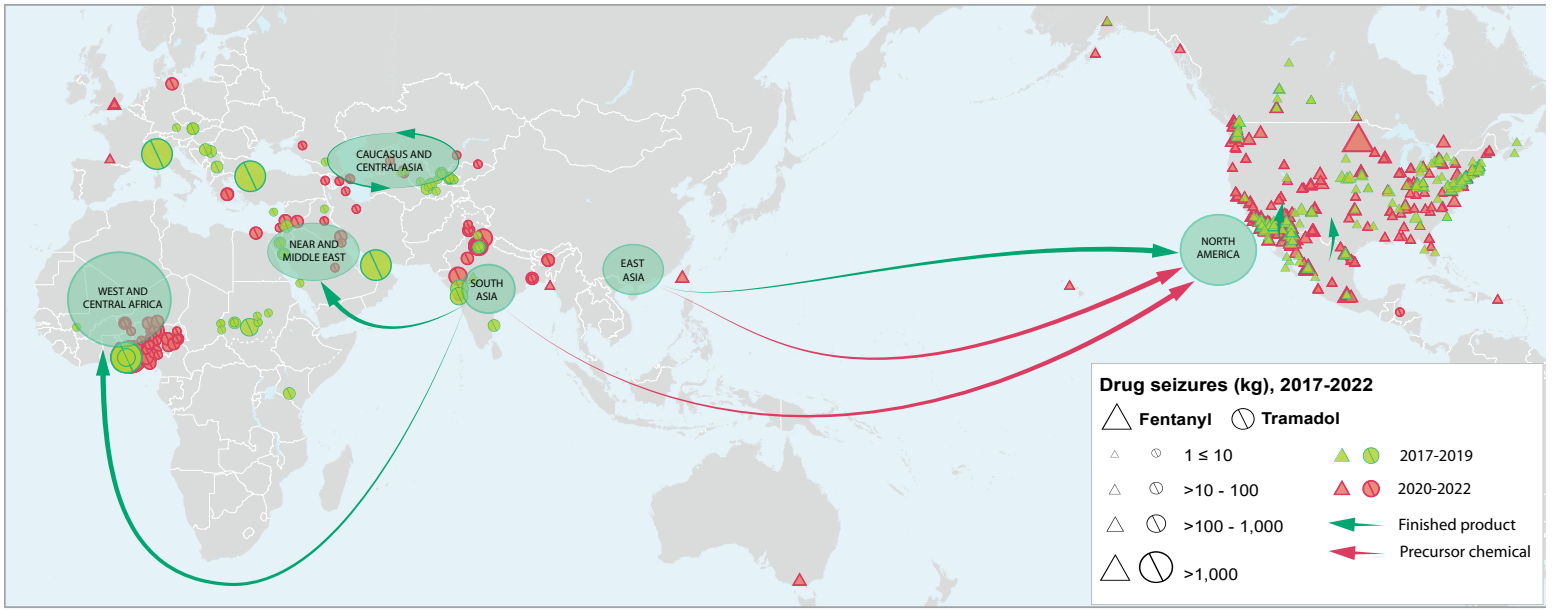
Analysis of significant seizures of fentanyl and tramadol shows that both South and East Asia are sources for finished pharmaceutical drugs destined for the illicit market as well as the precursors needed in the manufacture of finished drugs.

Improvement of manufacturing techniques

Coupled with increased access to chemicals and related equipment, the movement of goods and people and the expansion of Internet-based communications and encryption technologies have provided new means by which criminal organizations and drug suppliers can trade and exchange information and trade with end users.[39] This has facilitated the trade in drugs and chemicals, especially newer or "designer" compounds that may not arouse the suspicions of customs authorities or other law enforcement agencies.[40, 41] Criminal organizations are reportedly using online platforms on the open web to identify vendors of precursor chemicals or suppliers of other equipment needed to produce or process synthetic drugs.[42, 43] This is not the case for most plant-based drugs, apart from cannabis. Poppy and coca cultivators largely sell or trade their harvests directly to criminal groups.

Likewise, the ability to make use of findings from patents and medical literature on new synthetic drug discoveries, which are accessible online, allows clandestine chemists to consider and manufacture new drugs that were researched as potential medications but later shelved due to undesirable effects or abuse potential. This appears to be the case with several synthetic cannabinoids developed in the 1990s and

MAP 1 Significant individual Fentanyl and Tramadol seizures over 1 kg in weight, 2017-2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Source: UNODC Drugs Monitoring Platform.

Note: Member States have reported higher quantities of tramadol seized than is suggested by the map. On the basis of recent annual report questionnaire submissions, there appears to be a route for tramadol from countries in the Sahel region to North Africa and the Middle East.

synthetic opioids developed in the 1970s, which later emerged on illegal drug markets or in brick-and-mortar stores selling NPS.[44, 45]

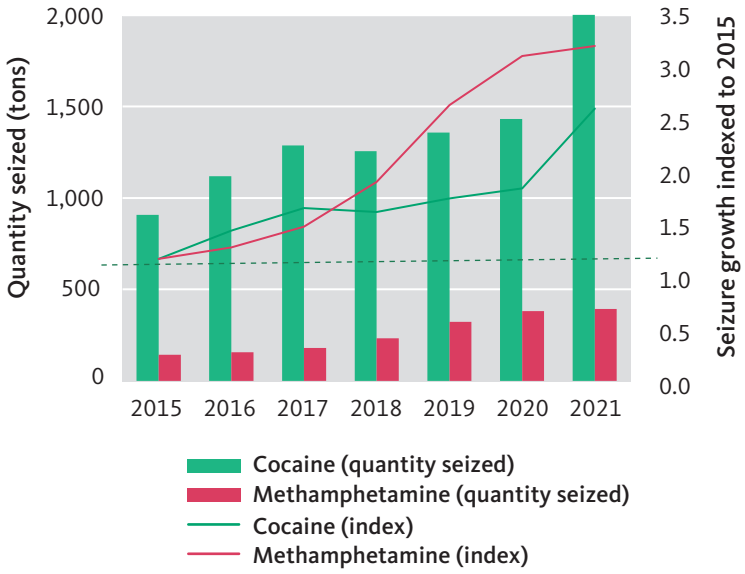
The Internet-based sharing of information related to synthesis and new drug discoveries also provides know-how for the synthetic manufacture of various drugs using plant-based inputs. The increasing availability of novel, semi-synthetic cannabis-derived compounds, such as hexahydrocannabinol (HHC), that serve to circumvent national and international controls may be related to the publication and promotion of simple synthesis routes that utilize CBD found in hemp as a starting material. In addition to synthesis routes found in peer-reviewed literature, simple Internet searches return easy step-by-step instructions on Internet forums and in video tutorials on how to extract and convert the primary inputs to finished psychoactive products.[46, 47]

Alternative chemicals that are not monitored or are less dangerous can facilitate new means of manufacture. For example, a review of the literature on the continuous development of synthesis routes for fentanyl has shown that those involved in the illegal manufacture of the drug are learning from published research and patents.[48] Enhanced synthesis routes for synthetic drugs offer shorter or simpler methods of manufacture for criminals who are not classically trained in chemistry. The analysis of fentanyl seizures has shown, for example, that in Mexico alternative synthesis routes have been employed that are sometimes operationally easier or utilize non-controlled chemicals.[49] Advances in the illegal manufacture of methamphetamine from P-2-P using tartaric acid refinement to boost potency, a method that has been used in Mexico since 2009, were reported in Europe for the first time in 2019.[50] Changes in the methods used to illegally manufacture methamphetamine might also be occurring in South-East Asia, with the use of

P-2-P, which is increasingly being seized, or of tartaric acid in conjunction with other chemicals to yield ephedrine.[51, 52] Afghanistan has recently become a reported source of methamphetamine manufactured using a variety of potential precursor inputs, including *Ephedra* and diverted cold medication; however, several recent large seizures of formic acid, totalling more than 5,800 litres, suggest an evolution in illegal manufacture towards smuggled industrial-grade precursors.[53, 54]

While global seizures of both methamphetamine and cocaine have increased in recent years, the increase in methamphetamine seizures has been much larger, indicating the scalability and diffusion of the synthetic drug's manufacture. Global cocaine seizures roughly doubled between 2015 and 2021, while methamphetamine seizures almost tripled over the same period. Although other factors are likely to be at play in relation to trends in seizures – better interdiction efforts, expanding markets, etc. – the production of most plant-based drugs cannot readily expand as rapidly or widely given that harvesting and processing take time and are sometimes limited to certain geographical locations.

FIG. 1 Global growth of methamphetamine and cocaine seizures, 2015–2021



Source: UNODC, responses to the annual report questionnaire.

Pharmacology and demand-related factors

The pharmacology of synthetic drugs can offer advantages to criminal suppliers and might be attractive to some people who use drugs. Several synthetic drugs are substantially more potent than the plant-based products they mimic. This is especially true of fentanyl and heroin. Fentanyl is perhaps 25 to 50 times more potent than heroin.[55] This translates into reduced legal risk and, therefore, costs, as traffickers can more easily conceal smaller quantities of pure fentanyl in place of larger volumes of heroin. It has been estimated that as little as a few tons of pure fentanyl would be needed to satisfy the annual consumption of illegally sourced opioids in the United States, in contrast to about 50 metric tons of heroin.[56] Smaller quantities can reduce risks to smugglers; however, high-purity, high-potency synthetic drugs are sometimes sent through legal channels. For example, prior to 2019, law enforcement in the United States frequently reported high-purity seizures of minute amounts, sometimes as small as a single gram, of fentanyl in the international postal and courier systems.[57]

Fentanyl's high potency relative to heroin means that smuggling even small quantities of low purity through a variety of means is sufficient to meet demand. The advantages of a higher-potency product suggest that trafficking organizations can spread the risk of interdiction over a large number of single pedestrians or vehicles. This could make many synthetic drugs resilient to interdiction, translating into reduced retail prices. As evidence of this, the purity-adjusted low-level wholesale price of illegally manufactured fentanyl powder in the United States fell by more than 50 per cent between 2016 and 2021.[58]

Similarly, methamphetamine has a longer duration of action than cocaine.[59] This can translate into less frequent redosing, which could be attractive to some buyers. There are other pharmacological aspects of methamphetamine that make it appealing to some. Unlike cocaine, which merely blocks dopamine reuptake, methamphetamine increases dopamine release while blocking its reuptake, thus providing a stronger stimulant effect.[60]

More productive sources of methamphetamine manufacture, coupled with the drug's greater potency and lower cost per dose, as reported in Western and Central Europe, South-East Asia and North America, signal an expansion of the prevalence of the substance.[61, 62, 63] In Western and Central Europe, where amphetamine has traditionally been more common, methamphetamine supply is increasing according to early warning and drug services monitoring systems.[64]

The market dynamics of single drugs are determined by a combination of supply and demand factors. Users – especially price-sensitive heavy users – typically seek purer or cheaper drugs.[65, 66, 67] Novice users may be less reluctant to try cheap drugs that appear in tablet form, especially if they appear to have been diverted from the pharmaceutical system and do not need to be smoked, snorted or injected.[68] Synthetic drugs can be manufactured and distributed at lower costs per dose[69, 70] and formulated in ways that satisfy existing user behaviours and preferences, such as the practice of taking tablets.

Manufacturers of synthetic drugs can easily adjust combinations to respond to supply or demand dynamics. Analysis of tablet seizures in the United States indicates that some drugs, including drugs made to look like diverted medicines, contain illegally manufactured fentanyl instead of pharmaceutical drugs.[71] In Afghanistan, tablets sold as MDMA often contain methamphetamine.[72] In other instances in the United States, tablets sold as MDMA or diverted pharmaceutical stimulants, such as Adderall, have reportedly contained methamphetamine.[73] Tablets containing amphetamine are often sold as "captagon" of pharmaceutical origin in the Near and Middle East.[74]

While drugs sold on illegal markets often contain other adulterants or diluents, suppliers had a narrower range of choices in earlier years. Long-term analysis of impurities in heroin and cocaine sold in Europe and North America shows increasing variety in additives. Previously, additives were generally limited to caffeine, procaine or sugars; sometimes, other tranquillizers were added, but mostly in the form of approved benzodiazepines or other barbiturates.[75, 76] In contrast, dealers today are mixing increasingly varied drug cocktails in order to offer various qualitative and psychoactive effects, often concealing the risks to buyers, with severe health-related consequences. In some opioid markets in North America, an increasing share of drug seizures contain mixtures of fentanyl with unapproved benzodiazepines, xylazine or veterinary tranquillizers.[77, 78]

Similarly, pharmacological factors, such as duration and mechanism of action, might be more variable for synthetic drugs, and appeal to different demand niches. Several synthetic ATS, such as MDMA or MDA, can produce varying psychoactive effects, unlike many plant-based drugs.[79, 80] The ease with which synthetic drugs can be rapidly modified to generate new psychoactive effects far outpaces the discovery of new naturally occurring drugs. For example, the synthetic cathinone mephedrone, which quickly gained entry to and prominence on some drug markets in Europe during the late 2000s and early 2010s, was reported by users to be similar but preferable to cocaine.[81, 82, 83]

Synthesis allows suppliers to explore new "research chemicals" that are designed to mimic the effects of existing drugs or to sell cheaper alternatives to unsuspecting buyers.[84] Such buyers include those looking for wholly new drug-induced experiences unlike those provided by typical drugs on offer (e.g. psychonauts), those on certain dance or party scenes seeking to enhance their lifestyles (e.g. persons engaging in chemsex), or those who want a drug-induced experience but wish to avoid detection (e.g. individuals subject to drug screening).[85, 86] Of the hundreds of NPS currently monitored by national authorities and international bodies, only a handful are plant-based.[87]

Different supply and revenue structures for naturally occurring and synthetic drugs

Table 1 and figure 2 summarize the significant differences in the supply of drugs of synthetic versus natural origin. In many respects, synthetic drug manufacture offers structural benefits to criminal groups in the form of shorter supply chains, reduced risk and lower costs associated with risk and production when compared with drugs of natural origin.

TABLE 1 Comparison of drugs of natural and synthetic origin

	Drugs of natural origin	Drugs of synthetic origin
Emergence of new drugs	Rare; would require discovery of new naturally occurring compounds; slow and limited	Chemical development; rapid by comparison and nearly unlimited
Inputs and materials	Crops or other natural inputs that require certain climates or environments; limited State control over growing areas; other related chemicals needed in processing	Precursor chemicals, some of which are controlled, at least in theory. Others can easily be masked or designed to circumvent controls
Scale and scope of production	Large, low-skilled labour supply dedicated to cultivating and harvesting large areas of illicit crops; geographically fixed production centres; extraction and refinement of alkaloids in rudimentary clandestine labs	Only requires a few individuals with knowledge of chemistry or means of carrying out chemical reactions in concealed and small locations; production can be mobile or easily relocated and scaled up or down as needed
Production time	Months. Some illicit crops are harvested only a few times a year, while some have staggered harvests; some plants may take years to reach maturity	Hours or days for reactions and processing
End products	Extracted/isolated and refined alkaloids (cocaine, morphine) or processed plant matter (cannabis, khat, kratom)	A wide array of psychoactive compounds can be produced using a range of precursor inputs
Trafficking	Often involves larger quantities of primary inputs and finished products transported over vast distances or through remote areas, sometimes crossing several borders, which enables the authorities to detect and seize such drugs	Can be manufactured close to end markets; small quantities can be posted to end buyers
Forms of administration	Most often injected, snorted or smoked, sometimes ingested	Can be smoked, snorted or injected, but a considerable share is tableted
Pharmacology	Largely understood	Not always known or predictable, even if the chemical structure is known; some new compounds may appeal to different user groups

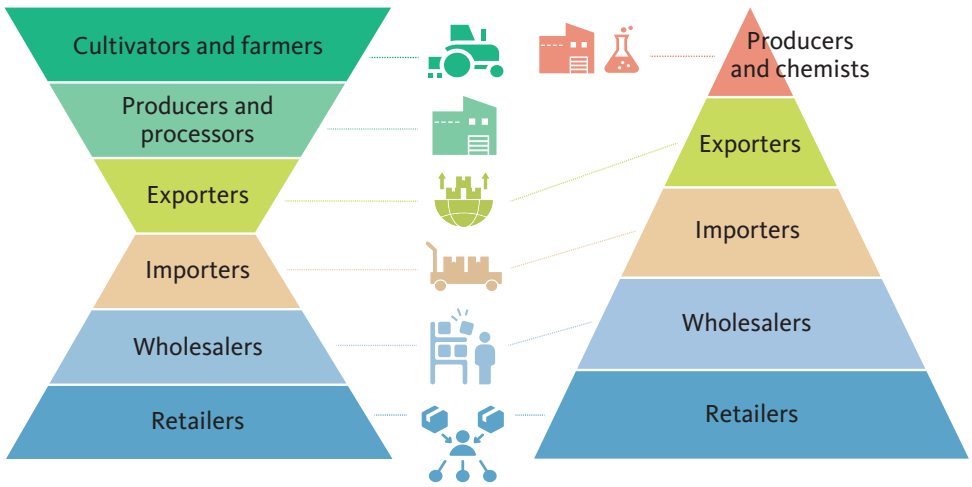
Synthetic drug manufacture represents a technological advancement, possibly disrupting markets and traditional supply chains.[88] The supply structure for traditional plant-based drugs can be thought of as having an hour-glass shape, with many cultivators and farmers at the top.[89, 90] The labour supply for each subsequent layer gets smaller until it reaches exporters and importers, as drugs make their way, often across international borders, from areas where they are produced to areas where they are consumed. After that point, the number of people involved increases, up to the many retailers who supply products to users. In contrast, synthetic drug manufacture removes much of the top half of the supply chain.

The manufacture of synthetic drugs can be scaled more easily; that is, the marginal return for an additional chemist is much greater than for an additional farmer. This has been the case with several synthetic drugs, such as methamphetamine and ketamine, whose manufacture has moved from small, "cottage industry" laboratories to larger and more professional industrial-scale laboratories in North America, Asia and Europe.[91, 92, 93] From there onward, the number of individuals involved in each level of the supply chain gets larger with each subsequent layer.

In economic terms, the synthesis of drugs is a capital-intensive means of production compared with labour-intensive plant-based drugs, although even for synthetic drugs, the capital involved can be small. Simply put, chemical synthesis obviates the need for tens of thousands of hectares of arable land and a large supply of unskilled labour. The illicit cultivation of plant-based drugs generally relies on poor farmers and their families living in remote locations.[94] The nature of this means of production incurs additional costs for criminal groups. Many plant-based drugs are cultivated in areas with weak rule of law and governance and their production often requires non-State actors, who may also be violent, to control the production and transport of key inputs such as coca or poppy.

In contrast, synthesis offers suppliers several advantages. Clandestine synthesis can occur in facilities that are easier to conceal from authorities, including single residences, warehouses or laboratories in remote areas, ports or cities. The large-scale manufacturing

FIG. 2 **Labour supply for drugs of natural and synthetic origin**



Sources: Kilmer, B. and Reuter, P., 2009. DOPED. *Foreign Policy*, (175), p.34.; and Reuter, P., Pardo, B. and Taylor, J., 2021, "Imagining a fentanyl future: Some consequences of synthetic opioids replacing heroin", *International Journal of Drug Policy*, *94*, p.103086.

Note: The figure is an abstract representation of the relative sizes of each segment of the labour supply for drugs of natural and synthetic origin. It is not drawn to scale.

of synthetic drugs has endured in areas with weak rule of law, but also happens in countries with strong rule of law; MDMA, amphetamine and methamphetamine, for example, are manufactured in Europe, as is a small share of cathinones, mostly to meet local or regional demand.[95, 96] Authorities in Europe have noted the increasing manufacture of synthetic drugs within the continent and their trafficking to other regions.[97] Compared with the production of plant-based drugs, which prioritizes control over territory and rural populations, the manufacture of synthetic drugs can be easily relocated, sometimes closer to end markets or to major commercial hubs with access to imported chemicals or export routes, and chemists or cooks can be rotated from one laboratory to another, further reducing the risk of detection.

Shorter supply chains for synthetic drugs can reduce or eliminate some risks, especially if synthesis laboratories are relocated within a country in order to avoid the crossing of borders. In recent years, Canadian and United States authorities have detected and dismantled fentanyl synthesis laboratories, sometimes located not far from end markets.[98, 99] Similarly, since the early 2010s, the illegal manufacture of "captagon" has shifted from East and South-Eastern Europe to end markets in the Middle East.[100] European authorities have recently seized increasing amounts of chemical precursors and detected clandestine laboratories for several synthetic drugs, such as cathinones, *gamma*-butyrolactone (GBL), *gamma*-hydroxybutyric acid (GHB) and ketamine, suggesting a shift in production to meet demand on the continent.[101] Prior to 2020, many of these synthetic drugs came from Asia.[102]

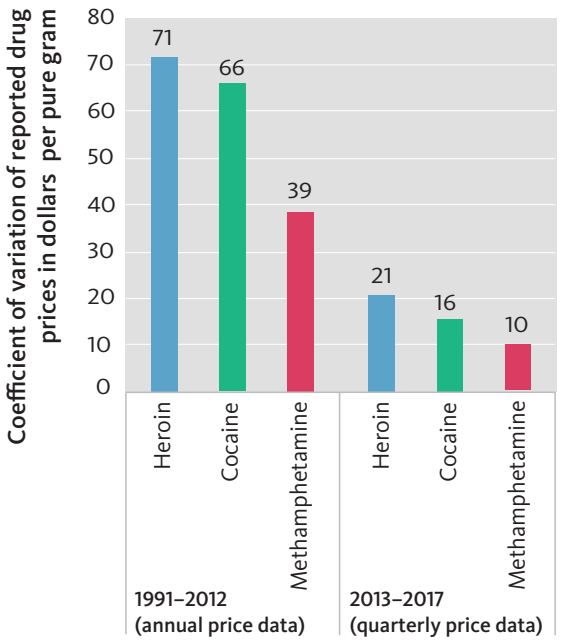
In other instances, criminal producers have expanded operations to other emerging markets or countries that have limited capacity to detect drugs or screen imports for a growing range of precursors. For example, the illegal manufacture of methamphetamine has recently been reported in countries in Africa, including South Africa and Nigeria,[103, 104] using precursor inputs from Asia[105] and intended for regional and global markets. In recent years, several large-scale ketamine laboratories using industrial-grade equipment and employing teams of foreign cooks have been dismantled in Cambodia.[106] Countries in Central Asia have also recently reported marked increases in the detection of domestic laboratories used for the manufacture of synthetic drugs, which was not previously the case. Authorities in Kazakhstan reported a 50 per cent increase in laboratory detections between 2020 and 2021, detecting, in 2021, 36 laboratories manufacturing mephedrone and *alpha*-PVP using increasingly sophisticated techniques and equipment.[107]

The synthesis of drugs can be honed to better guarantee product consistency and prices. The productivity of coca or poppy crops may vary from one harvest to another.[108] Economic analyses of illegal drug markets reveal that commodity prices for plant-based drugs suffer from chaotic or periodic fluctuations given the agricultural nature of inputs and because distributors are unlikely to hold much inventory in order to avoid risk.[109] Synthetic drugs have lower price volatility as they are guaranteed to have more consistent purity, and because synthesis takes a short amount of time, producers are more likely to be able to respond to demand signals and reduce the risk associated with holding inventory. In fact, data from the United States show that the price volatility of cocaine and heroin was much higher than that of methamphetamine.[110]

Furthermore, the processing of many drugs for retail markets requires diluting and repackaging the product, often near the point of retail sale.[111, 112] Generally, wholesale distributors take illegal imports and dilute them further, contributing to price volatility in retail markets as buyers are unable to determine the quality of the product until after consumption.[113] The retail distribution of powder imported in bulk allows local retailers to compete through product differentiation and branding in order to attract customers.[114] Dilution, repackaging and retail-level branding are common aspects of drug markets, especially for products sold in powder form.

Synthetic drugs can appear in tablet form, which has not generally been the case for plant-based drugs. From the supplier's standpoint, tableting can be automated and can ensure greater product consistency. Large-scale commercial tableting machines can run uninterrupted and require only a few skilled technicians to produce tens or hundreds of thousands of tablets a day.[115, 116] While dosing in tablets may be inconsistent across different suppliers,[117] large-scale manufacture

FIG. 3 **Price volatility of heroin, cocaine and methamphetamine in the United States, 1991–2017**



Source: UNODC calculations based on ONDCP, National Drug Control Strategy, Data Supplement 2016 and DEA, 2019 National Drug Threat Assessment (December 2019).

Note: The coefficient of variation is defined as the standard deviation of a time series divided by its mean and multiplied by 100.

may reduce heterogeneity in dosing within a single batch.[118] Furthermore, such processing for retail can occur at the point of manufacture, where risks are lower than immediately before final sale, given that the product has not yet been traded or trafficked. Moreover, the industrial- or large-scale tableting of synthetic drugs allows criminal groups to control branding using stamps, dies and colours, adding value to the product and possibly increasing export revenues by consolidating several layers of the supply chain.

Drug synthesis and tableting can shift revenue retention along the supply chain. Most of the price markups and revenue generated by the supply of illegal drugs occurs at the stages closest to retail, compensating for the risks incurred along the supply route.[119] This is true for drugs of synthetic origin, but with traditional plant-based drugs, many (transnational) trafficking groups tend to focus on one segment of the supply chain and do not control the entire chain from seed to sale. For example, a consignment of cocaine or heroin is subject to multiple trades as the product is transported from the mountains of Colombia or Afghanistan to retail street markets in destination countries.[120]

Outlook

From a criminal perspective, barriers to entry are lower for the supply of synthetic drugs than for plant-based drugs, and their production capacity ceilings much higher. Going forward, supply reduction efforts may be increasingly challenging as criminal suppliers employ new means of manufacture that are easier to conceal, use chemicals that fall outside of existing controls, or procure inputs from a global and expanding chemical and pharmaceutical sector. Additionally, traffickers stand to benefit from the shorter production times and higher potency offered by some synthetic drugs that reduce or overcome risks.

While synthetic drug manufacture provides a means of reducing production costs, declining revenues in the form of reduced retail and wholesale prices might affect illegal business operations. The way in which criminal groups will respond to declining revenues is unknown, but it may encourage adaptation in the form of new products aimed at new markets, or diversification into non-drug-related types of criminal enterprise. Expansion along the supply chain (either upward towards synthesis, or downward towards retail through tableting) is a possible response to the shifting nature of production costs, associated supply risks and revenue generated.

Beyond the manufacturing-related benefits enjoyed by criminal producers, new drug discoveries involving synthetic substances far outpace the emergence of new plant-based drugs. Chemists can design new compounds that could become quite popular for certain user groups based on their pharmacology. Many new synthetic drugs fall outside the scope of existing controls. While most new compounds fail to gain market share, they can sometimes cause harm during their

introduction to drug markets, especially if their potency is much greater than the drugs they replace.

In that regard, consumers face several challenges. In some instances, synthetic drugs are so new that their pharmacology and the harm that they cause are not entirely understood or documented. Likewise, there may be fewer available treatments, therapies or antagonists for some new drugs. The growing availability of a wider range of psychoactive substances allows suppliers to create ever-more dangerous cocktails, as evidenced by the growing number of tranquillizers, including unapproved benzodiazepines, mixed with other drugs that are showing up in the drug supply.

Although drugs of synthetic origin create certain economic and cost-cutting benefits for profit-maximizing criminals, they are unlikely to displace all plant-based drugs on every occasion and in every place. User tastes and preferences will continue to shape markets. Sociocultural contexts are important drivers, and some markets or individuals may opt for traditional plant-based drugs, such as cannabis or cocaine, because they appear to be more natural (i.e. they are considered to be less harmful), produce the desired psychoactive effect or are regarded more highly than their synthetic counterparts. In some instances, plant-based drugs such as cocaine[121] are for now, still more cost-effective than the synthesis of some key compounds. For these reasons, criminal groups are likely to continue to supply certain plant-based drugs.

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RECENT DEVELOPMENTS INVOLVING PSYCHEDELICS

RECENT DEVELOPMENTS INVOLVING PSYCHEDELICS

Renewed interest in psychedelics

- In recent years, there has been a renewed interest in the therapeutic use of some psychedelic substances, in psychedelics-related tourism and in self-therapy with psychedelics, linked with experiences of spiritual awakening and mindfulness
- There have also been policy developments in some jurisdictions allowing for the use of psychedelics for medical and non-medical (or quasi-medical) purposes
- In addition, there is a growing commercial interest in capitalizing on the psychedelics-related developments in the different spheres
- Overall, the pace of these developments is unprecedented in the area of drug policy and some developments may outpace the scientific evidence on therapeutic use of psychedelics
- It is in this context that the present section discusses recent developments surrounding the therapeutic, spiritual and non-medical use of a number of substances grouped under the term "psychedelics" as covered in the current debate and literature, although some of them may not be considered to be classic psychedelics
- The psychedelics being discussed in the current debate on their use include:
  - Classic hallucinogens or psychedelics, such as lysergic acid diethylamide (LSD), psilocybin, dimethyltryptamine (DMT) and mescaline
  - Entactogens, such as 3,4-methylenedioxymethamphetamine (MDMA)
  - Dissociative anaesthetics, such as phencyclidine (PCP) and ketamine

While there are hundreds of more substances classified as hallucinogenic or psychedelic, including NPS with hallucinogenic effects, this section does not cover the issues around non-medical use of those substances

The therapeutic use of psychedelic substances such as LSD and psilocybin has been researched by psychologists and psychiatrists for a range of psychiatric disorders, including substance use disorders.[1, 2, 3] Most of the early research around the therapeutic use of psychedelics was based on case studies or clinical trials that did not meet the contemporary standards of randomized clinical trials, e.g. with adequate controls or follow-up of the study participants.[4, 5, 6] With the signing of the Convention on Psychotropic Substances in 1971, most of the known psychedelic substances at the time came under international control.[7] However, around the same time, newer medications for the treatment of depression, PTSD and other mental health disorders appeared on the market. The main group of those medications was known as selective serotonin reuptake inhibitors (SSRIs), which had proven efficacy and safety in the treatment of complex mental health disorders.[8] All of these developments eventually resulted in the halting of further scientific research around the potential medical use of psychedelics.[9, 10] However, since the turn of the century, there has been renewed interest in the potential therapeutic use of different psychedelic substances for the treatment of a range of mental health disorders, including depression, anxiety, PTSD, substance use disorders and other addictive and compulsive behaviours,[11, 12, 13, 14] particularly for patients who do not benefit from, or respond to, conventional treatment interventions.[15] In parallel, the non-medical use of some psychedelic substances, for example MDMA and ketamine, as well as classic psychedelics, in recreational settings has also evolved to the point that they may represent a substantial share of the non-medical drug use market in some countries.[16]

Currently, most of the psychedelics substances that are discussed in the present section, such as LSD, mescaline, psilocybin and MDMA, are in Schedule 1 of the 1971 Convention,[17] meaning that their use is prohibited "except for scientific and very limited medical purposes by duly authorized persons, in medical or scientific

establishments which are directly under the control of their Governments or specifically approved by them".[18] There are psychedelics such as ketamine that are not under international control, but they have been subject to national control in some countries. The Convention grants exceptions to some of the control provisions for plants that contain psychedelics and that are "traditionally used by certain small, clearly determined groups in magical or religious rites".[19] To apply for this exception, a State must, at the time of signature, ratification or accession, make reservations concerning these plants and their traditional use.[20, 21] It is only the active compounds, such as mescaline and psilocybin, that are placed under international control, and not the traditional plants containing psychedelics themselves (e.g. ayahuasca, iboga and peyote).[22, 23, 24]

FIG. 4WHAT ARE PSYCHEDELICS?

Psychedelics are a diverse group of substances that induce distorted states of consciousness, perception, thinking and feeling, accompanied by different degrees of auditory or visual hallucinations.[25]

In medical research, three broad groups of psychedelics are currently being investigated on the basis of their mechanism of action and effects: classic psychedelics, MDMA (entactogens) and dissociative anaesthetics. The classic psychedelics include LSD, psilocybin, dimethyltryptamine (DMT) and mescaline.[26, 27] While the mechanism of action of most classic psychedelics is complex and not fully understood, in general they act as agonists (full or partial) of the serotonin 5-HT receptors, increasing the availability of serotonin in the body.[28] Many classic psychedelics are naturally occurring, but can also be synthesized from plant-derived materials. For instance, mescaline is derived from the peyote cactus and psilocybin from numerous species of mushrooms. DMT and many of its analogues can be synthesized, but DMT is found in numerous plants indigenous to South America. The plant-based psychedelic brew ayahuasca, for example, contains DMT, as well as monoamine oxidase inhibitors (MAOIs), which block the breakdown of DMT in the liver and thereby facilitate its hallucinogenic effect.[29] LSD, on the other hand, is a synthetic compound that was first synthesized in 1938.[30] Many of the plant- and fungi-based psychedelics have been used traditionally for millennia in spiritual or folk healing rituals in many regions, but they have been better documented in the Americas.[31]

The second group of psychedelics, known as entactogens, includes MDMA, which, in addition to producing effects that are similar to those of amphetamines, also acts as a serotonin-releasing agent and has effects that may be similar in some ways but are substantially distinct in others, from the classic psychedelics.[32, 33] For example, unlike psychedelics, MDMA enhances the release of oxytocin, which is considered likely to be responsible for its subjective effects.[34]

The third group of substances, which are not considered classic psychedelics and are known as dissociative anaesthetics, includes phencyclidine (PCP) and ketamine. Although currently there is no clinical use of PCP, it was introduced as an anaesthetic agent in 1950; it was, however, discontinued due to therapeutic safety concerns. Ketamine was introduced as a safer alternative to PCP and is widely used as an anaesthetic for medical procedures, particularly in paediatric and veterinary medicine.[35] Both PCP and ketamine act as antagonists to the NMDA receptor complex and in part contribute to the cognitive or dissociative changes they produce.[36]

Psychedelics, in general, rank lower in the degree of "abuse liability and dependence potential"[37] than substances such as opioids, psychostimulants, cannabis or alcohol.[38] However, a dependence syndrome has been identified in a small percentage of people who use psychedelics.[39] Except for a few substances, such as DMT, tolerance[40, 41] to both the physical and psychological effects of psychedelics develops rapidly. The psychoactive effects do not occur after three to four days of repeated use and may recur only after several days of abstinence.[42, 43] Repeated use of PCP can lead to tolerance and the development of a substance use disorder that includes a withdrawal syndrome when use of the substance is stopped.[44]

What does scientific research currently say about the effect of medical and non-medical use of psychedelics?

Medically supervised use

Given the increasing burden of disease attributed to mental health disorders globally,[45] a relatively recent wave of clinical trials, mainly in high-income countries, is presenting early yet promising results on the potential use of psychedelics to treat a range of mental health disorders in combination with conventional psychotherapies.[46] The selected psychedelics are being considered particularly for patients with severe mental health disorders, such as PTSD, or those who are resistant to, or cannot tolerate, the conventional treatment interventions involving pharmaceutical drugs such as selective serotonin reuptake inhibitors or other non-pharmaceutical interventions and psychotherapies.[47] As at February 2023, there were 450 registered clinical studies on the use of psychedelics, conducted mainly in the United States, Canada and Europe,[48] that are looking into the therapeutic effects of psychedelics. Many of these clinical trials involve multidisciplinary teams and different approaches.[49, 50]

Most of the major ongoing clinical trials are either in phase 2 or phase 3 and, therefore, have yet to determine the efficacy and safety[51] of psychedelics, a requirement from regulatory authorities to approve and mainstream psychedelic-assisted therapy. So far, however, the results of early phases of those clinical trials have shown the potential of psychedelics to treat several complex mental health disorders, including substance use disorders, in controlled settings, often producing sustained therapeutic effects.[52, 53, 54, 55, 56, 57, 58]

Moreover, a common element that is emerging from the clinical trials is that positive health outcomes are subject to the administration of the psychedelic substance under strict clinical guidelines in formal settings, including with the direct supervision of a trained professional following appropriate screening and controls, and coupled with conventional psychotherapy sessions.[59]

The combined therapy, that is, psychedelic-assisted psychotherapy, encompasses meticulous preparation involving professionally trained psychiatrists, psychotherapists and other facilitators. The preparations include an intake and medical screening of the patient, one or multiple hours-long supervised psychedelic (administered) sessions that are guided and supervised by trained therapists, and then extensive integration sessions. These sessions are followed by conventional psychotherapies such as cognitive behavioural therapy or motivational enhancement therapy.[60, 61, 62] In short, it is not the substances alone but their combination with the broader sequence of psychotherapy with trained psychiatrists and psychotherapists that ensures the therapeutic benefit. Therefore, while the ongoing research gives hope of new treatments for certain mental health disorders, it also suggests that such medical treatment will require demanding infrastructure and substantial resources, particularly in terms of psychotherapists' time.[63]

Adverse effects arising from non-medically supervised use

The use of psychedelics is not free of risks and may cause a number of acute adverse health effects. Some people who use a psychedelic can experience an acute anxiety or panic reaction in response to the drug's effects – commonly referred to as a "bad trip". Other effects that people may experience after a "trip" with classic psychedelics include flashbacks, which are usually transient and innocuous experiences of the same visual distortions as those experienced during the "trip".[64, 65, 66] Severe adverse reactions to the non-medical and unsupervised use of psychedelics may involve psychiatric or somatic symptoms, especially after chronic use; such adverse reactions depend on the dose and psychedelic substance used, as well as the presence of a pre-existing risk of developing psychosis.[67, 68] Although their occurrence is low, two long-term effects associated with the use of classic hallucinogens include persistent psychosis and hallucinogen persisting perception disorder (HPPD).[69, 70] Furthermore, the unsupervised use of psychedelics in a non-conducive environment can sometimes lead to physical harm to the persons using these substances or those around them.[71, 72]

TABLE 2 Medical and therapeutic use and major clinical trials of psychedelic-assisted psychotherapy, as registered in the National Library of Medicine (United States)

Substance	Status of control or proposal for therapeutic use	Conditions for which clinical trials are proposed or ongoing	Clinical trials completed	Major clinical trials in 2022
Psilocybin	Approved for prescription by psychiatrists in Australia in supervised settings for specific treatment-resistant mental health disorders (e.g. depression) More advanced clinical trials are ongoing for a range of disorders in North America and Europe Several states in the United States have begun approving psychedelic therapies for a range of conditions	• Depression • Bipolar disorder • Anxiety (especially in patients with terminal illness such as cancer) • PTSD • Obsessive-compulsive disorder (OCD) • Eating disorders • Cluster headaches • Migraines • Alzheimer's disease • Parkinson's disease • Post treatment Lyme disease • Treatment of alcohol, tobacco, methamphetamine and opioid use disorders	Multisite phase 2 trials have been completed in the United States and Ireland	Phase 3 clinical trials on treatment-resistant depression with psilocybin-assisted therapy in the United States Phase 2 clinical trials for binge eating disorders in the United States Phase 2 trial for PTSD among veterans in the United States and Canada
DMT and 5-MeO-DMT	DMT research is less advanced and in early stage pre-clinical and clinical trials	• Depression (including major depressive disorder, and among terminally ill patients) • Depression and anxiety in Parkinson's disease • Chronic pain • Substance use disorders (alcohol and cocaine)	Phase 2 clinical trials for treatment-resistant depression and major depressive disorder completed in the Kingdom of the Netherlands and phase 2 trial for major depressive disorder in the United Kingdom Phase 2 trial for major depressive disorder in cancer patients in the United States	Phase 2 trials for treating major depressive disorder with DMT-assisted therapy in the United States
LSD	Early-stage pre-clinical and clinical trials	• Depression • Illness-related anxiety • Cluster headaches • Attention deficit hyperactivity disorder (ADHD)	Phase 2 clinical trials for anxiety disorders and major depressive disorder completed in Switzerland	Phase 2 clinical trial for cluster headaches and phase 2 trial for ADHD in Switzerland
MDMA	Granted "Breakthrough Therapy" designation by the United States Food and Drug Administration (FDA) in 2017 for a development programme for MDMA for the treatment of PTSD	• PTSD • Autism spectrum disorder • Obesity • Mood disorder • Anxiety • PTSD and opioid use disorder, after childbirth • Substance (alcohol) use disorder • Eating disorder	Phase 3 clinical trials for PTSD completed in the United States and phase 2 trials completed in Canada, Israel and Switzerland	Second phase 3 clinical trial to treat PTSD with MDMA in the United States, Canada and Israel
Ketamine	The only substance among these psychedelics that is not under international control is being studied in the United States for a wide range of indications, other than its main use as an anaesthetic First approved ketamine-derived spray licensed for the treatment of treatment-resistant depression in the United States by FDA in 2019 Fast-track designation in the United Kingdom	• Depression (also major depressive disorder) • Bipolar disorder • PTSD • OCD • Obesity • Anxiety • Delirium • Chronic daily headaches • Suicidal ideation • Epilepsy • Substance use disorders (alcohol, cannabis, cocaine, tobacco, opioid) • Gulf war syndrome • Autism spectrum disorder • Acute and chronic pain • Parkinson's disease	Phase 2 clinical trials for treatment-resistant depression completed in multiple sites in Canada and the United States Phase 2 trial for Rett syndrome in the United States Phase 2 trial for OCD in the United States Phase 2 trial for PTSD in the United States Phase 2 clinical trials for alcohol use disorders completed in the United States and the United Kingdom, and opioid and cocaine use disorders in the United States	Phase 3 clinical trial for treating alcohol use disorders with ketamine-assisted psychotherapy in the United Kingdom

Sources: Based on a search of the database of the United States National Library of Medicine, ClinicalTrials.gov (accessed 22 February 2022); Kenneth W. Tupper, Evan Wood, Richard Yensen and Matthew W. Johnson. "Psychedelic Medicine: A Re-Emerging Therapeutic Paradigm". Canadian Medical Association Journal 187, no. 14 (6 October 2015): 1054–59.

Note: The database is maintained by the National Library of Medicine of the National Institutes of Health (NIH). Information on ClinicalTrials.gov is provided and updated by the sponsor or principal investigator of the clinical study. Studies, not only limited to the United States, are generally submitted to the website (that is, registered) when they begin, and the information on the site is updated throughout the study. In some cases, the results of the study are submitted after the study ends.

How are psychedelics currently used?

Medical use

As the phase 2 or 3 clinical trials of psychedelics are still ongoing, psychedelic-assisted psychotherapy is not currently a mainstream treatment for mental health disorders.[73] Nevertheless, in a few countries, such as Australia and the United States, selected psychedelics have been granted preliminary approval for the treatment of selected disorders such as PTSD and depression. The supervised medical use of psychedelics is therefore very limited or relegated to experimental trials at present.

Spiritual or traditional medicinal and wellness programmes and psychedelic tourism

Psychedelics in plants and fungi, many of them growing in the wild, have long been integral to some religious and spiritual practices of Indigenous communities in different parts of the world.[74, 75, 76] Indigenous tribes and communities in North and Latin America and parts of Africa and Asia continue to use psychedelics, and sometimes other psychoactive substances,[77] as part of their rituals. For instance, the Mazatec people in Mexico, the Shipibo people in the Upper Amazon, the Yanomami people in the Amazon and those practising the Bwiti religion in parts of Africa have all reportedly used psychedelics, including peyote, psilocybin mushrooms, ayahuasca and iboga, in traditional spiritual or healing rituals.[78, 79]

In connection with the renewed interest in the therapeutic use of psychedelics, the broader health and wellness market has also created a niche in the Americas and Europe for psychedelic-based spiritual journeys, mindfulness and healing retreats under the guidance of "trained" providers. There is an emerging psychedelic tourism sector, catering to high-end customers, but also tours that offer cheaper options in many locations where the use of psychedelics is permissible either among the Indigenous populations or in other settings.[80, 81, 82, 83] Such programmes, or retreats, typically borrow from traditional Indigenous rituals in an attempt to create spiritual experiences.[84, 85, 86, 87]

Traditional Indigenous medicine is protected by law in a few countries (the constitutions of the Plurinational State of Bolivia[88] and Ecuador,[89] for example, include regulations specific to Indigenous traditional medicine) and is recognized under some multilateral frameworks.[90, 91] Given the various developments related to the therapeutic use of psychedelics, and the use of psychedelics outside the settings of traditional spiritual rites, there are increasing concerns among many Indigenous nations regarding "cultural appropriation of their traditional medicines, a lack of recognition of the sacred cultural positioning of psychedelics within their communities and cultures, the exclusionary practices in research and scale up endeavours and the threat to their intellectual property rights with patents of traditional Indigenous medicines".[92, 93, 94]

Apart from concerns regarding the appropriation of Indigenous traditions, there can be other unintended or adverse consequences arising from the use of psychedelics in touristic retreats. These retreats may not be regulated in terms of their practices, such as screening of the persons participating, in terms of the availability of trained facilitators to administer the psychedelic substance or in terms of the level of dosing. Some psychedelics may not be well tolerated or suited to some individuals, especially those with a pre-existing mental health disorder such as a psychotic disorder or a history of mania.[95] There are also concerns regarding instances of abuse, including sexual abuse by providers or guides at psychedelic retreats, and different groups have called for greater awareness of such circumstances to reduce the risks, and for caution about referrals to retreat centres.[96]

Unsupervised self-therapy

In addition, many studies have documented the experiences of people in the unsupervised use of full doses or microdoses of psychedelics as self-medication to treat mental health disorders such as anxiety, depression or PTSD, or even to manage chronic pain,[97, 98, 99] highlighting varying frequency of use and a range of doses for such purposes. However, the precise dose and concentration of psychedelics required by patients to achieve the therapeutic benefit they are seeking are yet to be established through scientific evidence.[100, 101]

In recent years, social media and Internet discussions have played a vital role in the growing visibility of microdosing practices as a subculture of psychedelic use. Microdosing involves ingesting any of the psychedelics in amounts that are considered below the levels required to produce a hallucinogenic effect,[102] typically less than one tenth of the full dose of a psychedelic substance.[103, 104, 105]

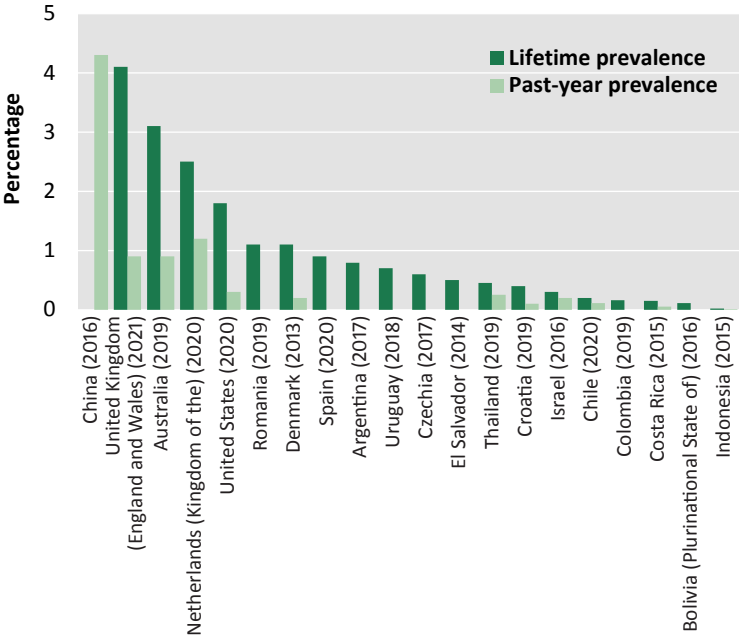
The practice of using repeated minimal doses of psychedelic substances is still under-researched, and there is limited clinical evidence of its effectiveness or safety.[106, 107] However, there are concerns that such practices of self-therapy can result in a "bad trip" or physical harm to the user; furthermore, among vulnerable individuals who have not been screened for pre-existing conditions, the use of such substances may precipitate a mental illness such as psychosis.[108]

Non-medical use of psychedelic substances

The non-medical use of psychedelic substances is not uncommon. "Ecstasy" or MDMA remains a common substance used in recreational and nightlife settings. In 2021, 20.2 million people, or 0.4 per cent of the global adult population, were estimated to have used it in the past year.[109] There are no global estimates of the use of other psychedelic substances, but many countries report their (non-medical) use. The non-medical use of ketamine in recreational settings is also common and reported by many countries in Europe and North America, as well as a continuing concern in South-East Asia, where it is mostly sourced through illicit production.[110]

The use of classic psychedelics, mainly LSD, is also not uncommon and has been reported by many countries in Europe and the Americas.[111] However, it is difficult to ascertain whether the self-reported use of psychedelics in national surveys is part of self-therapy or a pattern of personal spiritual exploration, or purely for recreational purposes.

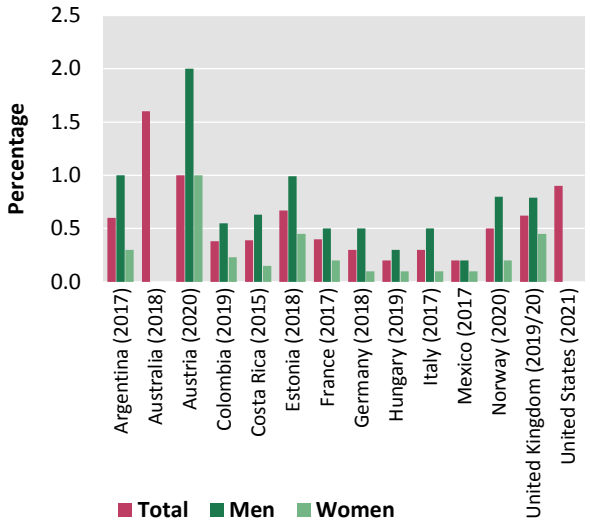
FIG. 5 Use of ketamine, most recent data from population surveys, 2013–2021



Source: UNODC, responses to the annual report questionnaire.

Notes: Prevalence estimates are based on the population aged 15–64 or similar. Data were included provided that the data collection was carried out no later than in the past decade. For more details, see the section on Ketamine in the present booklet.

FIG. 6 Past-year prevalence of classic psychedelics (mainly LSD) use in different countries



Source: UNODC, responses to the annual report questionnaire.

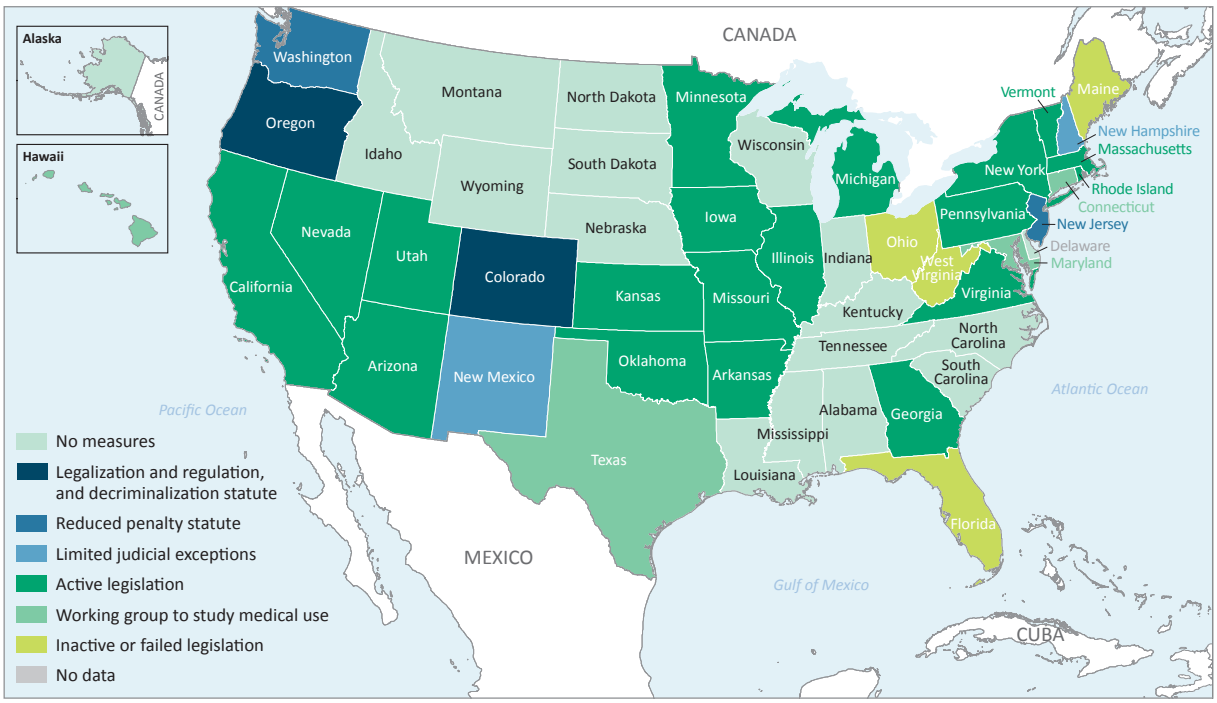
Regulatory developments related to psychedelics

The recent reports of clinical trials of therapies incorporating psychedelics have encouraged different advocacy and commercial interest groups and the public, mainly in high-income countries, to push for fewer restrictions on access to, and the use of, psychedelics, including for personal use as self-therapy or for recreational purposes.[112] There is also a growing commercial interest in capitalizing on these developments, especially with the outcomes of clinical trials; forecasts for 2028 have estimated a market for ketamine-assisted therapy valued at over 1 billion dollars and a market for MDMA-assisted therapy valued at over 2 billion dollars in the United States alone.[113]

Speeding up medical use

At the federal level in the United States the possession and distribution of many psychedelic substances, including those controlled by the 1971 Convention on Psychotropic Substances, are illegal except for research purposes. In the context of a high burden of mental health disorders and suicides including among veterans,[114, 115, 116, 117] and considering preliminary evidence supporting efficacy and safety in treating various conditions, research on medical use of psychedelics has been accelerated with the Food and Drug Administration in 2017 granting the "breakthrough therapy"[118] designation for a development programme for MDMA for the treatment of PTSD[119] as well as for psilocybin to treat depression,[120] and approval of esketamine (the S enantiomer of racemic ketamine) nasal spray for

MAP 1 Policy and regulatory developments related to psychedelics in the United States, 2023



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Psychedelics Legalization and Decriminalization Tracker - Psychedelic Alpha.

Notes: The map shows regulatory developments as at 3 April 2023. At the federal level, the possession of psychedelics is illegal throughout the United States unless authorized to a properly licensed researcher, or for a purpose approved by the federal Food and Drug Administration, regardless of state-level programmes or initiatives purporting to authorize such use.

treatment of treatment-resistant depression in 2019.[121] In Australia, the Therapeutic Goods Administration (TGA) announced in February 2023 that psychiatrists will be permitted to prescribe psychedelic substances to patients for certain conditions - psilocybine for treatment-resistant depression and MDMA for PTSD, from 1 July 2023. Currently, the TGA has not approved specific products containing psilocybin or MDMA; however, the recent amendment will allow only those psychiatrists who have obtained approval by a registered human research ethics committee (HREC) and a specific authorization by the TGA to access and legally supply 'unapproved' medicines containing these substances to patients under their care.[122]

Moving towards depenalization, decriminalization and legalization in some states in the United States

Local jurisdictions in the United States, often responding to advocacy groups and and voters' initiative, have also enacted state-level legal and regulatory changes related to the use of psychedelics, including depenalizing and decriminalizing certain behaviours, reducing penalties or assigning low priorities to enforcement or judicial exceptions for the possession or supply of psychedelics.[123] Oregon and Colorado are two states that have enacted legislation for regulated access to some psychedelics. In November 2020, Oregon approved psilocybin-assisted therapy, including the regulation of the supply chain and the sale and purchase of psilocybin products and the provision of psilocybin therapy services where anyone over the age of 21, with or without the diagnosis of a mental health condition, can consume the "mushrooms" in a supervised setting.[124, 125] Colorado followed in 2022.[126] Some states are also in the process of legalizing possession for personal use, cultivation and the sharing of psychedelics by adults, as well as licensing supervised therapy.[127] These developments have occurred in the context of allowing either the medically supervised use of psychedelics (as alternative therapies) or the unsupervised individual use of such substances.

Monitoring ongoing trends

The discussion surrounding access to and the use of psychedelics is advancing, sometimes beyond the realms of their therapeutic use and the outcomes of clinical research. Although research on the supervised clinical use of psychedelic substances has developed in the last 20 years, best practices, clinical guidelines and protocols for the medically supervised administration of psychedelics are yet to be developed. The risk is that the perception of psychedelics as good remedies for mental health disorders (strongly advocated for by a growing number of advocacy groups and commercial interests) will move faster than scientific evidence, opening up the market to unsupervised self-medication and recreational use before supervised therapeutic use is established. This may even undermine the further development of psychedelic-assisted psychotherapy. With a supervised medical treatment coupled with psychotherapy, which is likely to require substantial resources, including trained professionals and infrastructure, there is also the risk that the medical treatment may not be accessible to all. This may trigger the development of an underground and unsafe market for such therapies, with the inherent risks of misuse and abuse of an unregulated practice. Some of the policy developments taking place, for instance, in some jurisdictions in the United States, and even retreats catering to psychedelic tourism, or commercial interests, are outpacing the clinical evidence of the therapeutic benefits of psychedelics. All of these factors may allow the development or expansion of markets with little or no regulation or monitoring of the quality of substances and of the "therapies", which may further facilitate the unsupervised self-therapeutic, non-medical and recreational use of psychedelic substances.

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HERBAL CANNABIS FOR MEDICAL USE: A SPECTRUM OF REGULATORY APPROACHES

HERBAL CANNABIS FOR MEDICAL USE: A SPECTRUM OF REGULATORY APPROACHES

In recent decades, several political, legislative and judicial processes have advanced efforts to allow the use of the cannabis plant and its derivative products for medicinal purposes. The cannabis products that are currently being used medicinally can take different forms. These range from pharmaceutical preparations that have marketing authorization to cannabis plant extracts and magistral preparations.[1] Pharmaceutical preparatons are typically regulated by long-existing frameworks that govern pharmaceutical products, while cannabis plant extracts and magistral preparations and other cannabis-based products have started to be regulated more recently. Approaches to regulating medical cannabis differ widely between countries, leading to substantial variations in terms of products available, patient accessibility and supply mechanisms, with potentially different impacts on the non-medical market for cannabis.

Cannabis-based products

The term "cannabis-based products" refers to a broad range of products and may include any of the following:

- Herbal cannabis, that is, harvested and dried female flowering tops, which contain the highest concentrations of cannabinoids, THC, CBD, CBG (cannabigerol), etc.
- Herbal cannabis is also a generic term used to denote cannabis products that are not pharmaceutical products with marketing authorization, such as nabiximols.
- Cannabis plant extract refers to the extract made from the resinous flowers and small leaves of the cannabis plant.
- A medical-grade cannabis product is medicinal cannabis that has been certified for biocompatibility through a range of tests and standards and meets the standards of good agricultural and collection practices (GAP), good manufacturing practices (GMP) and active pharmaceutical ingredients (API). Different batches of a medical-grade cannabis product will have the same composition and ratio of the main cannabinoids. However, a medical-grade cannabis product may not have marketing authorization.

In the present chapter, the term "cannabis-based products" is used to describe the medical use of any of the above.

Additionally, a "pharmaceutical product with marketing authorization" has gone through clinical trials for safety and efficacy, complies with quality guidelines for production (e.g. good manufacturing practices) and has a marketing authorization issued by a drug regulatory authority.

This chapter provides an overview of the heterogeneity of the regulatory approaches in place for cannabis-based products, based on a few country examples. The aim is to provide the reader with some key elements that define the different regulatory approaches to the medicinal market for herbal cannabis products by looking at access by patients (the "who") to particular products (the "what") through various supply mechanisms (the "how"), with the aim of identifying the regulatory factors that determine the degree to which medical approaches to cannabis-based products differ in terms of limitations in accessing medical cannabis-based products or enabling conditions that could facilitate spillover into non-medical markets. The rationale for different approaches to regulating cannabis-based products may arise from various "push" and "pull" factors, including from advocacy groups and the industry, that shape the overall permissibility of access to cannabis-based products and the levels of control over their production, contents and quality.

What is presented in this chapter is not an exhaustive or a comprehensive review of regulatory approaches to medical cannabis-based products. It is based on a limited number of countries to illustrate the range of approaches taken.

One of the challenges of regulating the medical use of cannabis-based products, as for any medical product, is to ensure the right balance between guaranteeing the supervised use of approved products for recognized conditions and promoting the rational use of such products and preventing their diversion and non-medical use.[2] Similar to the typical medical practice, this would entail ensuring a regulatory mechanism by which the approval of the medical products is based on evidence of their safety and efficacy in treating specific conditions, and that they adhere to quality control measures and are made affordable and accessible to patients in need, with the necessary safeguards in place.[3, 4]

The regulation of cannabis for medical purposes in the Single Convention on Narcotics Drugs of 1961 as amended by the 1972 Protocol

- Establishing a national cannabis agency (in line with articles 28 and 23 of the 1961 Convention as amended). The duties of such an agency include, in particular, the designation of the specific areas and plots of land where cultivation will be permitted and the establishment of a licensing system for the cultivation and production of cannabis-based products.
- Ensuring that the agency purchases and takes physical possession of cannabis crops and has the exclusive right of importing, exporting, wholesale trading and maintaining stocks of the cannabis products (article 23).
- Estimating the anticipated consumption of cannabis for medicinal purposes and submitting annually to the Board the estimates, along with statistical reports on the consumption, stocks and production of cannabis for such purposes (articles 19 and 20).
- Ensuring that the prescription of cannabis for medical use is performed with competent medical knowledge and supervision.
- Ensuring that the labelling under which cannabis for medicinal purposes is offered for sale shows the exact contents by weight or percentage (article 30).
- Ensuring that the provision of medical cannabis and its practice is based on available scientific evidence and consideration of potential side effects.

Source: Single Convention on Narcotics Drugs of 1961 as amended by the 1972 Protocol, United Nations, 1975.

Is it medicinal or medical?

The term "medical" refers to the practice of medicine, to medicines, products and devices, and to the broader field of medicine. For instance, the term "medical use of cannabis" refers to the practice of allowing cannabis use for medical purposes or to the use of a cannabis-based product for medical purposes.

The term "medicinal" is mainly used to describe the beneficial effects of a drug or a herb. For a substance used to cure disease or relieve pain, the term may be used in reference to its medicinal properties or its use for medicinal purposes. One example is the medicinal use of cannabis for epilepsy.

In the present chapter, the terms "medical" and "medicinal" have been used with the meanings set out above.

Evidence of the effectiveness of cannabis to treat medical conditions

Renewed interest in the therapeutic potential of cannabis and cannabis extracts followed the discovery of the endocannabinoid system in the mid-1980s and growing understanding of that system throughout the 1990s.[a, b] Nevertheless, evidence of the effectiveness of cannabinoids in treating certain conditions remains limited, and cannabinoids are typically recommended for use after a patient has failed to respond to conventional treatment for those conditions or as an adjunctive therapy.[c, d] There is conclusive or at least substantial evidence that cannabis and cannabinoids are effective for the treatment of chronic pain in adults, in the treatment of chemotherapy-induced nausea and vomiting, and for mitigating patient-reported multiple sclerosis spasticity symptoms and epilepsy.[e, f] Evidence of the effectiveness of cannabis in the treatment of other conditions is, however, moderate, insufficient or inconclusive.[d]

In the scientific literature, researchers have hypothesized an "entourage effect", whereby the combination of phytocannabinoids, terpenes and other constituents of the whole cannabis plant has a greater medicinal effect than an isolated cannabinoid extract present in a pharmaceutical product;[g] such an effect also lead patients in some jurisdictions to indicate their preference for herbal cannabis, as opposed to specific cannabinoid or cannabis extracts.[d]

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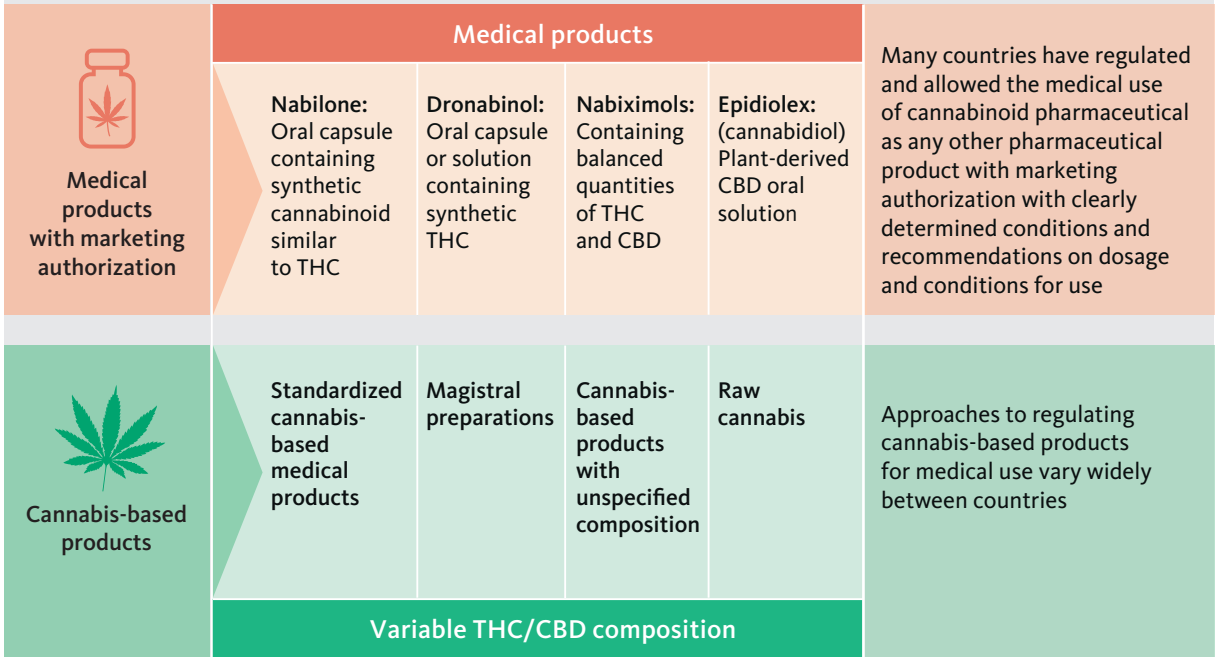
PHARMACEUTICAL AND CANNABIS-BASED PRODUCTS



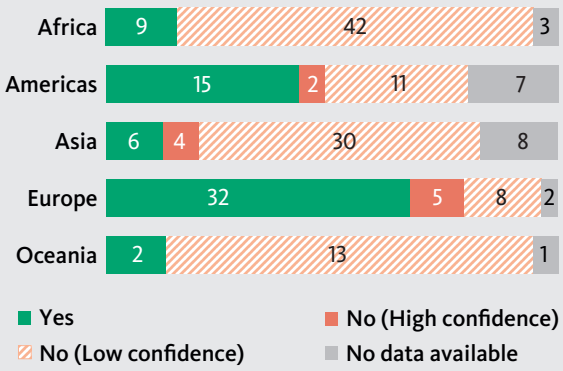
Source: Adapted from EMCDDA "Medical use of cannabis and cannabinoids: questions and answers for policymaking" (Luxembourg, 2018); and UNODC, responses to the annual report questionnaire.

COUNTRIES THAT HAVE PROVISIONS FOR MEDICAL USE OF CANNABIS, 2021

As of 2021, 64 countries had provisions in their national legislation, or had developed guidelines, allowing the medical use of cannabinoid pharmaceutical preparations and/or cannabis-based products for a range of medical conditions

Out of the 64 countries, 34 countries allow the use of cannabis-based products for the treatment of a range of medical conditions

Number of countries having provisions for medical use of cannabis, 2021:



Source: UNODC, responses to the annual report questionnaire (reproduced from UNODC, *World Drug Report 2022*).

Is regulating medical cannabis-based products similar to regulating traditional herbal medicines?

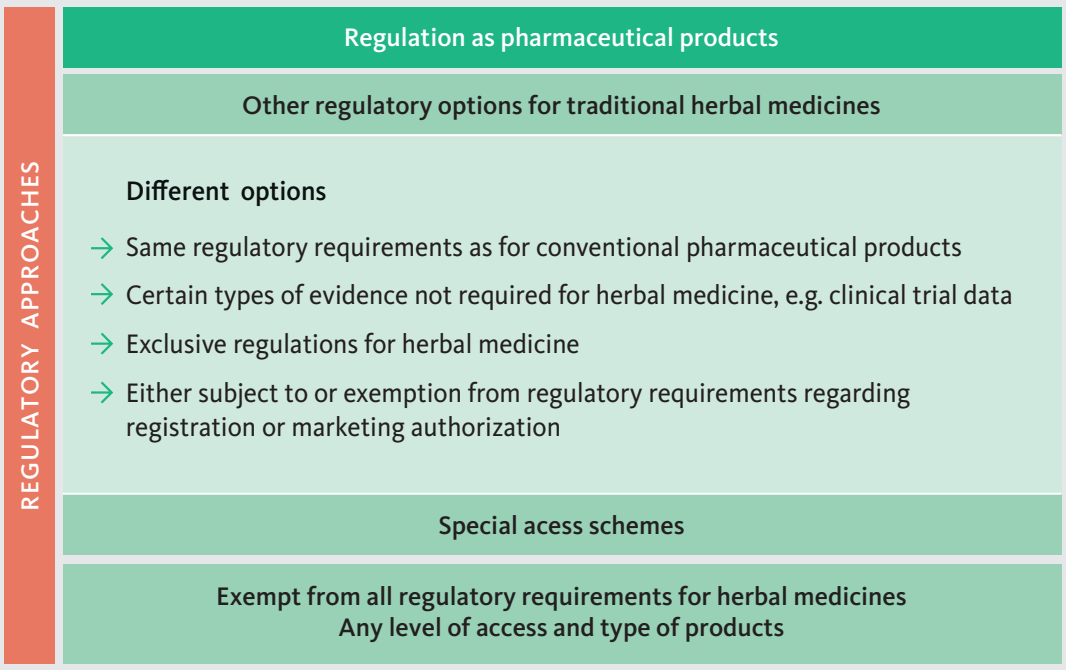
The countries that allow the medical use of cannabis-based products face a range of options and issues in relation to the regulation of such products that are similar to those that may affect the regulation of any of the traditional herbal medicines and products.

The approaches to regulating the medical use of cannabis can range from those used in regulating pharmaceutical products to those used in regulating herbal medicines. Even within the regulatory options for herbal medicines, there is a range of options that countries have chosen and apply to varying degrees.

Apart from those herbal products that are exempted from regulatory control, most of the herbal products for medicinal use are regulated in a manner that does not differ considerably from the regulation of pharmaceutical products. However, the regulatory control of herbal products may differ among countries, and not all of the regulatory requirements for traditional herbal medicines may be applied for a particular herbal product.

Traditionally, countries have taken different approaches to regulating medical herbal products, based on how they may be defined as products. Some traditional herbal medicines, like any other pharmaceutical product, require strict monitoring and controls, including allowing access only through prescriptions, while others, such as supplements, are available over the counter.[5] One challenge in the regulation of herbal medical products is the natural variability that occurs within a plant's constituents. A plant – or a herb-based product derived from a plant – may contain one or more active ingredients, and different batches of the

REGULATORY APPROACHES TO TRADITIONAL HERBAL MEDICAL PRODUCTS



Source: Based on WHO, "Global report on traditional and complementary medicine 2019", World Health Organization, Geneva, 2019.

Comparison of broad guidelines for herbal and pharmaceutical products		
	Herbal products	**Pharmaceutical or medical-grade products**
Agency	National law, policy or regulation on traditional medicines	National pharmaceutical regulatory body
Pharmacopoeia and monograph	Description of pharmacopoeia and monograph defining qualifying conditions and dosage	Pharmacopoeia or monograph defining qualifying conditions and dosage
Evidence of efficacy and safety	Evidence of therapeutic effects and benefits based on established traditional herbal medical practices, as well as evaluation of quality, safety and efficacy of herbal medicines. For dietary supplements, any claim can be accepted	Evidence-based laboratory and clinical trials among humans, with evaluation of quality, safety and efficacy of pharmaceutical products, with identification of active pharmaceutical ingredient
Designation	**Either as:** • Prescription herbal medicines • Over-the-counter herbal medicines • Dietary supplements • Health food	**Either as:** • Prescription medicines • Over-the-counter medicines • Dietary supplements
Manufacturing	**Quality assurance through:** • Application of good manufacturing practices (GMP) • Good laboratory practices • Active p ingredients (API) • Good agricultural and collection practices (GAP or GACP)	**Quality assurance (national laboratories) through:** • Application of good manufacturing practices (GMP) • Active pharmaceutical ingredients (API)
Marketing	Marketing authorization	Marketing authorization
Pharma-covigilance	Post-marketing surveillance of herbal medicines for adverse effects	Pharmacovigilance based on reporting of adverse effects
Essential medicines list	National law, policy or regulation on traditional medicines	National essential medicines list Registration requirements to establish interchangeability (bioequivalence)

Source: Based on WHO, "Global Report on Traditional and Complementary Medicine 2019." Geneva: World Health Organization, 2019; and WHO, "Expert Committee on Specifications for Pharmaceutical Preparations – Forty-Eighth Report" Technical Report Series, No. 986. Geneva: World Health Organization, 2014.

same plant or herb may vary in their content of active ingredients. In addition, variations in the cultivation environment (e.g. soil, water, sunlight, humidity, pesticides, fungi and other contaminants) can affect the quality of any herbal medicine.[6] For these reasons, there are recommended quality control practices for plant-based pharmaceutical preparations that may also be applied to cannabis-based products for medical use, with the aim of protecting consumer health by ensuring that medicines are effective, safe and of high quality.[7]

Approaches to patient access to medical cannabis-based products: from restricted access for only few predetermined conditions to limited oversight for unspecified conditions

A range of regulatory approaches provide patients with access to medical cannabis-based products. At one end of the spectrum is the regulatory approach, where patients with very specific conditions only can access medical cannabis products. For example, in the United Kingdom, medical cannabis products for medical use can be prescribed only by a specialist based in a hospital for specific conditions, such as

Recommended quality control practices for plant-based medicinal preparations

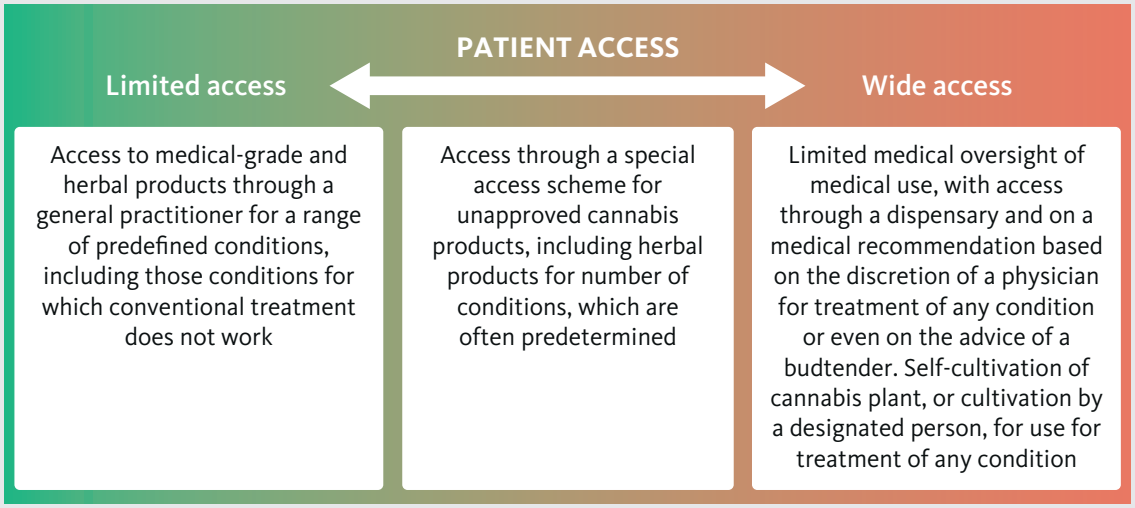
Quality control practice	Description	Result or purpose
GAP – good agricultural practices or GACP – good agricultural and collection practices	Quality assurance mechanism ensuring homogeneity of concentrations of herbal preparations (e.g. cannabinoid concentrations in the case of cannabis-based productions) applied to medical plants in order to obtain standardized products	Control of batch-to-batch variation (e.g. cannabinoid profile in the case of cannabis-based products); limitation of microbiological and chemical contamination (e.g. pesticides, heavy metals) of the herbal material; and guaranteeing that the plant material is free from microbiological contamination (e.g. bacteria and fungi)
GMP – good manufacturing practices	Quality assurance for industrial-scale production of herbal products (in the context of cannabis-based products, assuring quality control measures in production, including of the contents and composition of cannabinoids)	Certification of the production site evaluation of basic quality parameters, including the fulfilment of criteria established in pharmacopeial monographs
API – active pharmaceutical ingredients	Quality assurance for each herbal pharmaceutical product (in the cannabis-based products context, it would include those that are cannabis extracts)	Homogeneity of chemical composition and content (in the cannabis-based products context, it would be to ensure the homogeneity of the cannabinoids)

Sources: Souza, Maíra Ribeiro de, Amélia Teresinha Henriques, and Renata Pereira Limberger. "Medical Cannabis Regulation: An Overview of Models around the World with Emphasis on the Brazilian Scenario." Journal of Cannabis Research 4, no. 1 (June 16, 2022): 33; WHO. "Expert Committee on Specifications for Pharmaceutical Preparations - Fifty-Fifth Report." Technical Report Series, No. 1033. Geneva: World Health Organization, 2021; WHO. "Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants." Geneva: World Health Organization, 2003. WHO. "Guidelines for Assessing Quality of Herbal Medicines with Reference to Contaminants and Residues." World Health Organization, 2007.

chemotherapy-induced nausea and vomiting, spasticity associated with multiple sclerosis and treatment-resistant epilepsies.[8, 9] In Germany, every physician can prescribe medicinal cannabis products. The physician has the responsibility for every single prescription of a medical cannabis product; however, for the first prescription, the physician is required to get the approval of the patient's health insurance company.[10] In the Kingdom of the Netherlands, a general practitioner can prescribe medical cannabis-based products, and their prescription is allowed only when conventional treatments (using authorized medicines) have failed or cause adverse effects.[11, 12, 13] In Israel, the cannabis guidelines lay down the conditions for which medical cannabis-based products can be prescribed. The attending physician is required to determine the appropriate product type and adjust the potency, route of administration, monthly quantity, daily dosage and consumption according to those guidelines.[14]

A few countries, for example Australia and Brazil, make cannabis-based products available to a limited set of patients with specific conditions through existing therapeutic special access schemes.[15] These existing national programmes, typically known as "compassionate access schemes", "compassionate use schemes" or "authorized prescriber schemes", allow the use of cannabis-based products. In the case of Australia, the "Special Access Scheme" authorizes lawful access to certain medical practitioners and nurse practitioners who may prescribe unapproved medicinal cannabis products to clinically appropriate patients under their care. As a condition of approval to use unapproved medicinal cannabis products via these schemes, the prescribing health practitioner is required to have considered all clinically appropriate treatment options before applying to access an unapproved medicinal cannabis product for their patient and report adverse events and defects associated with the unapproved medicine to the Therapeutic Goods Administration.[16, 17] In the case of Brazil, cannabis-based products are made available on a controlled basis and under controlled conditions. Access to cannabis-based products is subject to prescription by a qualified health professional, who is responsible for defining the indications and appropriate dosage of the cannabis-based product on the basis of a clinical assessment of the patient.[18] In some jurisdictions in the United States, a compassionate use programme allows the use of low-THC cannabis-based products for patients with a limited set of medical conditions.[19]

SPECTRUM OF APPROACHES FOR REGULATING PATIENT ACCESS TO MEDICINAL CANNABIS



At the other end of the spectrum are regulatory approaches like that of Canada and several states in the United States, where patients with qualifying medical conditions, such as "chronic pain", "anxiety" and "muscle spasms", can obtain a recommendation from a licensed health care practitioner for cannabis.[20, 21, 22] Similarly, in South Africa medical cannabis-based products can be prescribed for any health condition if the physician with whom the patient is registered determines that it could help the treatment of that health condition.[23, 24]

Guidance or guidelines are available in many countries to inform the medical use of cannabis-based products, including in Australia, Canada, the United Kingdom, Israel, the Kingdom of the Netherlands, and some states in the United States.[25] For example, the Israeli Medical Cannabis Agency has a medical-grade cannabis "Cannacopoeia" – a manual for prescribing physicians as a good clinical practice guideline – as well as guidelines for high-quality practice for all supply chain segments. Notably, the clinical guidance on the qualifying conditions and on prescribing specific cannabis-based products for those conditions may vary by country or even within a country.[26]

Medical cannabis-based products on the market: from standardized products to cannabis preparations of unspecified composition

One of the challenges in regulating the medical use of cannabis-based products is defining which products to make available, whether the plant only or plant-based derivatives or extracts will be allowed, and what production processes will be permitted.

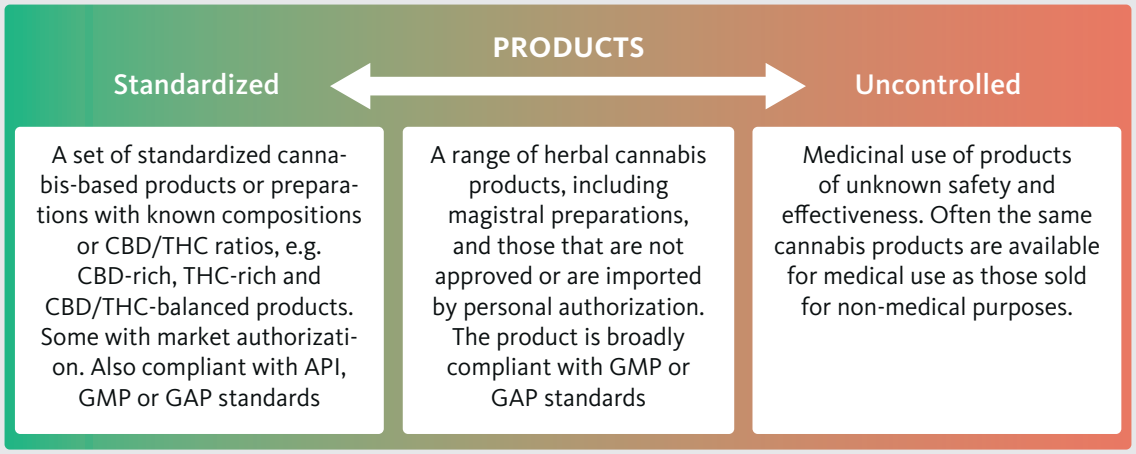
Different cannabis-based products based on cannabis flowers and cannabis extracts are marketed in some countries as herbal medicinal preparations, often without regular marketing authorizations. These range from strictly approved standardized products with known contents and concentrations to any cannabis preparation with an unspecified composition. For example, on the one hand, in many countries in the European Union, pharmacies can prepare patient-specific products (magistral preparations) based on a physician's prescription.[27, 28] On the other hand, in some jurisdictions in the United States and Canada, products with high THC content, including smokable cannabis products with known carcinogens, tars and other harmful effects on health[29, 30] (such as respiratory illnesses),

Medical cannabis products in the Kingdom of the Netherlands

Category	Product	THC	CBD
High THC, low CBD	Bedrocan®	≅ 22	<1
	Bedica®	≅ 14	<1
	Bedrobinol®	≅ 13.5	<1
THC and CBD balanced	Bediol®	6.3	8
Low THC, high CBD	Bedrolite®	<1	9

Source: Brunetti, Pietro, Simona Pichini, Roberta Pacifici, Francesco Paolo Busardò, and Alessandro Del Rio. "Herbal Preparations of Medical Cannabis: A Vademecum for Prescribing Doctors." Medicina (Kaunas, Lithuania) 56, no. 5 (May 15, 2020): 237.

SPECTRUM OF CANNABIS-BASED PRODUCTS AVAILABLE FOR MEDICAL USE



cannabis leaf, inflorescence and extracts, are available as herbal medicinal preparations.[31, 32, 33] These products have not been approved by the federal Food and Drug Administration, however, and their marketing and use is illegal under federal law throughout the United States.

Some jurisdictions, such as Israel and the Kingdom of the Netherlands, require producers of cannabis-based products to provide evidence of product quality and consistency to a central regulatory authority and to ensure that patients receive standardized doses of cannabis-based products that are free of contaminants and adulterants.[34] In the Kingdom of the Netherlands, the Office for Medicinal Cannabis Research, for instance, makes available five types of medical cannabis-based products with different cannabinoid compositions and content to be used for specific qualifying conditions. The quality of the herbal cannabis in each of the products is guaranteed by constant supervision to ensure compliance with good agricultural practices and good manufacturing practices and by batch-to-batch quality control analysis performed by a certified laboratory.[35]

In Germany, several hundred pharmaceutical-grade cannabis herbal products, which are imported from more than a dozen different countries, are available on the market.[36] The concentrations of the specific medical products range from less than 1 per cent to 30 per cent THC and from less than 1 per cent to 17 per cent CBD.[37] Some of these products, similar to those in the Kingdom of the Netherlands, include preparations with high THC and low CBD (e.g. Tilray THC 25® contains 25 per cent THC and less than 1 per cent CBD), THC and CBD balanced (e.g. Tilray THC 10® contains 10 per cent of both THC and CBD), and high CBD and low THC (e.g. Bedrolite®, contains less than 1 per cent THC and 8.1 per cent CBD).[38]

The Israeli Medical Cannabis Agency makes available two forms of medical cannabis-based products – inflorescence and cannabis extract diluted in oil. Each of these forms is manufactured in the three groups of products, i.e. high-CBD products with 20 per cent or higher CBD and 1 per cent or lower THC; high-THC products, which contain between 10 and 20 per cent THC and 2 to 4 per cent CBD; and CBD-THC balanced products, which contain nearly equal quantities of the two cannabinoids (5 per cent THC and CBD or 10 per cent CBD and THC).[39] Each medical cannabis-based product that is approved for medical marketing and is of a quality suitable for medical use, is marked as "IMC-Medical Grade".[40] However, unlike in the

Kingdom of the Netherlands, although all aspects of the supply chain are standardized, the production or manufacturing of those medical cannabis-based products is not centralized.

In other jurisdictions, the cannabis-based products made available for medical use may be neither limited nor highly regulated. While the Government of Australia makes cannabis-based products available for medical use through its special access scheme, the specific products used by patients are all unapproved by the federal medicines regulator, the Therapeutic Goods Administration, although the Administration does require companies or individuals that produce or grow a medical cannabis-based product to follow good manufacturing practice for medicines.[41] More than 40 companies were registered in 2022, and several dozen more imported products have been approved, offering patients in Australia a wide range of medical cannabis-based product options with varying cannabinoid compositions, including CBD-only or CBD-predominant, CBD-THC balanced, and THC-only or THC-predominant products.[42]

Canada and some jurisdictions in the United States have allowed a much wider array of producers and cannabis-based products in their medical markets; in the case of United States, these include products that are not approved by the federal Food and Drug Administration and are therefore illegal under federal law throughout the country.[43] In Canada, people can access cannabis-based products for medical purposes by registering with licensed cannabis producers, they can register with Health Canada to produce a limited amount for their own medical purposes, or they can designate someone else to produce cannabis for them.[44] The cannabis-based products available for medical (and equally for non-medical) purposes include products ranging from plants or seeds to dried and fresh cannabis plant, extracts, edibles and topical ointments.[45]

There are risks associated with self-cultivation or home cultivation of cannabis for medicinal use. The extracts from cannabis plants may contain pesticides or herbicides as well as other contaminants. The THC potency may vary from one plant to another, making it difficult to determine the precise dosage for the consumption of cannabis, and rather than providing therapeutic benefits, such use may actually harm the person. In addition, if cannabis-based products are not stored safely in a dwelling, it may even lead to their diversion.[46] Different studies that have reviewed the cannabis-based products available in medical cannabis dispensaries in jurisdictions in the United States have reported a variety of products available; several studies have also noted that these products are similar to the cannabis-based products offered for non-medical use.[47, 48, 49] Another issue noted in studies of the medical cannabis market in the United States is that the contents of the cannabis-based products do not always match what is indicated on the labels. For instance, in one study some products contained negligible amounts of CBD and others contained significantly more THC than indicated on the label; the median THC-to-CBD ratio of the products that were tested was 36:1, placing patients at risk of experiencing adverse effects.[50] In another study, the THC content observed in the samples that were tested were considered to be high enough to produce intoxication or impairment, especially among children, thereby negating any potential clinical response.[51] The level of THC and CBD and their ratio are important factors in the therapeutical effects of the products. In a study, for instance, it was shown that the exposure of patients with chronic pain to high THC concentrations, i.e. higher than 10 to 15 per cent THC, puts them at risk of experiencing side effects or adverse events without any further beneficial effect of pain relief.[52] Similarly, a THC-CBD balanced product is considered appropriate for pain management, and cannabis-based products with other THC-to-CBD ratios or with a THC content higher than 15 per cent may not provide the desired therapeutic benefit.[53]

Supply of medical cannabis-based products: from centralized systems to unlicensed or unregulated supply

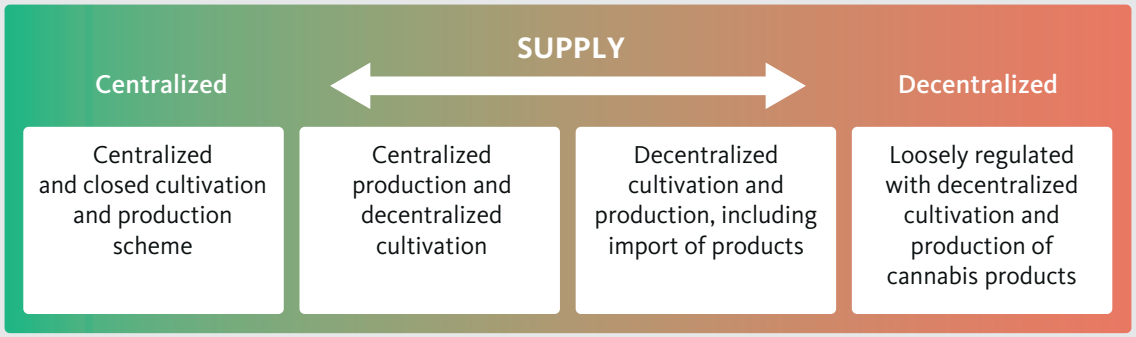
Regulatory control of the supply of medical cannabis may vary, with limits placed on the number of producers, distributors and retailers supplying medical cannabis products and limits on the actual products allowed. Regulations may also relate to the practice of cultivation and production of cannabis-based

medical products, requiring that suppliers follow good agricultural practices, good manufacturing practices or ensure the consistency of the active pharmaceutical ingredients. Furthermore, regulatory approaches can range from a centralized and closed cultivation and production system to decentralized approaches and ultimately approaches with limited to no oversight over the production or the quality of cannabis-based products for medical use. The standards of good agricultural practice and good manufacturing practice may be applied within any of these approaches, but oversight of the application of those standards may be easier in a more centralized and closed system.

Centralized systems for the supply of medical cannabis products are in place in countries such as the Kingdom of the Netherlands, Italy, Israel and Germany. In the Kingdom of the Netherlands, the Office of Medicinal Cannabis purchases cannabis from all licensed producers and maintains a monopoly over the supply of medical cannabis-based products to pharmacies and general practitioners.[54] The Cannabis Agency of Germany controls cultivation of medicinal cannabis in Germany and its distribution. The cultivators of medicinal cannabis in Germany and the company commissioned with its distribution were selected in a Europe-wide tendering process.[55] Another example of centralized production is Italy, where only two standardized cannabis-based products of pharmaceutical grade (FM2, containing 5–8 per cent THC and 7–12 per cent CBD, and FM1, containing 13–20 per cent THC and less than 1 per cent CBD) are made available through the Military Pharmaceutical Chemical Works of Florence.[56, 57] The Israeli Medical Cannabis Agency also has guidelines for the production of standardized medical cannabis-based products, which are equivalent to the guidelines for good manufacturing practices applied in the European Union, and internalizes the entire supply chain through a centralized system.[58]

Examples of less regulated approaches are those observed in South Africa and Brazil. The South African Health Products Regulatory Authority allows patients to access unregistered cannabis-based products by applying for individual authorization.[59] The Authority issues licences for cannabis cultivation and the manufacture of cannabis-based products. Such licences are subject to broader regulations on good agricultural practices and good manufacturing practices and strict controls to ensure security to prevent the diversion of cannabis-based products. In Brazil, the national agency responsible for the medical cannabis programme (Agência Nacional de Vigilância Sanitária) issues individual import authorizations as well as broader authorizations for cannabis-based products to be marketed in Brazil for a specified period.[60] However, applicants seeking authorization have been exempted from the obligation to present proof of safety and efficacy of the products since many of the imported products are not subject to regulatory approval as medicines in their countries of origin.[61]

SPECTRUM OF APPROACHES FOR REGULATING THE SUPPLY OF MEDICAL CANNABIS AND CANNABIS-BASED PRODUCTS



Other examples of less or minimally regulated supply chains are some state jurisdictions in the United States, where patients or their caregivers are allowed to grow their own cannabis for medicinal purposes without the need for a formal licence or the requirement to follow good agricultural practices or good manufacturing practices for the plants and other medical cannabis products that are produced, with inherent risks of product variation and contamination, e.g., with pesticides and heavy metals. Medical cannabis dispensaries also operate in many of these jurisdictions, with varying legal requirements across states on the products and the contents that are allowed to be sold, the companies allowed to manufacture those products and the practices that they may follow.[62, 63]

Other issues and considerations for regulating cannabis-based products for medical purposes

Besides the main areas of medical cannabis regulation reviewed above, there are other issues that could influence the evolution of regulatory approaches to medical cannabis-based products. The evidence on the conditions for which medical cannabis-based products can be effective is continuously evolving, and the use of cannabis-based products for conditions for which there is a perceived benefit may also evolve. Other factors that may also have an influence on regulatory approaches to medical cannabis-based products include changes in the perception of risk and harms of non-medical cannabis use, as well as product innovation and diversification led by commercial interests, which may also open the market for the recreational or non-medical use of cannabis.

Dosage of cannabis-based products

There remains limited research on cannabis-based products for therapeutic use. Given the costs and time involved in developing a new medical product, especially for a plant-based or herbal product such as cannabis, in an environment of developments to legalize the non-medical use of cannabis, there is less incentive for pharmaceutical companies to finance clinical trials that generate evidence using the "gold standard" of randomized clinical trials for qualifying medical conditions on the basis of the exact concentration and dosage at which medical-grade cannabis-based products can be effective. For that reason, the pharmaceutical industry has not gone beyond the development of pharmaceutical products such as nabiximols, nabilone and dronabinol. As a result, for cannabis-based products, standards for effective dosages, typologies and medical conditions for which they would exhibit proven efficacy are not as well established as for pharmaceutical products. There are advocates who, instead of pursuing this "gold standard", favour relying on the real-world or lived experiences of people, using information similar to pharmacovigilance data on adverse events from patients who use a range of cannabis-based products for medical purposes.[64] These are issues that have emerged and also may have an influence on the regulation of traditional herbal medicine.[65]

A false perception of health and safety

It has been argued that in the absence of clinical guidelines on specific medical conditions that can be treated with cannabis-based products or on the dosing of cannabinoids that could be prescribed, health practitioners are often uncomfortable speaking to patients about these products. Patients may then turn to their friends or family, social media, cannabis dispensaries and cannabis advocacy groups to learn about dosage and self-administration of cannabis for medical purposes.[66]

The perception or belief, backed by cannabis advocacy groups and the industry, that herbal cannabis and cannabis-based products are a natural remedy and that people need to accept the "natural origin" of cannabis plant with no "safety concerns", has reduced perceptions of harm for a wide array of health conditions in addition to the non-medical use of cannabis.[67] The marketing of CBD-based products as health and wellness products, often labelled as cannabis, has amplified this perception. While there are conditions for which the science does support therapeutic benefits from cannabis-based medications,[68, 69] there is also growing evidence documenting adverse events associated with high-CBD products,[70] high-THC products and drug interactions with other drugs that may be used in the treatment of a condition.[71, 72, 73, 74]

Moreover, medical cannabis markets that are minimally regulated and exposed to competing commercial interests, such as those in jurisdictions in the United States, have been shown in various studies to give a degree of credibility to the use of cannabis-based products in general (not only medically). They have led to a shift in public opinion, encouraging voter initiatives for the legalization of the non-medical use of cannabis in several states[75, 76, 77] and to an increase in the non-medical use of cannabis by adults,[78, 79] as well as an increase in emergency room visits and hospitalizations related to adverse effects, such as cannabis hyperemesis syndrome, after cannabis consumption.[80, 81]

Commercial interests

Lastly, in jurisdictions with competing commercial interests, there has also been an industry-led diversification of products, some of which may contain a specific cannabinoid or a combination of either THC or CBD, or both, at levels that may not be safe for the conditions for which the products are advertised.[82, 83] There are reports from patients in the United States who are unable to find products containing their desired ratios of THC and CBD since the cannabis industry is instead producing products that appeal to non-medical users.[84, 85, 86]

Conclusions: what approaches can provide safe access to medical cannabis while limiting unsafe use?

The examples of regulatory approaches presented above highlight the range of choices that regulators need to consider when defining a medical market for cannabis-based products. These choices determine the permeability of the market. There are key factors that ensure limited product availability, with proven safety and efficacy, that can address legitimate medical needs, making medical products available for the conditions where scientific evidence is available. Such factors may also limit potential spillover into a non-medical or recreational use market. In jurisdictions with minimal or no regulation of the market for medical cannabis-based products, there are concerns regarding quality assurance for the products as well as the diffusion of new products containing ingredients that are not well suited for medical conditions, and regarding changes in the perception of harm associated with the non-medical use of cannabis. Regulatory approaches that centralize the supply of medical cannabis are also likely to limit the influence of private sector entities with commercial interests that advocate for increasing the acceptability of cannabis use and the portrayal of cannabis as a healthy choice.

The regulation of medical cannabis programmes also depends on the expansion of clinical research to obtain the needed evidence base regarding qualifying conditions for medical cannabis, stakeholders' involvement in the development of supply and regulatory frameworks and clinical guidelines that outline the potential benefits and risks of medical cannabis, and broader strategies to promote safe and equitable access to medical cannabis products that meet the required quality standards.[87]

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80 Daniel Thomas Myran et al., 'Changes in Emergency Department Visits for Cannabis Hyperemesis Syndrome Following Recreational Cannabis Legalization and Subsequent Commercialization in Ontario, Canada', *JAMA Network Open* 5, no. 9 (16 September 2022): e2231937.but it is unclear how cannabis commercialization (ie, greater retail store access as well as increased variety and potency of cannabis products

81 Douglas R. Roehler et al., 'Trends and Characteristics of Cannabis-Associated Emergency Department Visits in the United States, 2006–2018', *Drug and Alcohol Dependence* 232 (March 2022): 109288.

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THE NEXUS BETWEEN DRUGS AND CRIMES THAT AFFECT THE ENVIRONMENT AND CONVERGENT CRIME IN THE AMAZON BASIN

THE NEXUS BETWEEN DRUGS AND CRIMES THAT AFFECT THE ENVIRONMENT AND CONVERGENT CRIME IN THE AMAZON BASIN

KEY FINDINGS

- Illicit drug trafficking is exacerbating and amplifying an array of other criminal economies in the Amazon Basin, including illegal land occupation, illegal logging, illegal mining, trafficking in wildlife and other crimes that affect the environment.
- The direct impact of coca cultivation on deforestation is minimal but indirectly it can act as a catalyst for deforestation, although the deforestation observed in the Amazon Basin is largely driven by other factors. "Narco-deforestation" – the laundering of drug trafficking profits into land speculation, the agricultural sector, cattle ranching and related infrastructure – is posing a growing danger to the world's largest rainforest.
- Converging crimes such as protection and extortion rackets, money-laundering and corruption have turned tri-border areas in the Amazon Basin into violent hotspots, with diverse organized criminal groups simultaneously engaged in cocaine production and trafficking and natural resource exploitation.
- Indigenous Peoples and other minorities are disproportionately affected by the criminal nexus in the Amazon Basin, as they suffer forcible displacement, mercury poisoning and other health-related impacts, increased exposure to violence and victimization and more.

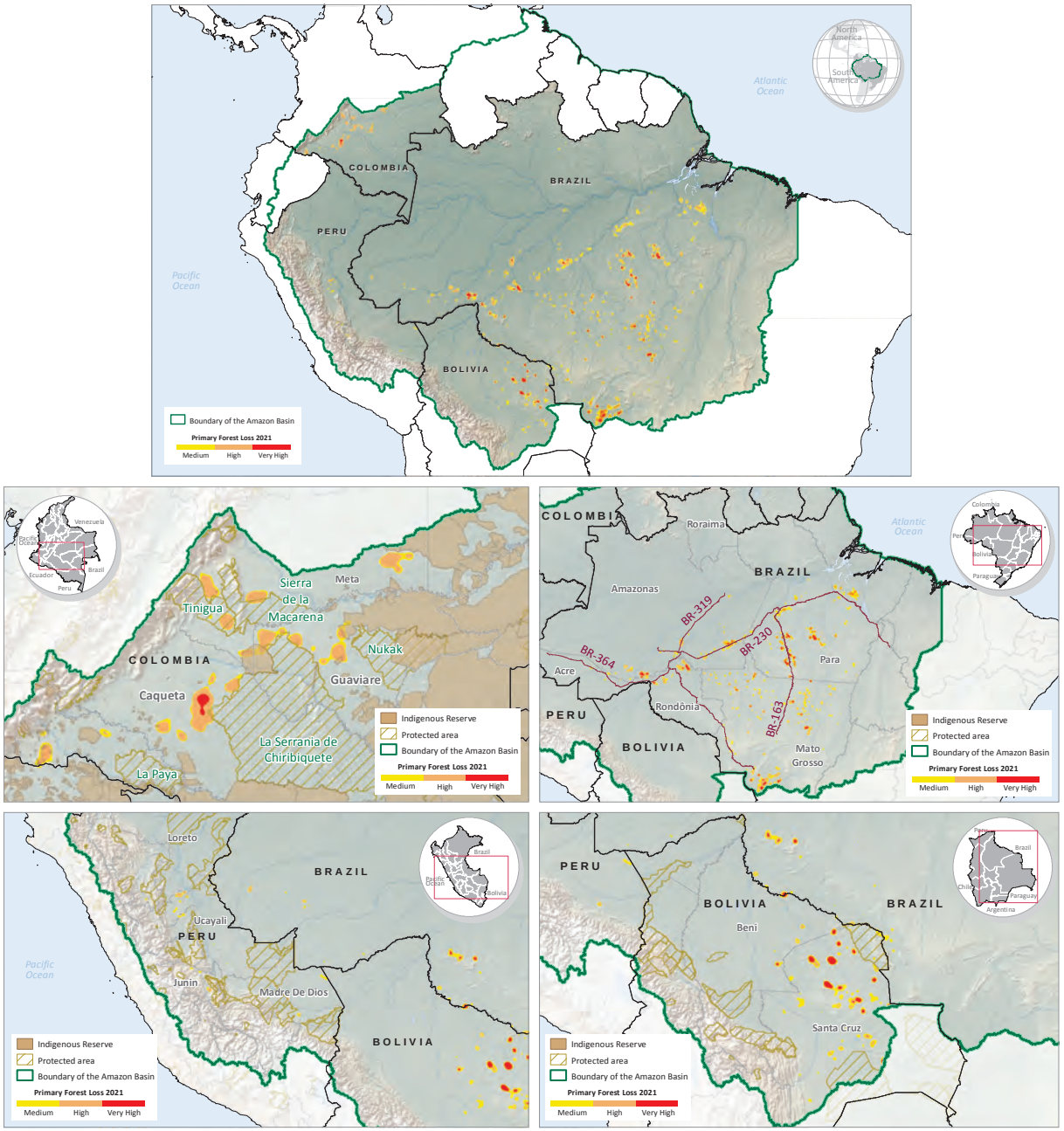
Introduction

Significant parts of the Amazon Basin are wracked by a complex ecosystem of drug crime, crime that affects the environment and convergent crime.[1] This chapter sheds light on this nexus, including the diverse impacts of drug-related activities where natural and human ecosystems are most at risk. Spanning eight South American countries and territories over 7 million square kilometres, the Amazon Basin is the world's largest rainforest.[2,3] It is also threatened by deforestation and degradation, virtually all of it illegal.[4] The countries hosting the largest share of the Amazon Basin rainforest – Brazil (59 per cent), Peru (13 per cent), Plurinational State of Bolivia (8 per cent), and Colombia (7 per cent) – are particularly at risk of forest and biodiversity loss.

Although Ecuador, Guyana, Suriname, Venezuela (Bolivarian Republic of) and French Guiana are also part of the Amazon Basin and are affected by drug and related crime issues, this chapter focuses on the Amazon region covering Bolivia (Plurinational State of), Brazil, Colombia and Peru, countries that either host nearly all global illicit cultivation of coca leaf and cocaine manufacture or have high levels of cocaine trafficking.[5,6,7] It is also in these four countries that UNODC has a stronger research capacity and could build on existing programmes.

This chapter builds on the *World Drug Report 2022*,[8] which provided an overview of the possible environmental impacts of illicit drug cultivation and production on natural ecosystems and communities, while keeping the size of those effects in perspective relative to other human activities that cause environmental degradation. By focusing on one specific geographical region, it adds a comprehensive focus on the multi-layered relationships between drug production, trafficking and consumption on the one side, and crimes that affect the environment and convergent crime on the other.[9]

MAP 2 Amazon Basin deforestation hotspots, 2021



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: Base cartography of Colombia and internal administrative boundaries: Agustin Codazzi Geographic Institute - IGAC and the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Base Cartography of Brazil and internal administrative boundaries: Brazilian Institute of Geography and Statistics - IBGE and Geoportal Provita, 2023. Base cartography of Peru and internal administrative boundaries: Open Street Map and the National Geographic Institute, 2021 and Unique digital platform of the Peruvian State, 2023. Base Cartography of Bolivia and internal administrative boundaries: Geographic Server: Servidor Geográfico - GeoBolivia and United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2023. Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socio-environmental Information (RAISG, 2020). Forest cover loss: Global Forest Watch (GFW), 2021.

The relationships between drug-related crime, crimes that affect the environment, and convergent crime in the Amazon Basin are complex and evolving. Any assessment will be partial and non-exhaustive. This chapter offers a preliminary analysis of basic trends and patterns based on official data, site visits to selected countries, open sources and qualitative information collected through 25 interviews with experts from law enforcement authorities, the judiciary, environmental protection agencies, intergovernmental entities and civil society.

The chapter describes how the Amazon regions of Bolivia (Plurinational State of), Brazil, Colombia and Peru are at the intersection of multiple forms of organized crime that are accelerating environmental devastation, with severe implications for the security, health, livelihoods and well-being of the population across the region. A focus on the tri-State border between Brazil, Colombia and Peru provides an example of the convergence of drug trafficking and crimes that affect the environment and their impact on communities.

Drug cultivation and trafficking and crimes that affect the environment are surging in the Amazon Basin covered by the four countries analysed in this chapter, due in part to an abundance of natural resources alongside a limited State presence, persistent corruption and structural factors related to informality, inequality and unemployment. Drug trafficking constitutes just one of multiple criminal activities in which organized criminal groups are involved, together with land-grabbing, timber trafficking, illegal mining and trafficking of wildlife across the region. These organized criminal networks are not just exacerbating deforestation but are also accelerating convergent crime ranging from corruption, tax and financial crimes, to homicide, assault, sexual violence, exploitation of workers and minors, and the victimization of those defending the environment, including Indigenous Peoples.

The illegal activity affecting the environment in the Amazon Basin is, however, not always directly connected to organized criminal groups. Often, illegal logging and mining are a result of either the corrupt award of licences and permits by elected public officials and senior bureaucrats,[10] the falsification of the origin of wood or gold by buyers and sellers, or of less serious offences, related to occupying public land and selling property without proper documentation.[11] Nonetheless, the Amazon Basin is registering an increase in both organized and market-driven crime, with dangerous implications for global climate and biodiversity commitments. One reason for this is that cocaine production and trafficking are surging, in particular in the Amazonian departments of Caquetá, Guaviare, Meta, Putumayo and Vichada in Colombia.[12] Most of the coca cultivation in the Amazon Basin, however, is not taking place in Colombia but in Peru. Another reason for the surge is that organized criminal groups, which have traditionally focused on drug production and trafficking, are diversifying into highly profitable activities related to crimes that affect the environment.

Organized criminal groups involved in drug trafficking in Brazil, Colombia, Peru and, to a lesser extent, the Plurinational State of Bolivia are leveraging illegal and legal supply chains to expand their operations. There is growing evidence, for example, of drug traffickers financing and providing logistical support for illegal gold mining operations across the region, including on protected territories,[13] expanding into illegal logging and trafficking in wildlife (including plants, insects and animals). Shipping vessels used to lawfully transport wood or minerals are also routinely loaded with cocaine concealed in consignments destined for foreign markets.[14, 15, 16, 17] These kinds of illicit activity are frequently accompanied by convergent crime, ranging from bribery, extortion, fraud and money-laundering to homicide, violent assault, sexual violence and forced labour.[18] Those most directly affected by these crimes are the poorest and most vulnerable communities in the Amazon, including Indigenous Peoples and those of African descent.

Conceptualizing drug-related crime, crimes affecting the environment and convergent crime

Large areas of the Amazon Basin are experiencing the convergence of multiple forms of criminality with severe implications for public security and sustainable development. Specifically, drug-related crimes can range from coca and cannabis cultivation to trafficking

CONCEPTUAL FRAMEWORK: CONCEPTUALIZING THE CRIME ECOSYSTEM

Drug-related crime

Illegal land appropriation and illegal purchases for illicit coca and cannabis cultivation, including on protected and Indigenous territory

Illegal cultivation and processing of coca, cannabis and other synthetic drugs for the purposes of illegal sale

Trafficking and trans-shipment of illegal drugs, both domestically and across borders

Domestic and international consumption of controlled drugs and non-medical use of other substances

Environmental crimes

Clearing and burning of land; timber trafficking; and occupying public and private land for illegal mining and wildlife crime (poaching)

Illegal logging and degradation of (protected/ Indigenous) land; watershed depletion; pollution of soil and water with toxic precursor chemicals

Illegal logging and degradation due to the building of illegal air strips and clandestine roads

Convergent crimes

Corruption, including in the allocation of licences and permits; illegal occupation of land; money-laundering, fraud and violent intimidation

Corruption, including the sale of illegally procured and non-registered chemicals; forced labour, including of Indigenous populations; establishment of protection and extortion rackets

"Narco-deforestation" and associated money-laundering and corruption in the public and private sectors; high levels of violent and non-violent crime due to disputes over territory and routes; and trafficking in persons, including for sexual exploitation, as well as sexual violence

Increased prevalence of violent and non-violent crime; expansion of corruption and money-laundering, including in remote communities

Additional harms

Population displacement due to environmental impacts and risks of violence; diminished access to services, including health and education; and increased exposure to human rights violations, including online

Expansion of informal urbanization, as well as irregular roads and airstrips; and increased exposure to health-related risks, including contagious diseases

International and national threats to peace and security due to domestic and cross-border disputes between groups; and impacts on wider emission-reduction-, forest- and biodiversity-related agreements

Increased risk of drug-related mortality and morbidity; and negative impacts on education and livelihoods of urban and remote communities

and possession. Crimes that affect the environment are also varied including land-grabbing, illegal logging, illegal mining and illicit activities related to farming and livestock rearing. Convergent crime refers to criminal activities that connect, overlap, enable and co-locate with drug-related crime and crimes that affect the environment, including corruption, money-laundering, fraud, extortion, violence and other forms of victimization.

Corruption facilitates the expansion of both drug-related crimes and crimes that affect the environment in the Amazon Basin. According to open sources and interviews with law enforcement officers, prosecutors and customs officials, and non-governmental organizations, the government agencies tasked with safeguarding and protecting the Amazon Basin and people who live there – from high-level decision makers to police, border agents, and permit and licensing authorities – are routinely exposed to corruption in its different forms, such as bribery, abuse of function and trading in influence.[19] There are a multitude of ways that trafficked commodities – drugs, gold, soy, cattle, palm oil,[20] timber and wildlife – cross borders facilitated by the use of fraudulent permits, licences and related documents, the complicity of public officials and elaborate money-laundering schemes involving legitimate businesses.[21, 22, 23, 24, 25]

A preliminary conceptual framework tracing the ways in which drug-related crimes interact with crimes that affect the environment and convergent crime, as well as highlighting wider impacts on society, offers a roadmap for diagnosing risks and formulating prevention strategies. Several features of this conceptual framework stand out. First, the process of producing, processing and trafficking, can have a direct and indirect impact on the environment, from selective illegal deforestation and degradation, which makes way for the cultivation and processing of drugs, to the pollution of the environment due to the burning of trees and use of precursor chemicals, as well as financial and land acquisition crimes associated with "narco-deforestation".[26] Second, drug trafficking groups are diversifying into crimes that affect the environment by default and design, including illegal land occupation for industrial agricultural purposes, illegal logging, illegal mining, poaching and trafficking in wildlife as a way of generating and laundering illicit profits. Third, drug trafficking undermines the rule of law and amplifies criminal economies that facilitate and incentivize the involvement of a wide range of individuals and actors involved in crimes that affect the environment.

Drugs and deforestation in the Amazon Basin

Concerns regarding drug production and trafficking in the Amazon Basin are hardly new and extend back at least four decades.[27,28,29,30,31] From the 1990s onward, governments started explicitly linking the production of coca, and the trafficking of coca paste and cocaine, with the destruction of rainforests. The relationships between coca production and deforestation and degradation in the Amazon Basin are, however, not clear-cut. Indeed, the far more important drivers of forest clearance are crop and livestock production. Nevertheless, early studies tended to emphasize a direct link between the expansion of coca bush cultivation and corollary forest cover loss,[32,33,34] and macro-socioeconomic and demographic analyses indicated that coca bush cultivation acted as an indirect driver of forest loss, mostly as a result of associated economic development.[35]

The direct impact of illicit coca cultivation on deforestation is limited

Although there are clear relationships between coca bush cultivation and some level of deforestation and environmental degradation, the scale of the direct impact is limited.[36, 37] The reverse is also true: despite more frequent clearing associated with illicit coca cultivation, areas *with* illicit coca cultivation can register less deforestation and smaller deforestation clusters than areas *without* coca cultivation.[38] Recent scientific studies suggest that the effects of illicit coca cultivation on deforestation varied between countries between 2010 and 2020, and the extent of forest loss was often highly locally specific.[39]

Although drug markets have expanded in the Amazon Basin region overall, coca cultivation on its own is not explicitly correlated with large-scale deforestation.[40, 41, 42, 43, 44, 45, 46] There are exceptions: for example, coca production in Colombia close to the border with the

TABLE 3 Drug cultivation and deforestation in the Amazon Basin

	Percentage of the Amazon Basin accounted for by each country	Percentage of the country that is in the Amazon Basin	Cumulative deforestation (2001–2021) in hectares	Proportion of national coca cultivation that is in the Amazon Basin
Brazil	58.8	58.9	Acre (969,100) Amapá (71,300) Amazonas (1,933,300) Maranhão (1,206,200) Mato Grosso (7,307,400) Pará (9,311,700) Rondônia (34,600,600) Roraima – (534,400) Tocantins (186,200)	
Colombia	7.1	42	(2000–2021) Caquetá (735,000) Meta (656,000) Guaviare (371,000) Putumayo (236,000)	20
Peru	12.8	60	Loreto (776,000) Ucayali (687,000) San Martin (648,000) Huánuco (418,000) Madre de Dios (301,000)	99
Bolivia (Plurinational State of)	7.7	43	Santa Cruz (4,500,000) Beni (1,000,000) La Paz (293,000) Cochabamba (256,000) Pando (237,000)	100

Sources: "Forest Monitoring, Land Use & Deforestation Trends," Global Forest Watch, n.d.; "Connecting Space to Village: Geospatial Information for Improved Environmental Decision-Making in the Amazon," SERVIR Amazonia, n.d.; "Datos cartográficos Visualización de información geoespacial sobre la Amazonía.," RAISG, n.d.; "Subregiones de la Amazonia Colombiana," Instituto SINCHI, n.d.; coca cultivation surveys in Bolivia (Plurinational State of), Colombia and Peru; Instituto de Hidrología, Meteorología y Estudios Ambientales - IDEAM. Subdirección de Ecosistemas e Información Ambiental. Grupo de Bosques 2022. Proyecto Sistema de Monitoreo de Bosques y Carbono. Bogotá, D. C., Colombia; Instituto Nacional de Pesquisas Espaciais (INPE), Brazil, 2023.

Bolivarian Republic of Venezuela has been reported as a key factor driving deforestation there since 2016, including by forcibly requiring farmers to clear forests to make way for plantations.[47] Nonetheless, the actual *production* of coca leaf and *processing* into cocaine overall appear to have a comparatively limited direct effect on deforestation and degradation. There are, however, clear indirect effects generated by drug economies. Research has shown that the expansion of the agriculture frontier, cattle ranching, mining, roads, urban and energy development schemes, displacement and migration driven by the drug economy are potentially stronger covariates contributing to deforestation.[48]

Drug cultivation and processing do generate environmental impacts. For example, the use and spread of toxic precursor chemicals, such as acetone and sulfuric acid, and gasoline can contaminate groundwater and soil.[49] It takes more than 300 litres of gasoline to produce 1 kilogram of cocaine, with legacy impacts ranging from water pollution to soil degradation, which have implications for both animal and human health. Coca farmers also frequently use (illicitly sourced) chemical fertilizers and herbicides, which are leaching into rivers and disrupting local habitats and ecosystems.[50] The wider effects of the drug production processes in the Amazon Basin are still poorly researched and warrant further investigation.

Forced eradication can also trigger deforestation and environmental degradation since it can push illicit cultivation into new areas. Evidence however is only available in Colombia and, although a 2013 assessment suggested a positive correlation between eradication and shifting cultivation,[51] a more recent study, from 2019, indicated that the effect on new coca cultivation

MAP 3 Coca cultivation area in Bolivia (Plurinational State of), Colombia and Peru, 2021

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: National monitoring systems supported by UNODC and the governments of Bolivia (Plurinational State of), Colombia and Peru. Boundary of the Amazon Basin, produced by the Amazon Network of Georeferenced Socioenvironmental Information (*Red Amazónica de Información Socioambiental Georreferenciada*) (RAISG, 2020)

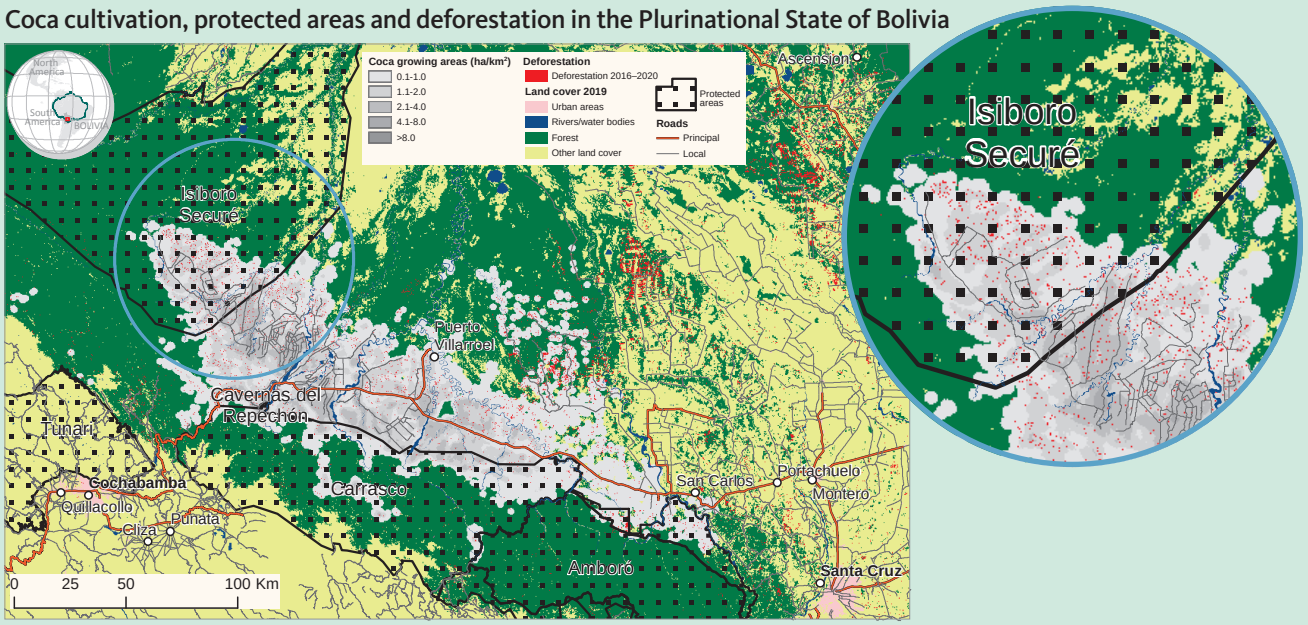
is either non-existent (in the case of manual eradication) or leads to a reduction of new coca cultivation in neighbouring areas as well (in the case of aerial spraying).[52] Moreover, while some research has shown that aerial spraying can generate negative health effects on coca growing communities,[53, 54] other research is not so conclusive about the size and scope of the impact on the environment of glyphosate, spraying mixtures and the precision of spraying.[55] Forced eradication can also contribute to population displacement and voluntary migration, thus imposing new pressures on forested areas through urbanization and increasing deforestation and degradation.[56, 57]

The indirect impact of the illicit coca economy on deforestation is more important

There is growing evidence of the indirect relationships between drug markets and deforestation. Specifically, drug trafficking and associated money-laundering tied to local extractive sectors are associated with the loss of forest cover.[58] Dubbed "narco-deforestation", these activities include the reinvestment of drug trafficking proceeds into legal and illegal land acquisition, forest clearance, the creation of pasture for cattle, and other agricultural activities such as soy and palm plantations.[59] Alongside the recycling of profits into agricultural activities is the financing of accompanying infrastructure, ranging from landing strips to irregular roads, all of which affect the integrity of forests and

Most of the deforestation in Bolivia is not driven by coca cultivation but coca cultivation is driving deforestation into protected areas

Coca cultivation, protected areas and deforestation in the Plurinational State of Bolivia



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: UNODC Coca cultivation survey 2021; Internal administrative boundaries of Bolivia: United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2023. Protected areas: Servicio nacional de areas protegidas SERNAP. Deforestation data: RAISG 2021. Forest/land cover: Copernicus Global Land Service, 2019.

biodiversity. Such phenomena have been documented across Central America, in Guatemala, Honduras, and Nicaragua,[60, 61] and regional authorities are opening an increasing number of investigations into similar crimes in the Amazon Basin.[62, 63]

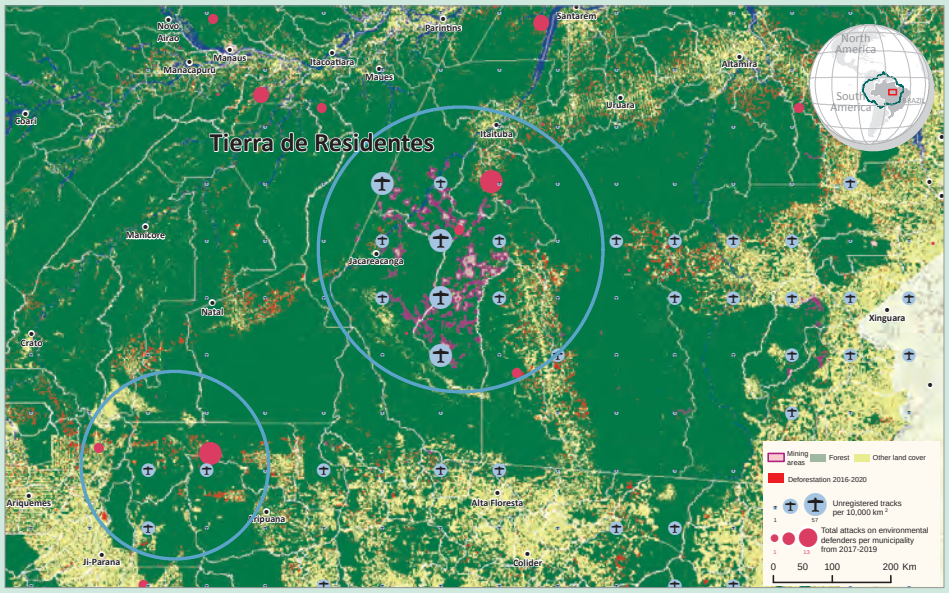
Drug trafficking organizations contribute to deforestation through other crimes that affect the environment

The expansion and diversification of drug trafficking organizations and other criminal groups into cattle ranching, selective logging, gold mining, real estate, and trafficking in wildlife are directly and indirectly contributing to a host of negative environmental impacts.[64, 65, 66, 67, 68] For example, law enforcement officials, social scientists, journalists and environmental activists have detected instances of drug factions and criminal groups illegally purchasing land to support illegal logging operations in Amazon Basin countries.[69, 70] Some have also observed the clearance of land to establish cannabis plantations in Pará State in Brazil.[71, 72] The scale of these latter activities is considerable: Federal and state police reportedly seized over two million marijuana plants between 2015 and 2020 in the Legal Amazon, over half of them in Pará.[73] A single intervention – Operation "Damned Harvest" in August 2020 – netted 200 tons (over 400,000 plants) of cannabis in Pará.[74]

Not only can coca and cannabis plantations impose a strain on water resources (using twice as much water as alternative crops)[75, 76] but their establishment and maintenance often generate wide-ranging negative social effects. When land is seized, purchased, cleared and cultivated by drug traffickers, this can trigger and exacerbate local tensions over land and property rights, especially if coca and cannabis growing occur on or

An example of crime convergence in the context of deforestation

Illegal mining, unregistered airstrips, attacks against environmental defenders and deforestation in Brazil



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Sources: Base Cartography of Brazil and Administrative boundaries: Brazilian Institute of Geography and Statistics - IBGE and Geoportal Provita, 2023. Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2020). Forest/land cover: Copernicus Global Land Service, 2019. Attacks against environmental defenders: Tierra de Residentes, 2023. Mining and deforestation data: RAISG, 2020/2021. Unregistered tracks: plataforma.brasil.mapbiomas.org, 2023.

near Indigenous land. There are frequent media and non-governmental reports of disputes flaring up between drug trafficking groups and traditional communities, including an increase in assassinations, assassination attempts, death threats, and violent and non-violent protests.[77, 78, 79, 80, 81] Across the Amazon Basin, violent disputes between local residents and drug traffickers are routinely reported, often a result of complaints over land speculation and illegal occupation.[82, 83]

Drugs are trafficked along with timber products

Authorities in the Amazon Basin are particularly concerned by the fact that drug-trafficking groups are not only burning down and clearing tropical forests but also trafficking timber and illegally leveraging shipping and trading routes. These challenges are well known in Brazil and Peru, where drug traffickers have long exploited timber trafficking routes and disguised drug shipments in legal and illegal lumber exports either via Pacific or Atlantic ports and onward to global markets.[84, 85, 86, 87] In Colombia, drug traffickers also subcontract timber companies and smugglers who conceal drugs in the hulls of boats and transport them from ports, including via Brazil and Venezuela (Bolivarian Republic of), or from Guyana and Suriname.[88]

Federal police in Brazil have observed a sharp increase in instances of drugs concealed in consignments of timber destined for foreign markets, in particular Western Europe. An estimated 16 major seizures of cocaine in Brazil were concealed in wood shipments between 2017 and 2021 alone.[89] For example, approximately 9 tons of drugs were intercepted from large timber consignments due to be shipped onward to Belgium,[90] France, Germany, Italy, Portugal, Slovenia and Spain. Drug seizures occur in ports in the Amazon, such as Vila do Conde, near Belém, but also far from the

Illegal gold mining in the Amazon Basin

Major sites of illegal gold mining in Bolivia (Plurinational State of), Brazil, Colombia and Peru

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: Amazon Network of Georeferenced Socioenvironmental Information, (RAISG, 2020); Insight Crime May 2021 and October 2022; and consultations with environmental and law enforcement specialists in Colombia, Ecuador and Peru.

Gold mines and presence of the criminal group *Primeiro Comando da Capital*

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations

Note: the shaded area reflects approximately where the Criminal group Primeiro Comando da Capital (PCC) is operating within a larger area.

Sources: Boundary of the Amazon Basin: Amazon Network of Georeferenced Socioenvironmental Information, (RAISG, 2020); Mining deforestation alerts: Amazon Mining Watch; PCC presence based on reports from federal police and from local Indigenous Peoples.

A significant proportion of the gold produced in the Amazon Basin is illegal,[a, b] and high prices during the coronavirus disease (COVID-19) pandemic have precipitated a veritable gold rush. In Brazil, tens of thousands of illegal miners operate in hundreds of illegal gold mining operations, with approximately half of the country's gold believed to be illicitly sourced.[c, d] Studies have identified over 320 illegal mines, both active and inactive, in 2017 across the nine states making up the Legal Amazon. [a, e, f]According to media reports, drug trafficking groups such as *Primeiro Comando da Capital* (PCC) have infiltrated multiple illegal mining operations, offering "protection", extorting "taxes", and controlling pits and dredging machinery.[g, h]

Illegal gold mining is also widespread in other Amazon Basin countries. In Colombia, most illicit wildcat gold mining occurs outside the Amazon Basin; 70 of the 101 municipalities reporting illicit extraction of gold also allegedly registered coca cultivation.[i, j] In the Colombian Amazon, illicit gold mining using wildcat machinery is less frequent than the exploitation of rivers with dredges, which is not comprehensively monitored; only 10 rivers have been monitored for evidence of gold exploitation, 9 of which were affected by dredging.[k] Gold is the top export of the Plurinational State of Bolivia and the use of mercury is generating negative environmental impacts,[l] including along the "golden route" that transects national parks and reserves in the Amazon Basin.[m, n] In Peru, gold mining is one of many industries in which drug traffickers seek to launder their proceeds[o] and the Superintendency of Banking, Insurance and Private Pension Funds of Peru has highlighted how drug traffickers have been financing gold mining – including dredgers, backhoes and other heavy machinery – in the departments of Madre de Dios and Puno.[p]

Brazilian drug trafficking groups have expanded their interests in gold mining across borders. For example, since 2019, *Comando Vermelho* (CV) reportedly extended operations into Madre de Dios, Peru.[p] According to media sources, a newly formed group, *Los Malditos del Comando Vermelho*, is also controlling drug trafficking routes that pass through the Valle de los Ríos Apurímac, Ene y Mantaro (VRAEM) and Puno.[q] Peru ramped up anti-mining activities in VRAEM in 2019, including a notorious site in La Pampa, but activities increased on the Pariamanu river in 2020 and 2021.[r] Local authorities there

have noted an increase in mercury poisoning, as well as a sharp rise in armed robberies. Meanwhile, the ex-members of *Fuerzas Armadas Revolucionarias de Colombia* (ex-FARC) are also operating gold mining operations on both sides of the border between Colombia and the Bolivarian Republic of Venezuela.[s]

[a] Melina Risso, Julia Sekula, Lycia Brasil, Peter Schmidt, Maria Eduarda Pessoa de Assis, "Illegal Gold That Undermines Forests and Lives in the Amazon," Strategic Paper 53 (Igarapé Institute, April 8, 2021).

[b] Bruno Venditti, "Illegal Gold Mining in Amazon Equivalent to Half of Brazil's Production — Report," Mining.com, July 7, 2022.

[c] Bruno Manzolli et al., "The Prevalence of Illegal Gold Production in Brazil" (Centro de Sensoriamento Remoto, Laboratório de Gestão de Serviços Ambientais (UFMG), Instituto de Geociências (IGC), 2021).

[d] Anthony Boadle, Lisandra Paraguassu, and Anthony Boadle, "Exclusive: Brazil Plans Legislation to Crack down on Laundering of Illegal Gold," *Reuters*, February 16, 2023.

[e] "Estudo denuncia epidemia de garimpos na Amazônia brasileira," Deutsche Welle, December 10, 2018.

[f] About half of the gold exported from the country between 2015 and 2021 appears to have some degree of illegality.

[g] Reuters, "U.S. Treasury Eyes Brazil Drug Gang Ties to Illegal Amazon Gold Mines," *Reuters*, August 17, 2022.

[h] "Illegal Gold Miners Stalk Amazon as Authorities Look Away," *BBC News*, June 23, 2021, sec. Latin America & Caribbean.

[i] UNODC, "Methodological Proposal for the Estimation of Illicit Financial Flows Associated with Illicit Cocaine Markets and Illicit Gold Mining in Colombia," 2021.

[j] UNODC, "Survey of Territories Affected by Coca Cultivation, 2021," 2021.

[k] UNODC, "Alluvial Gold Explotation in Colombia. Evidence from Remote Sensing as Dated 2021" (Bogota: UNODC-SIMCI, 2022).

[l] Thomas Graham, "In Bolivia, Mercury Pollution Spreads Amid a Surge in Gold Mining," Yale Environment 360, December 8, 2022.

[m] Maxwell Radwin, "Shady Contracts, Backdoor Deals Spur Illegal Gold Mining in Bolivian Amazon," Mongabay, November 8, 2022.

[n] Eduardo Franco Berton, "Gold Rush in Bolivia Sparks Conflict between Miners and the Community," Mongabay, October 28, 2016.

[o] "On the Trail of Illicit Gold Proceeds: Strengthening the Fight against Illegal Mining Finances: Peru's Case" (Washington D.C: Organization of American States (OAS), Department against Transnational Organized Crime (DTOC), November 2021).

[p] Livia Wagner, "The Ecosystem of Illegal Gold Mining," *Research Publications* 43 (October 1, 2021).

[q] Manuel Calloquispe Flores, "'Los malditos del Comando Vermelho': así operaba la perversa organización criminal que era dirigida desde Brasil," *El Comercio*, November 13, 2019.

[r] "MAAP #137: Nuevo Foco de Minería Ilegal en la Amazonía Peruana: Río Pariamanu (Madre de Dios)," MAAP, May 4, 2021.

[s] OECD, "Gold Flows from Venezuela: Supporting Due Diligence on the Production and Trade of Gold in Venezuela" (Paris: OECD, 2021).

Amazon, notably in north-eastern ports such as Natal (Rio Grande do Norte State), Pecém (Ceará State), Salvador (Bahia State), and Suape (Pernambuco State), as well as southern and south-eastern ports, such as Paranaguá (Paraná State), Itajaí, Navegantes and São Francisco do Sul (all in Santa Catarina State) and Santos (São Paulo State). Contraband is frequently concealed in shipments of logs, beams, pallets and laminate.[91, 92]

Beyond deforestation: drug actors, crimes that affect the environment and convergent crime

Drug trafficking organizations have a significant role in perpetrating crimes that affect the environment with an impact that goes beyond deforestation. Several of the largest drug trafficking organizations in South America are involved in financing logging, mining, farming and cattle operations, providing protection services, extorting local workers and communities, and leveraging logistical capabilities and trafficking routes to move contraband and money-laundering proceeds. These activities are frequently accompanied by a host of convergent crimes, ranging from bribing politicians and law enforcement and port officials to perpetrating violence and trafficking in persons for sexual exploitation. Groups involved in both drug-related crime and crimes that affect the environment also regularly establish shell companies to facilitate money-laundering and other forms of fraud and evasion.[93, 94]

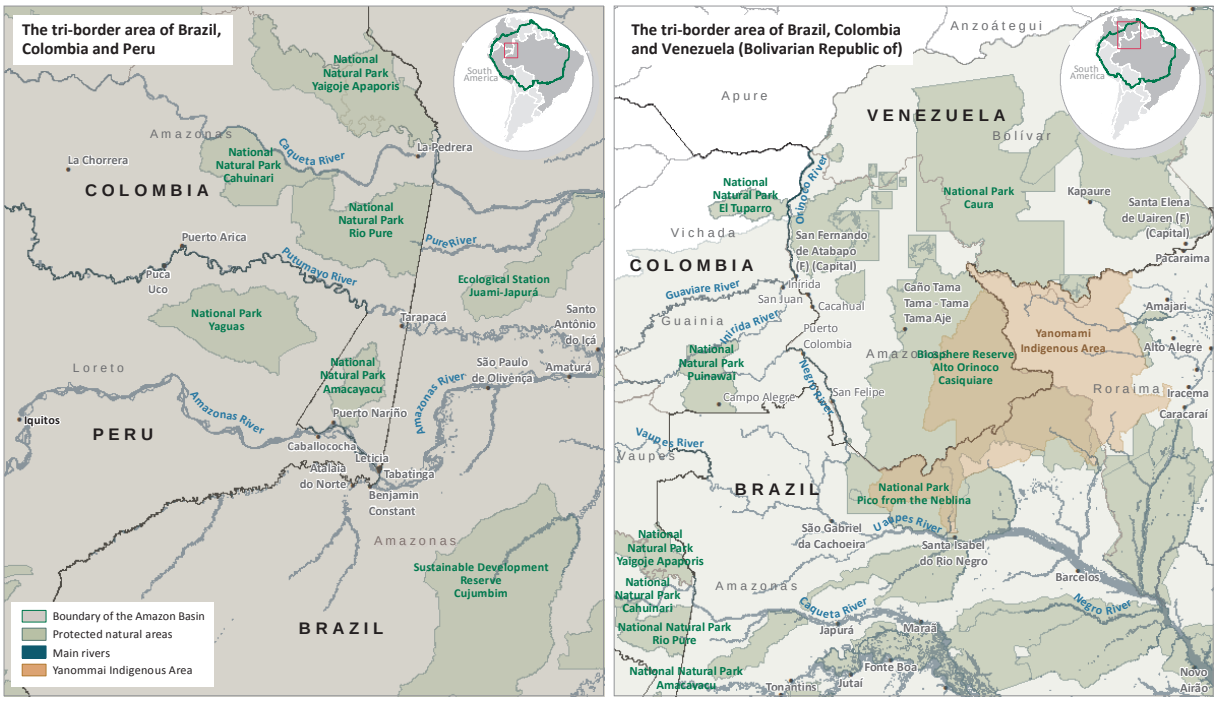
Drug trafficking organizations are diversifying into new business lines, including land-grabbing, illegal logging,[95] trafficking of precious metals and minerals, illegal mining and trafficking of wildlife. They are doing so by leveraging their technical skills and networks for shipping drugs to foreign markets in order to traffic a diverse range of raw materials, ranging from illegal wood products to critical and precious minerals such as gold, but also coltan, corundum, graphite, manganese, microsilica and tungsten. Organized criminal groups are also transferring illicit proceeds into ostensibly legal businesses, including farming, ranching, and small and medium-sized businesses in and outside the Amazon Basin.

Examples of crime convergence in the tri-border areas

The Amazon Basin is home to several vast frontier regions where drug-related crime, crime that affects the environment and convergent crime are concentrated, benefiting from weak law enforcement, a rich ecosystem of criminal actors and a scarcity of meaningful economic alternatives. Border areas are often hotspots where primary forests are being cleared to make way for coca production, illegal logging and gold extraction which amplifies corruption, financial crimes and lethal and nonlethal violence. A notable high-risk area is where the frontiers of Brazil, Colombia and Peru converge, in particular their key rivers, namely the Caquetá, Putumayo and Amazon, facilitating the trafficking of timber, gold and drugs. Another high-risk zone extends across the northern border of Brazil with Colombia and the Bolivarian Republic of Venezuela, which is 4,000 kilometres long and stretches from Cucui to Pacaraima.

Coca cultivation and processing has intensified in several Amazonian border areas where the presence of law enforcement officers is limited.[96, 97, 98] An example of this is the Bajo Amazonas region in Loreto, Peru, where coca production has surged from 370 hectares in 2015 to over 6,470 hectares by 2021.[99] Raids in the Putumayo and Mariscal Ramon Castilla departments of Peru have yielded enormous quantities of gasoline, cement and calc-silicate, all indicators that coca is being both grown and processed there.[100, 101] While the primary organized criminal groups in Peru are less widely known, a group calling itself *Clan Chuquizuta* is reportedly active near the Colombian border.[102] Local authorities believe that traffickers in the region may

MAP 4 Tri-border areas in Colombia, Peru, Brazil and Venezuela (Bolivarian Republic of)



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Internal administrative boundaries of Brazil: the Brazilian Institute of Geography and Statistics. Internal administrative boundaries of Colombia: the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Internal administrative boundaries of Brazil: Geoportal Provita, 2023. Internal administrative boundaries of Colombia: the National Geographic Institute, 2021. Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2020). Protected areas of Brazil: Ministry of the Environment, 2023. Protected areas of Colombia: National Natural Parks, 2022. Protected areas of Venezuela: Geoportal Provita, 2023. Igarape Institute and InSight Crime.

be acting as independent criminal contractors, providing services to Colombian and Brazilian criminal groups.[103]

The tri-border areas are long-standing transit corridors for all manner of informal and illegal commodities. During the early 2000s, for example, media reports suggested that as much as 20 tons of cocaine a month was allegedly exported by FARC to high-level Brazilian traffickers.[104] More traditional drug trafficking groups scaled up their involvement in crimes that affect the environment during the 2010s. The dominant drug trafficking groups involved in crimes that affect the environment are from Brazil and Colombia. Among the most known in Colombia are the ex-FARC and *Ejército de Liberación Nacional* (ELN), as well as the FARC breakaway faction, *Los Comandos de la Frontera*.[105] Meanwhile PCC and CV of Brazil have long-established footholds in Colombia, Peru, and Venezuela (Bolivarian Republic of).[106, 107]

The spread of criminal activity in border areas engenders a host of security and health risks while also entangling local populations in criminal enterprises. Poorer populations, in particular younger men without stable employment and lacking formal education, may succumb to recruitment by criminal groups or resort to growing coca, selling illegal timber or working on gold-dredgers, often colluding with criminal organizations. Men, women and youth with few alternative opportunities are often pulled into the crime vortex as prospectors, loggers, cooks, drivers or, in some cases, into forced sexual labour. Whether involved in crime or not, residents are routinely exposed to toxic residue from mining operations that poison local ecosystems, including food and water sources.[108, 109, 110]

Among the most common forms of crime affecting the environment involving drug factions in tri-border areas is illegal mining, in particular of gold but increasingly also of other precious metals.[111] Owing to limited law enforcement measures, informal mining activities and associated businesses are proliferating in border areas such as Tarapacá in Colombia (on the tri-border with Brazil and Peru), many of them "taxed" by criminal groups. Drug factions and illegal mining operations frequently work with criminal brokers using fraudulent receipts to launder gold. These activities reportedly intensified during the COVID-19 pandemic owing to significantly reduced military, police and environmental patrols across the region.[112]

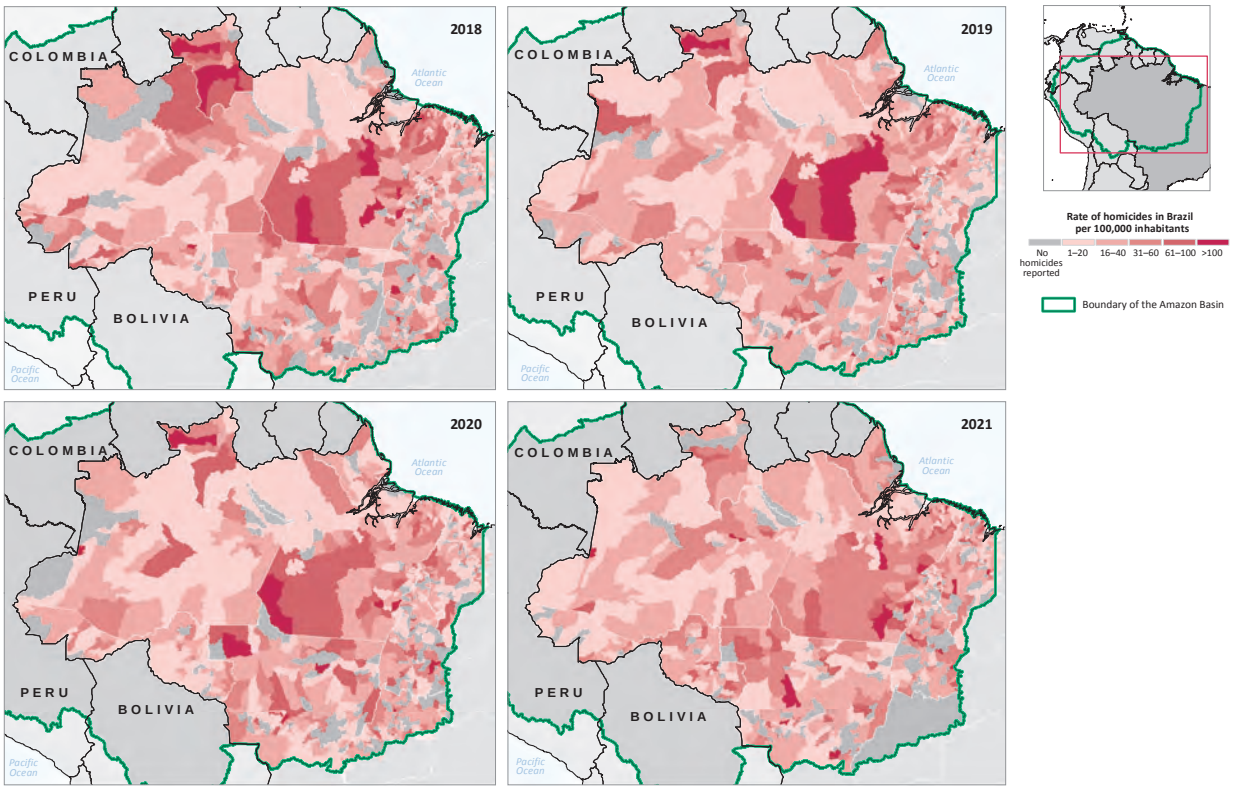
Another common form of crime that affects the environment in the tri-border areas of Brazil, Colombia and Peru is illegal logging. Illegal logging operations in Brazil, for example, are expanding from established areas in Brazil such as Mato Grosso, Pará and Rondônia to more remote regions of Acre, Roraima and Amazonas.[113] The combination of abundant forest, cheap land and limited controls has given rise to an explosion in illicit deforestation. Timber harvesting in Peru is also targeting high-value hardwood species. Trees are cut down, transformed into planks and rapidly sold domestically and exported, despite export bans. The border areas serve a role in allowing the concealment of illegally procured timber. For example, the village of Islandia on the Yavarí River in Peru near the border with Brazil and Colombia serves as a major hub for timber trafficking and processing.[114]

Impacts on communities and Indigenous populations

Impact on health, violence and environment

In under-policed areas of the Amazon Basin where State presence and associated social services are limited, drug production, trafficking and consumption typically have a disproportionately high impact on vulnerable communities and the environment for each unit produced.[115, 116, 117] One reason for this is that drug producers and traffickers have fewer constraints in place to minimize their environmental impacts. Another factor is that people who use drugs, as in other deprived urban and rural areas of South America, often have fewer options to access drug prevention and treatment services. In order to reduce the risk of disruption from security forces, drug groups often confine production and trafficking to more isolated, protected areas where many of these environmental impacts are hidden from public scrutiny. In Colombia, for example, nearly half of all illicit coca bush cultivation occurred in areas with special protection status in 2020,[118] and

MAP 5 Mapping homicide rates in relevant states and municipalities of the Amazon Basin, Brazil, 2018–2020



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Source: Notes: Internal administrative boundaries: the Brazilian Institute of Geography and Statistics. Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2020). Homicide data: Ministry of Health - DATASUS.

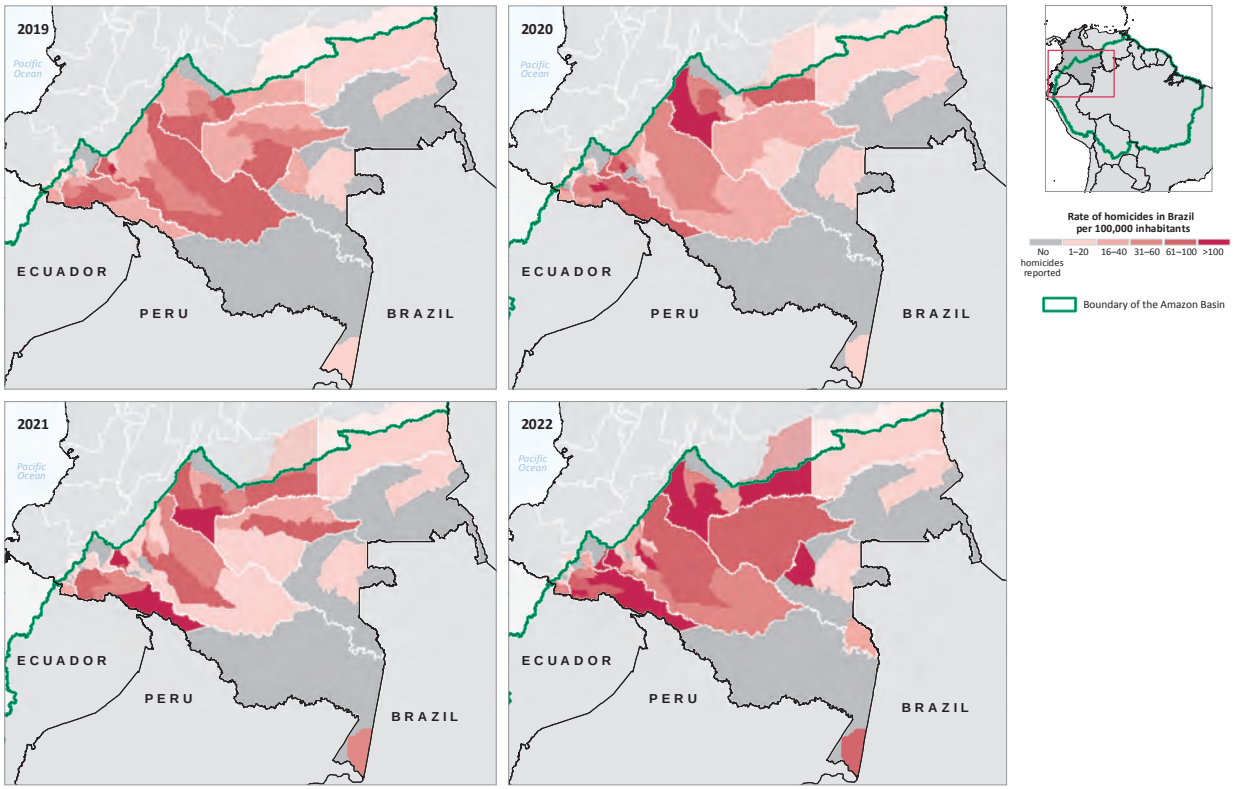
in Brazil, cocaine trafficking occurs on the dozens of rivers and tributaries in the Legal Amazon, easily evading the modest police presence there.

Many municipalities in the Amazon Basin register higher rates of criminal violence than the national average. This is due in part to violent competition between rival criminal factions competing for control over various facets of the production distribution, and retailing of drugs (and, increasingly, of other commodities). In 2021, for example, municipalities in the Brazilian Legal Amazon registered among the highest homicide rates in the country: a regional average of 29.6 homicides for every 100,000 people, compared with a national average of 23.9.[119] The homicide rate in northern Brazil, home to seven of nine Legal Amazon states, increased by 260 per cent between 1980 and 2019 at a time when large parts of southern Brazil registered significant declines in homicide rates. Municipalities reporting comparatively higher levels of deforestation also recorded above-average levels of violence and disputes over land and property.[120]

Impact on Indigenous communities

Organized criminal groups are increasingly encroaching upon national and state parks, conservation and protected areas and Indigenous territories. The implications for local populations range from property disputes to periodic cooptation and recruitment into various facets of the illicit drug trade. The impacts can also be extremely violent. For example, Indigenous

MAP 6 Mapping homicide rates in relevant states and municipalities of the Amazon Basin – Colombia, 2019–2022



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Source: Internal administrative boundaries: the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socio-environmental Information (RAISG, 2020). Homicide data downloaded from the Colombian National Police.

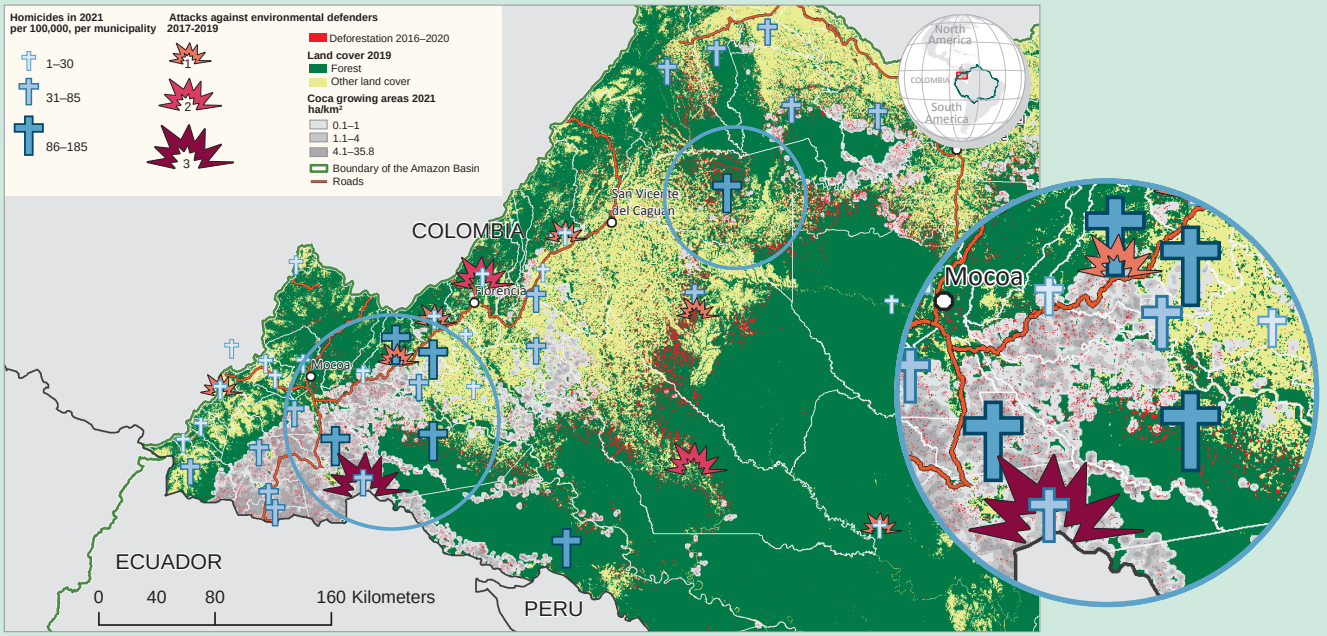
populations registered a more than 20 per cent increase in homicidal violence between 2009 and 2019 in Brazil.[121] They also experienced a rapid increase in exploitation of their protected lands, in particular from land-grabbers, illegal loggers and *garimpeiros* (wildcat gold miners). In Brazil, mining on Indigenous lands expanded by 625 per cent between 2011 and 2021, with a particularly large increase since 2019.[122, 123] The deforestation and environmental degradation generated by the extraction of gold and prolific use of mercury has had disastrous impacts on Indigenous territories.[124, 125, 126] Illegal mining has further precipitated devastating outbreaks of disease and malnutrition in local communities.[127, 128]

Members of the criminal group PCC are increasingly involved in aspects of mining operations in Yanomami in Brazil, the world's largest Indigenous territory and home to approximately 30,000 Indigenous People.[129, 130, 131] Drug trafficking and sexual exploitation are also increasingly common,[132] with PCC viewed as a key actor.[133, 134, 135] The PCC is also suspected of being involved in providing protection, financing the extraction of gold and using the mines to launder drug profits.[136] The Urariocera river is a key corridor through Yanomami land that facilitates illegal mining, with organized criminal groups illegally "taxing" miners, store owners and local residents.

The expansion of illegal gold mining in and around Yanomami territory has had devastating health

Hot spots of violence, coca cultivation and deforestation: an example of uneven overlap

Coca cultivation, violence and deforestation in the eastern part of the Colombian Amazon



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: UNODC survey on coca cultivation 2021; Base cartography of Colombia and administrative boundaries: Agustin Codazzi Geographic Institute - IGAC and the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Limit of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information and deforestation data (RAISG, 2020/2021). Attacks against environmental defenders: Tierra de residentes, 2023. Homicides: Policía Nacional de Colombia.

implications for local communities. A 2022 study determined that half the fish collected from the Mucujaí and Urariocoera rivers recorded unsafe levels of mercury, raising concerns about the well-being of local residents.[137] Moreover, with tens of thousands of miners flocking to the region, deforestation accelerated across large areas of the Yanomami land, almost doubling from approximately 1,200 hectares in 2018 to 3,300 in 2021, virtually all of it connected to illegal mining. Federal police have been leading operations since early 2023 and removed an estimated 25,000 illegal miners.[138]

The Yanomami are hardly alone: illegal mining on Indigenous land in Brazil is estimated to have increased by almost 500 per cent between 2010 and 2020.[139] In the Yanomami and Munduruku communities, for example, between 50 and 90 per cent of the population suffer from mercury poisoning as a result of the use of mercury in nearby mining activities.[140] Meanwhile, in Peru, criminal groups are also involved in disputes with Indigenous populations alongside efforts to expand timber and gold extraction, with dangerously high levels of mercury poisoning also recorded.[141, 142] In Colombia, media reports and research studies document how armed groups routinely target Indigenous and community leaders in the Amazon region.[143] Narco-penetration has also extended into trafficking in wildlife and illegal fisheries, as recent investigations into violence in the Vale do Javari in the State of Amazonas in Brazil attest.[144, 145] According to police from the region, drug trafficking groups are also bartering in wildlife and commodities to transfer value between illicit economies.

Environmental impact: waste generated in the production of cocaine

The production of cocaine consists in essence of extracting the alkaloid found in the coca leaf and then refining and integrating the alkaloid into molecules that facilitate its absorption in the human body. The process of transforming coca leaf into cocaine through the solvent extraction method generates chemical waste. Indeed, coca bush growers use more agrochemicals in the cultivation of coca than of any other crop. In 2020, approximately 85 fertilizers, 62 herbicides and 100 pesticides were used in the illicit cultivation of coca crops in Colombia.[a] Diversification in the use of agricultural inputs appears to be aimed at improving coca crop yields and profitability. Substances of environmental concern include herbicides that contain paraquat, glyphosate and 2,4-dichlorophenoxyacetic acid; insecticides containing methamidophos and monocrotophos; and fungicides such as mancozeb.

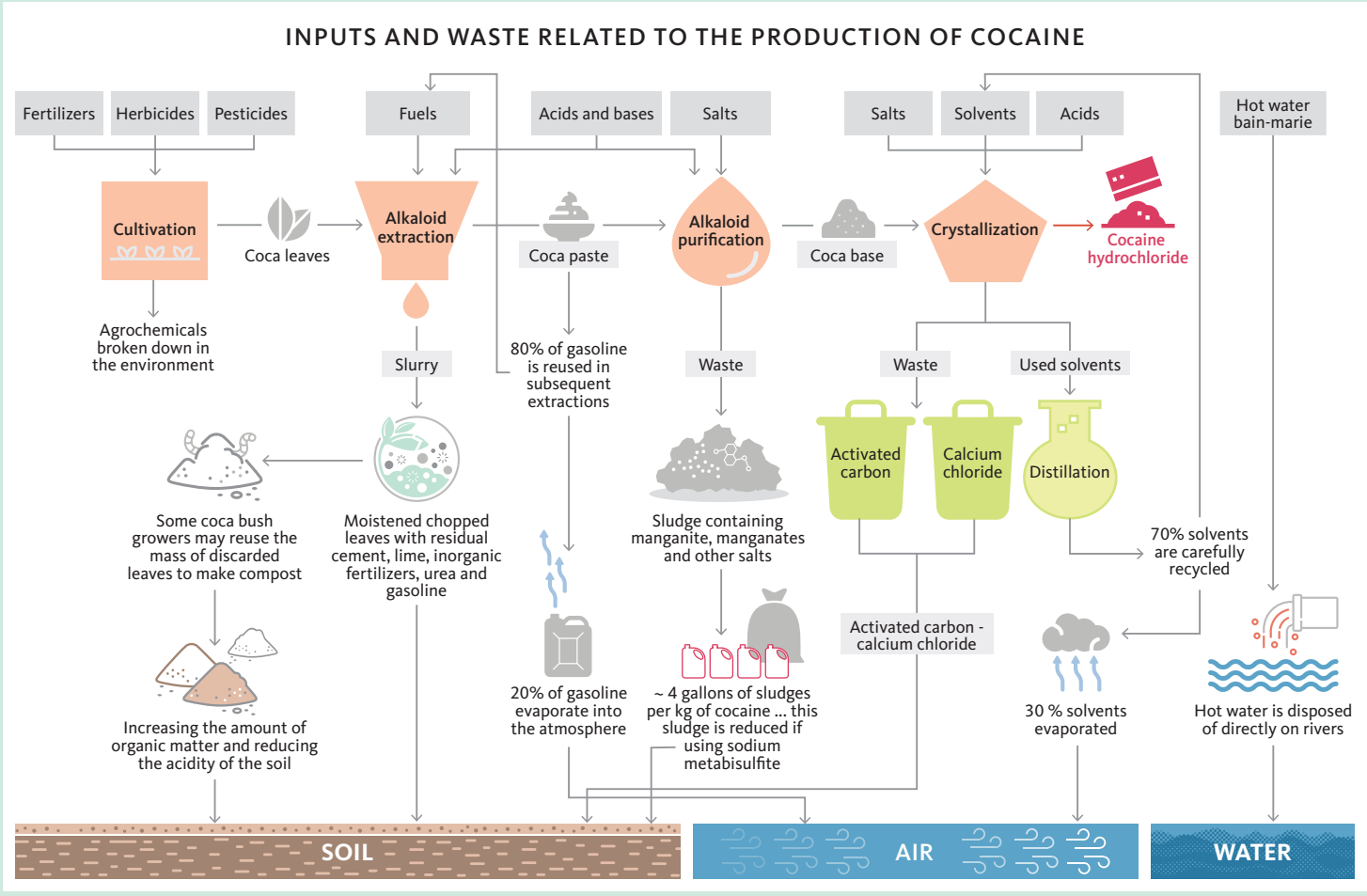
There are three main steps in cocaine production, which can be carried out in separate geographical areas including: extraction, refinement and crystallization.

Extraction – from coca leaf to PBC

The extraction phase involves separating out the cocaine alkaloid concentrated in the coca leaf. This is achieved by immersing leaves in fuel, mineral acids and alkaline substances, and results in the conversion to cocaine base paste. Typically, the percentage of cocaine alkaloid that is extracted from the leaf is 60–70 per cent. Given that the concentration of cocaine alkaloid in the coca leaf is just 0.2–0.8 per cent, approximately 99 per cent of the leaf mass that enters the extraction process is ultimately discarded. This explains why 700 kilograms of coca leaf are needed to produce a single kilogram of cocaine.

To process 700 kilograms of coca leaf, approximately 320 litres of gasoline are required.

The gasoline separates the organic elements from the physical structure of the coca leaf during the extraction phase, which generates approximately 260 litres of gasoline containing the cocaine



alkaloid and other organic substances that play no role in the final product, and waste material. Approximately 60 litres of gasoline evaporate into the atmosphere during this process or are absorbed into the moistened waste material.

The waste material is typically disposed of in cultivation areas without being treated and usually consists of chopped leaves with residual cement, lime, inorganic fertilizers, urea and gasoline. The limited amount of gasoline remaining on moistened leaves evaporates rapidly, generating infinite dilution.[b] Some coca bush growers may reuse the mass of discarded leaves to make compost that will eventually be added to the coca crop, increasing the amount of organic matter and reducing the acidity of the soil, since the chemical substances used in the process are alkaline.

Sulfuric acid and water are then used to separate the cocaine alkaloid from the gasoline, and the acid becomes cocaine sulfate in solution. No waste is produced during this step of the process, since the gasoline (without the alkaloid) is reused in subsequent extractions. Subsequently, the cocaine sulfate is neutralized with an alkali in order to produce cocaine base paste (*pasta básica de cocaína* or PBC). The purity of the PBC produced at the end of the extraction phase typically varies between 50 and 65 per cent. In addition to cocaine, PBC contains other organic compounds such as tannins, fibers and other alkaloidal impurities, which are eliminated in the refining phase.

The refining or purification phase transforms PBC into cocaine base. This phase is usually carried out in concealed locations in the vicinity of coca bush cultivation or during the subsequent crystallization phase. Refining consists of eliminating organic impurities from PBC by means of chemical oxidation using potassium permanganate, which generates a sludge containing manganite, manganates and organic salts. In some laboratories where large quantities are processed, this sludge is reduced using sodium metabisulfite, making it easier to obtain cocaine base of a purity higher than 80 per cent. The remaining sludge is disposed of directly in the immediate environment.

Crystallization – from cocaine base to cocaine hydrochloride

The crystallization phase, which converts cocaine base to cocaine hydrochloride, generally occurs in isolated locations, often in forested areas that are difficult to access, where traffickers can more easily set up and maintain a clandestine laboratory. Proximity to a water source is fundamental, as crystallization laboratories require a large volume of water. In this phase, a type of *bain-marie* is used to heat the base, which is dissolved in organic solvents and has hydrochloric acid added to it. The hydrogen and the chlorine in the hydrochloric acid become integrated into the cocaine base, converting it into cocaine hydrochloride. Solvents are carefully recycled so that losses are kept to a minimum. During this step, waste that can harm the environment includes evaporative emissions. Accidents that may occur during this process can also generate environmental impacts.

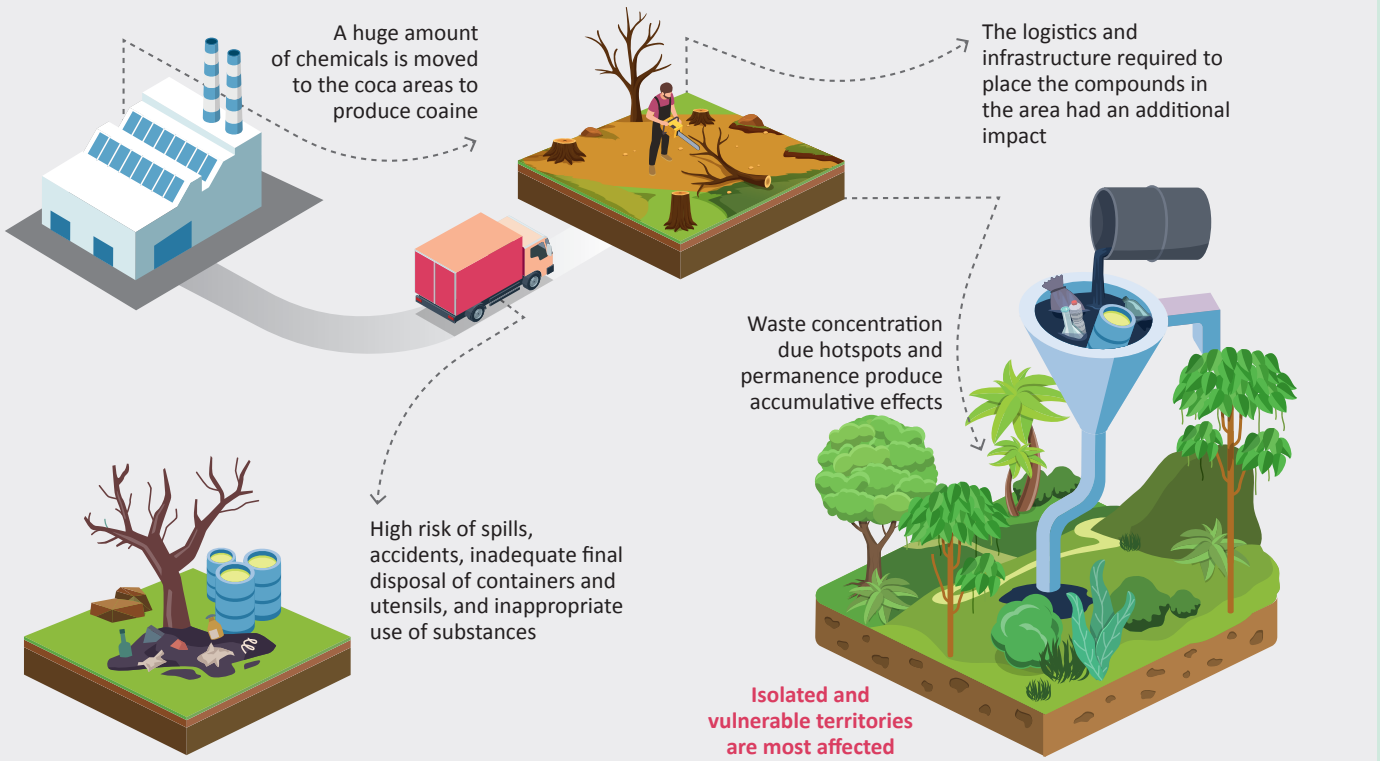
Processing cocaine: inputs and residuals estimations

	Input materials		Quantity of cocaine produced			Waste residuals		Quantity of cocaine produced			Affected areas
			1 ton	Amazon Basin	Global			1 ton	Amazon Basin	Global	
				1,250 tons	2,304 tons				1,250 tons	2,304 tons	
Extraction phase	Coca leaves	metric tons	700	875,000	1,612,800	Moistened chopped coca leaves	ton	709	886,176	1,633,626	Residuals affecting mostly coca cultivation regions
	Gasoline	million of litres	0.34	423	779						
	Sulfuric acid	Litres	1.90	2,375	4,378	Evaporated gasoline	million of litres	0.07	85.4	156.4	
	Cement	Kilograms	61	75,875	139,853						
	Urea	Kilograms	6.40	8,000	14,746	Inorganic material	ton	67	84,688	155,038	
	Ammonia	Litres	1.20	1,500	2,765						
Refining phase	Potasium permanganate	Kilograms	0.20	250	461	Sludges	million of litres	0.016	20	37	
	Sulfuric acid (*)	Litres	0.90	1,125	2,074						
	Sodium hydroxide	Litres	0.20	250	461						
	Sodium metabisulfite (*)	Kilograms	0.20	250	461						
Crystallization phase	Solvents: Includes acetates (Ethyl, Butyl, n-propyl);	Litres	14	16,875	31,104	Evaporation of solvents	million of litres	0.004	5.1	9.3	Residuals affecting isolated and hidden forested laboratories zones
	Chloridric acid	Litres	0.20	250	461						
	Calcium chloride	Kilograms	1	1,250	2,304	Calcium chloride	ton	0.98	1,238	2,267	
	Cutting substances	Kilograms	0.20	250	461						
	Activated carbon	Kilograms	0.10	125	230	Activated carbon	Kilograms	100	126,400	231,400	

Sources: Government of Colombia and UNODC/SIMCI. Estimates based on the characterization of cocaine processing and subsequent validation.

Note: Quantities estimated on the basis of the solvent extraction method for processing coca leaves.

RISK FACTORS ASSOCIATED WITH COCAINE PRODUCTION WASTE



a Government of Colombia and UNODC / SIMCI (2021). Coca cultivation yield surveys in affected regions (2005-2021).

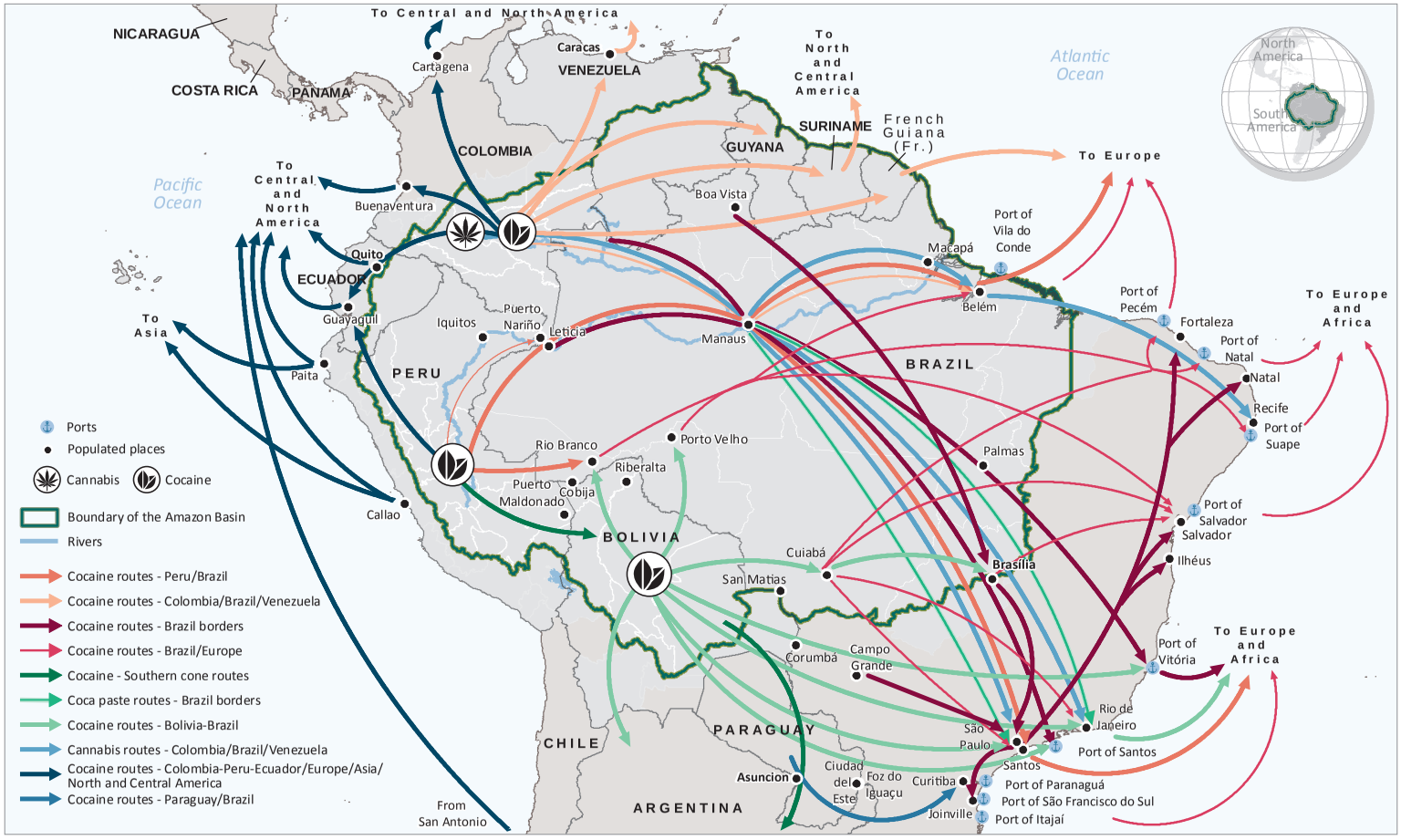
b "Infinite dilution" refers to a condition in which the concentration of the solute (gasoline) becomes zero. In this case, as the processing is done in open areas, the gasoline disperses rapidly in the air and the concentration of gasoline rapidly becomes zero.

Drug trafficking routes

Although drugs and other contraband, such as illegally felled hardwoods, illicit gold and captured animals, are frequently transported by road and air, rivers are the central conduit for trans-shipment within countries and across borders. The sheer volume of commercial traffic across the Amazon Basin's vast water network means that illicit products are easily concealed and often missed. Another factor is the weak regulation and monitoring of boats and shipping containers, including at public and private ports.[146]

Seizure data and open-source reporting show that cocaine produced in Colombia is typically exported to North America (and, to a lesser extent, Western Europe), either directly from ports on the Pacific or the Caribbean coasts or through Brazil and Venezuela (Bolivarian Republic of) northward toward the Caribbean and Central America. By contrast, Peru, and the Plurinational State of Bolivia, are considered the most common sources of cocaine for domestic markets in Brazil and Western Europe.[147] Drugs may be sent through Acre, Amazonas, Rondônia, Roraima, and Mato Grosso in Brazil before exiting through the north-eastern and south-eastern states on the Atlantic to Africa, Europe and beyond. Paraguay is a primary source of cannabis for Brazil and high-potency varieties are also trafficked from Colombia to Brazil, primarily for local consumption.[148]

MAP 7 Selected drug trafficking routes in the Amazon Basin



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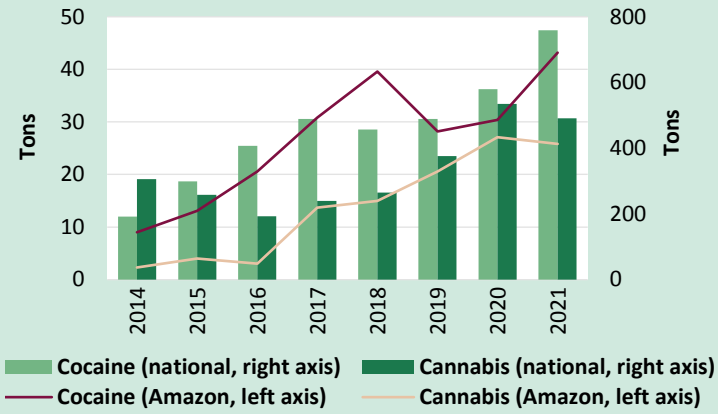
Source: Internal administrative boundaries of Brazil: Geoportal Provita, 2023. Internal administrative boundaries of Colombia: the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Internal administrative boundaries of Peru: the National Geographic Institute, 2021. Internal administrative boundaries of Bolivia: United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2023. Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2020) UNODC elaboration based on several sources, including previous editions of *World Drug Report*, open sources, media reports, seizure data, interviews and multiple international and national publications.

Disaggregating drug seizures in the Amazon Basin

The scope and scale of reported drug seizures in the Amazon Basin vary considerably from country to country and year by year. Even so, a review of official data over the past decade from all four countries indicates that the frequency and volume of drug seizures in the Amazon region are increasing over time.

Cocaine and cannabis seizures in Amazon departments and at the national level, Colombia, 2014–2021

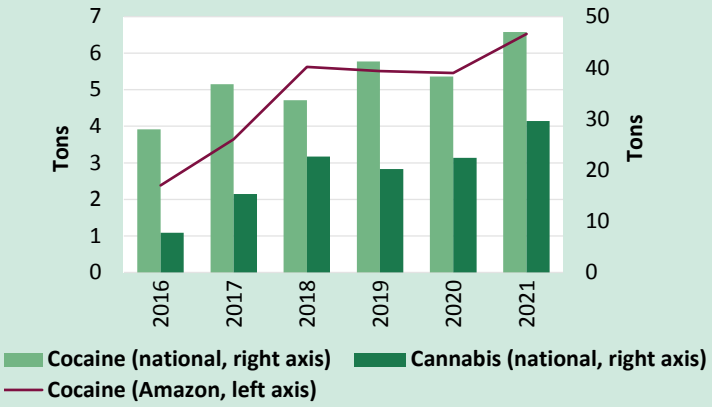


Sources: Amazon Basin calculations. Incautación de estupefacientes. Policía Nacional https://www.policia.gov.co/grupo-informacion-criminalidad/resultados-operativos; UNODC, responses to the annual report questionnaire.

In Colombia, for example, trends in cocaine and cannabis seizures in Amazon departments are broadly in line with national seizures between 2010 and 2022 but it should be noted that only a very modest share of all cocaine and cannabis seizures occur in Amazon departments: only between 1 and 5 per cent of all seizures of cocaine (including coca paste) in Colombia and an even smaller share of cannabis seizures between 2010 and 2022. A likely reason for this is that a modest share of Colombia's overall coca cultivation and cocaine production is located in departments in the Amazon Basin,[a] with most product exiting ports in the Pacific, the Caribbean or through Brazil and Venezuela (Bolivarian Republic of).

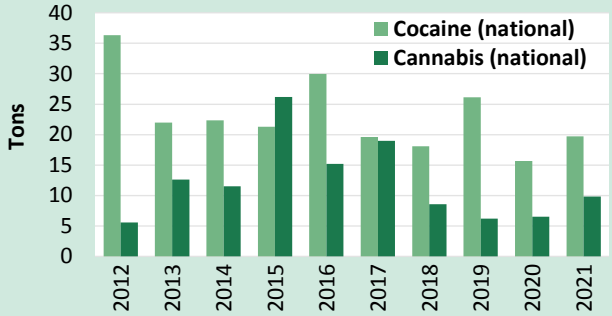
Likewise, in Peru, a comparatively small share of cocaine was seized in Amazon departments between 2015 and 2021 compared with the overall national incidence of seizures. Unlike in Colombia, however, virtually all coca and cocaine cultivation and processing in Peru occurs in departments located in the Amazon Basin. Only a minor share of all seizures of cocaine occurred in departments straddling the Amazon. In the absence of publicly available disaggregated data on cannabis seizures, it is not possible to discern the share occurring in the Amazon region.

Cocaine seizures in Amazon departments; Cocaine and cannabis seizures at the national level, Peru, 2016–2021



Source: Peru (2023) El Instituto Nacional de Estadística e Informática (INEI) – Dirección Antidrogas de la Policía Nacional del Perú (DIRANDRO); UNODC, responses to the annual report questionnaire.

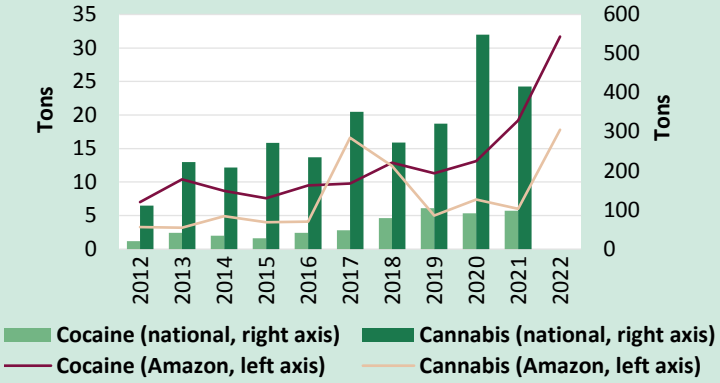
Cocaine and cannabis seizures in tons, Plurinational State of Bolivia, 2012–2021



Source: UNODC, responses to the annual report questionnaire.

In the Plurinational State of Bolivia, cannabis seizures at the national level peaked in 2015 but national seizures of cocaine did not reveal a clear trend between 2012 and 2021. The Plurinational State of Bolivia seized 20 tons of cocaine and just under 10 tons

Cocaine seizures in the Legal Amazon and cocaine and cannabis seizures at the national level in tons, Brazil, 2012–2022



Source: Brazil (2022) Drogas apreendidas por UF – Série histórica de 1995 a 2022 (até junho). Diretoria de Investigação e Combate; UNODC, responses to the annual report questionnaire.

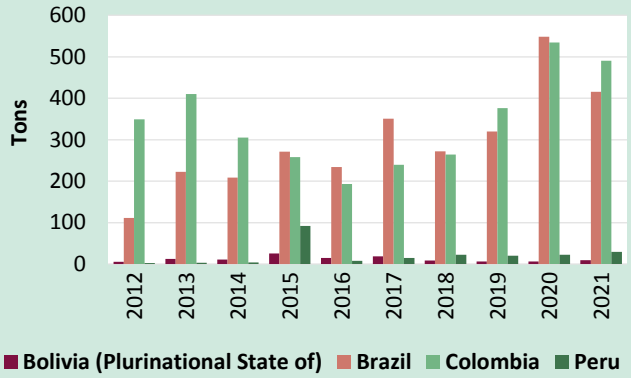
Note: seizures are sourced from Federal Police registers; the data from the states' civil police are not included.

of cannabis in 2021. As no official disaggregated data is available, the proportion of seizures occurring in the Amazon departments of the Plurinational State of Bolivia cannot be determined.

In contrast to the situation in Bolivia (Plurinational State of), Colombia and Peru, a significant share of the cocaine and cannabis seizures in Brazil between 2012 and 2022 were reported in the nine states that make up the country's Legal Amazon. Overall levels of cocaine seizures in the Legal Amazon steadily increased between 2012 and 2022, reaching over 30 tons by 2022.

A review of national seizures of cocaine (including coca derivatives) across all four countries between 2010 and 2021 reveals a high degree of variation. On the one hand, total seizures of cocaine from Colombia rose gradually between 2012 and 2021, reaching over 750 tons in 2021. Meanwhile, cocaine seizures from Peru collapsed between 2012 and 2013, from just over 32 tons to approximately 24 tons, and increased again to almost 47 tons in 2021. Seizures from Brazil also ebbed and flowed, though have crept steadily upward from a low of 20 tons in 2012 to around 100 tons since 2019. Cocaine seizures in the Plurinational State of Bolivia steadily declined from a high of over 36 tons in 2012 to just under 20 tons in 2021.

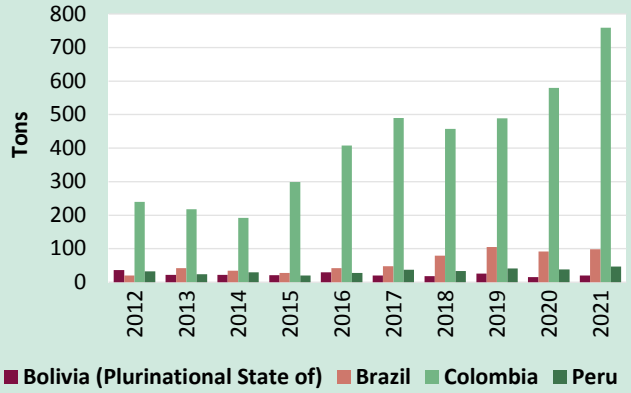
Regional trends: national reported cocaine seizures in the four Amazon Basin countries, 2012–2021



Source: UNODC, responses to the annual report questionnaire.

Note: Includes cocaine derivatives. In Brazil, seizures are sourced from Federal Police registers; the data from the states' civil police are not included.

Regional trends: national reported cannabis seizures in the four Amazon Basin countries, 2012–2021



Source: UNODC, responses to the annual report questionnaire.

Note: in Brazil, seizures are sourced from Federal Police registers; the data from the states' civil police are not included.

Regional trends in reported cannabis seizures between 2012 and 2021 appear more stable in comparison with seizures of cocaine and coca derivatives. For example, cannabis seizures in Colombia fluctuated from a low of 193 tons in 2016 to a high of 534 tons in 2020. Seizures in Brazil have likewise oscillated between a low of 111 tons in 2012 and a high of 548 tons in 2020. The most extreme variations occurred in Peru, from 3 tons in 2012 to 92 tons in 2015.

[a] 20 per cent of illicit coca cultivation in Colombia is located in the Amazon Basin and 25 per cent of the cocaine produced in Colombia comes from the Amazon.

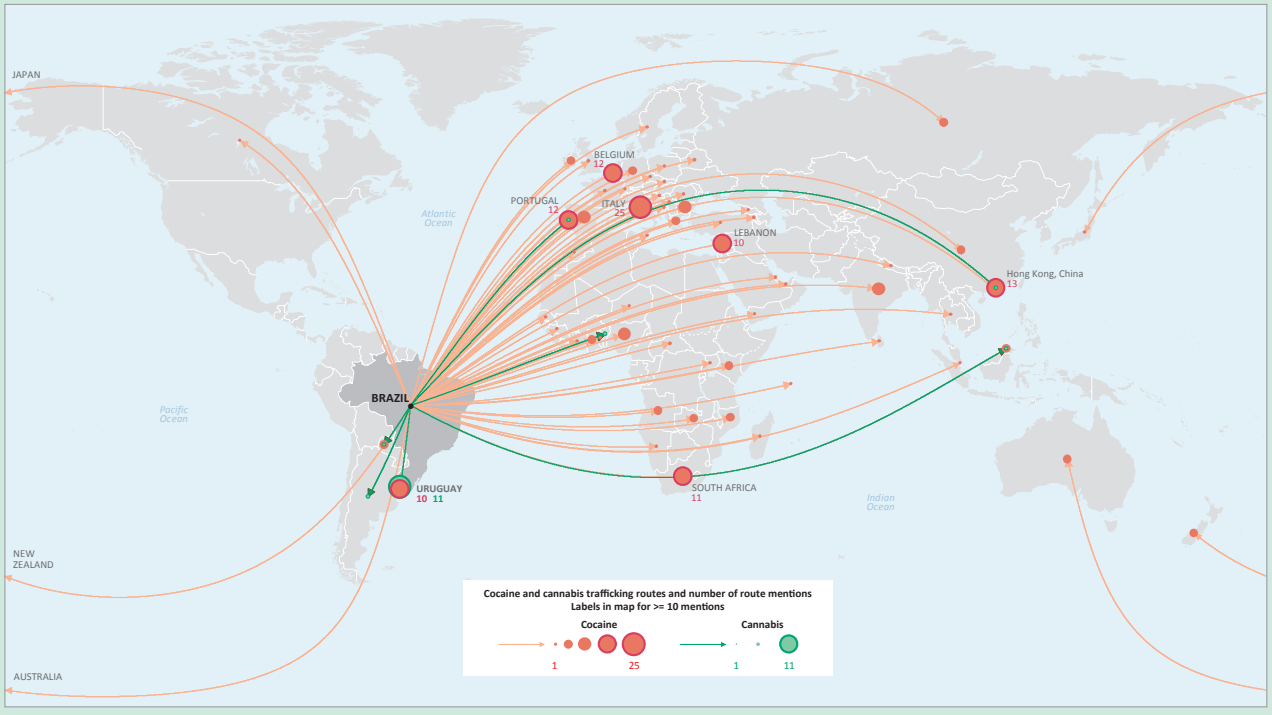
The high relevance of four countries in the Amazon Basin for global drug trafficking: trafficking routes of cocaine and cannabis departing from Brazil, Colombia, Peru and Bolivia (Plurinational State of)

Cocaine (including cocaine-type drugs) produced and transiting through the four countries of the Amazon Basin is reaching global markets. A review of drug trafficking routes reported to UNODC between 2010 and 2021 provides insight into their scope and scale. In total, over 900 drug routes departing from the Amazon Basin countries of Colombia, Brazil, Peru and Bolivia (Plurinational State of) were reported during the reporting period.[a]

Cocaine (including cocaine-type drug) trafficking transiting through and exiting from Brazil, including states in the Legal Amazon, has been reported to have reached 65 countries between 2011 and 2021, with primary destinations including Italy, Uruguay, Hong Kong, China, Portugal, Belgium, South Africa, and Lebanon. Almost half (44 per cent) of all documented cocaine trafficking routes were destined for Western or Eastern Europe, and 23 per cent for Asia or Africa. Most of the cannabis-type drugs were destined for Uruguay or, to a lesser extent, Paraguay.

Cocaine from Colombia was reportedly shipped to at least 64 countries, with Ecuador, the Bolivarian Republic of Venezuela, Panama, Italy, Belgium, El Salvador, Spain, Mexico and the United States being among the top recipients. Approximately 52 per cent of recorded cocaine routes departing from Colombia were reported in the Americas and 35 per cent were reportedly

Reported cocaine and cannabis trafficking routes between Brazil and other countries and territories, 2010–2022

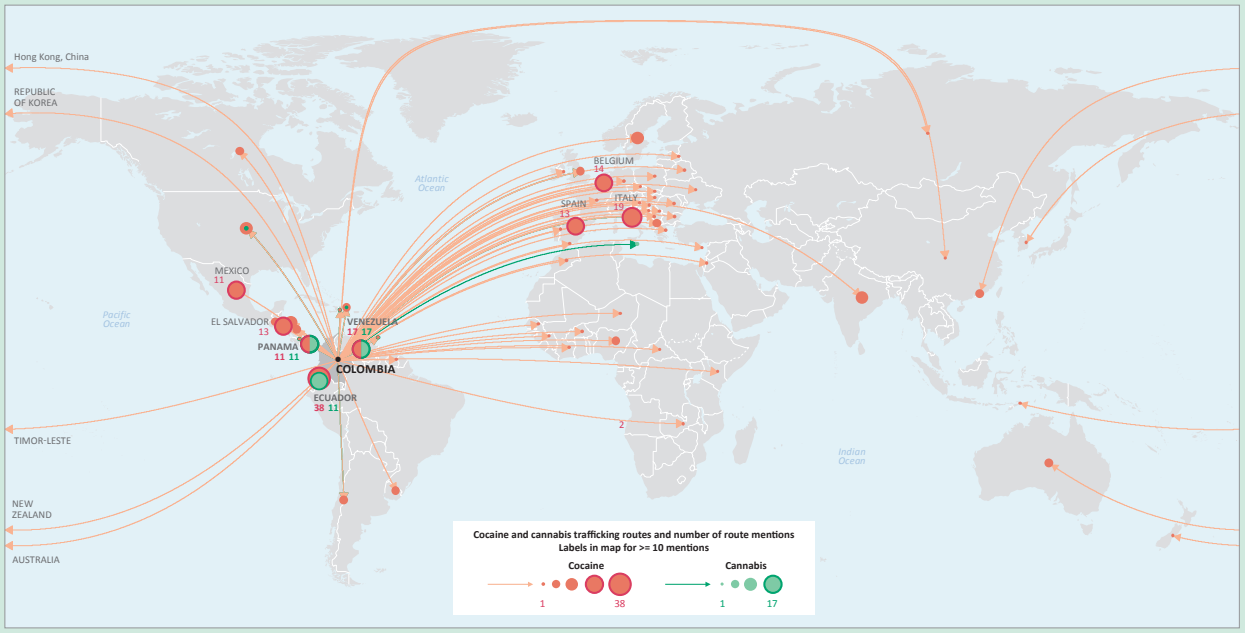


The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Source: UNODC, responses to the annual report questionnaire.

Notes: Routes are based on reporting from destination or transit countries for cocaine and cannabis originating in or transiting Brazil. Cocaine seizures Brazil: Drogas apreendidas por UF - Série histórica de 1995 a 2022 (até junho). Diretoria de Investigação e Combate ao Crime Organizado - DICOR.

Reported cocaine and cannabis trafficking routes between Colombia and other countries and territories, 2010–2022



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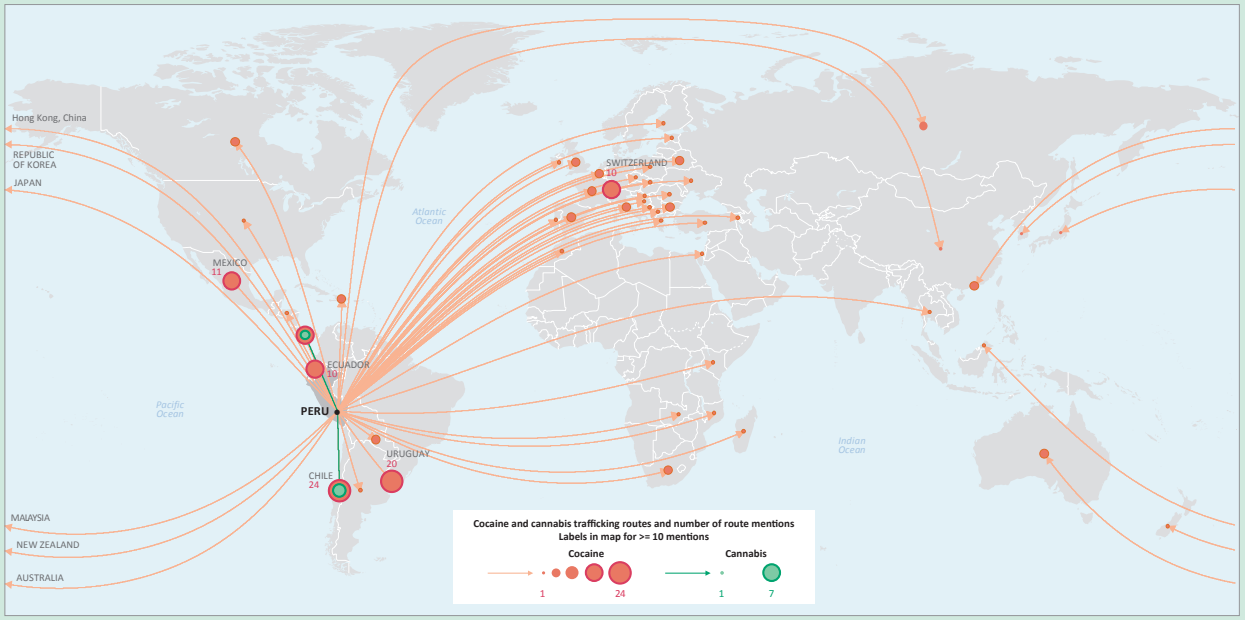
Notes: Routes are based on reporting from destination or transit countries for cocaine and cannabis originating in or transiting Colombia..

Source: UNODC, responses to the annual report questionnaire.

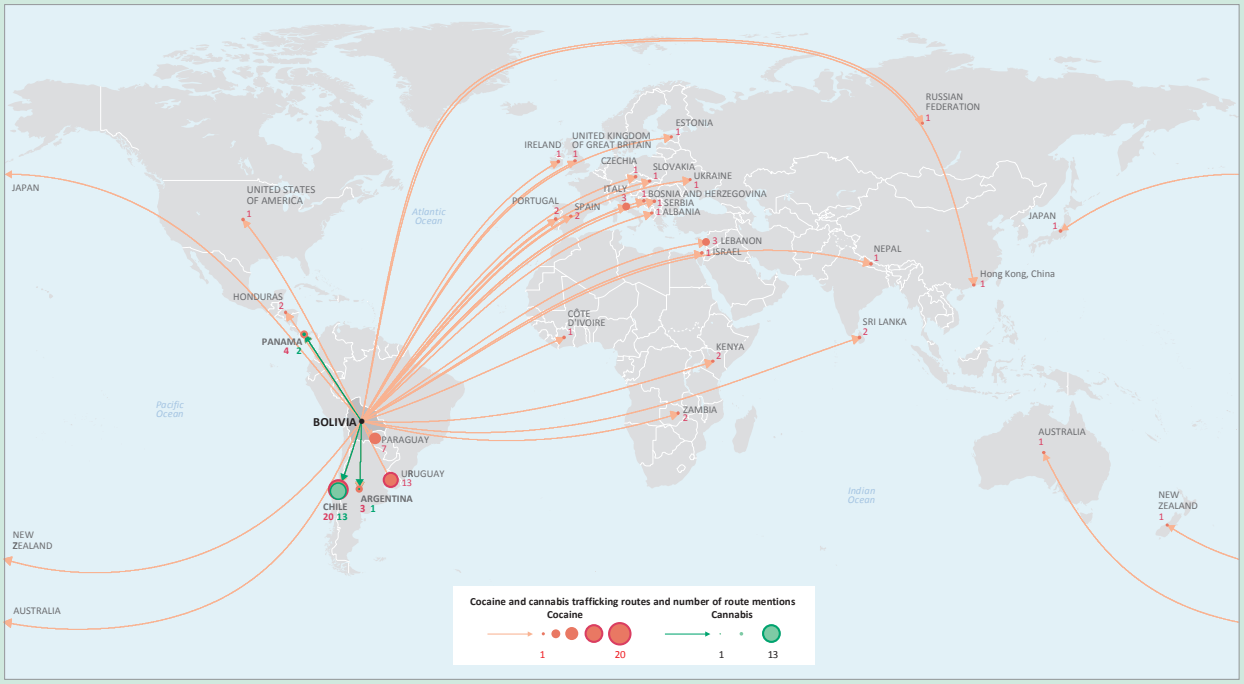
Reported cocaine and cannabis trafficking routes between Peru and other countries and territories, 2010-2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.
Note: Routes are based on reporting from destination or transit countries for cocaine and cannabis originating in or transiting Peru.

Source: UNODC, responses to the annual report questionnaire.

Reported cocaine and cannabis trafficking routes between the Plurinational State of Bolivia and other countries and territories, 2010–2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.
Note: Routes are based on reporting from destination or transit countries for cocaine and cannabis originating in or transiting the Plurinational State of Bolivia. The Plurinational State of Bolivia notes that the cannabis trafficking route to Panama does not exist or is not recognized since it does not have any case reports from the Plurinational State of Bolivia to Panama, and since, due to its geographical location, the Plurinational State of Bolivia is a transit country for cannabis.

Source: UNODC, responses to the annual report questionnaire.

directed to Western and Eastern Europe. By comparison, 54 reported cannabis routes departing from Colombia primarily supplied the Bolivarian Republic of Venezuela, Ecuador and Panama. Virtually all reported cannabis routes from Colombia were destined for markets in the Americas.

Cocaine from Peru was shipped to at least 51 countries, with the highest number of reported routes during the period of 2010–2021 being to Chile, Ecuador, Uruguay, Montenegro, Mexico, Panama and Switzerland. Almost half (47 per cent) of all cocaine trafficking routes departing from Peru were to countries in the Americas, and 35 per cent were to Europe. By comparison, there were just 11 mentions of routes from Peru to Chile and Panama, though this likely underrepresents the volume of cocaine from Peru transiting these countries.

Cocaine shipped from the Plurinational State of Bolivia was reported in 31 countries, including Chile, Uruguay, Paraguay, Panama, Argentina, as well as Italy and Lebanon. Approximately 60 per cent of all reported cocaine trafficking routes from the Plurinational State of Bolivia were reported as reaching countries in the Americas, as compared with 20 per cent to Europe and 11 per cent to Asia. Approximately 13 of cannabis trafficking routes were registered between the Plurinational State of Bolivia and Chile, compared with just 2 to Panama and 1 to Italy. Virtually all reported cannabis trafficking routes from the Plurinational State of Bolivia were limited to the Americas, in particular its South American neighbours.

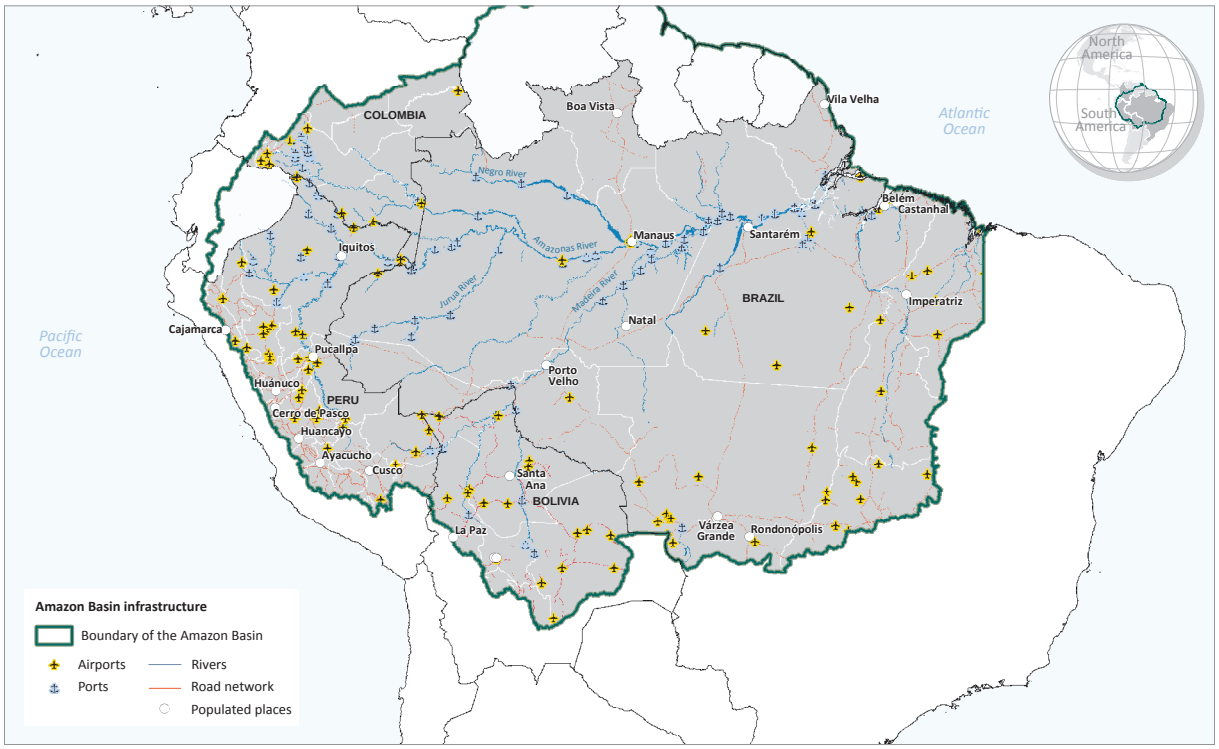
[a] Some routes reported by Member states may occur in a specific context and thus may not necessarily match other information on trafficking routes.

Structural enablers of drug-related crime, crimes that affect the environment, and convergent crime

Infrastructure development has provided opportunities to expand drug trafficking and crimes affecting the environment

The expansion of organized crime in the Amazon Basin is not solely a consequence of trafficker preferences. Structural demographic changes and infrastructural expansion across the region have played a critical role in the spread of drug trafficking, crime that affects the environment and convergent crime.[149, 150] Areas where measures were introduced to expand the agricultural frontier, and which were slated for road construction, agricultural, cattle, mining and urban development during the 1960s and 1970s, later emerged as deforestation and degradation hotspots. The same corridors designed to expand agricultural yields facilitated the penetration of the drug economy and crimes that affect the environment.[151] Indeed, corruption often serves as a lubricant to facilitate the expansion of illegal crops and livestock and their processing and transportation. For example, federal, state and municipal public officials regularly disregard national and state regulations and approve road constructions in the interest of local ranchers and farmers, including coca growers. This can even happen in national and state parks and regions demarcated as protected areas or conservation units.[152, 153]

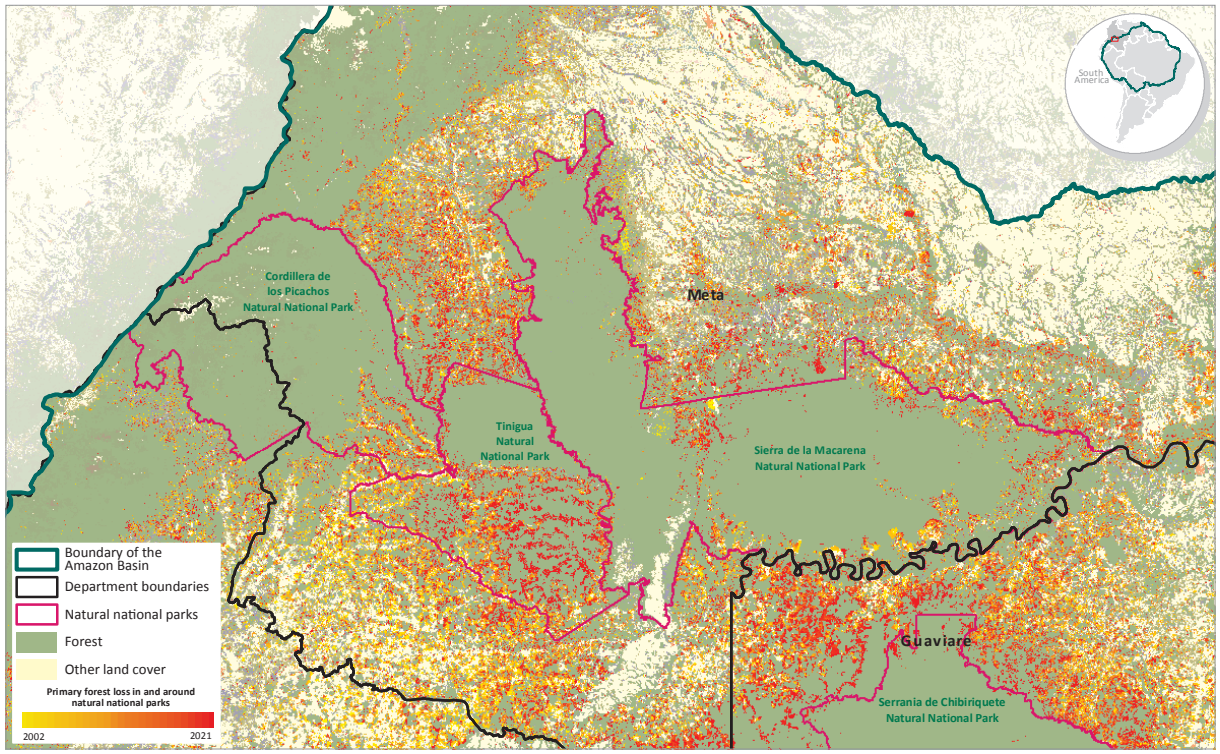
MAP 8 Amazon Basin infrastructure



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: Agustin Codazzi Geographic Institute (IGAC) and the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021); Brazilian Institute of Geography and Statistics (IBGE) and Geoportal Provita, 2023; OpenStreetMap and the National Geographic Institute, 2021 and Unique Digital Platform of the Peruvian State, 2023; Geographic Server: Servidor Geográfico, GeoBolivia and United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2023; The Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2020).

MAP 9 Shrinkage of parks in Colombia, 2001–2021



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

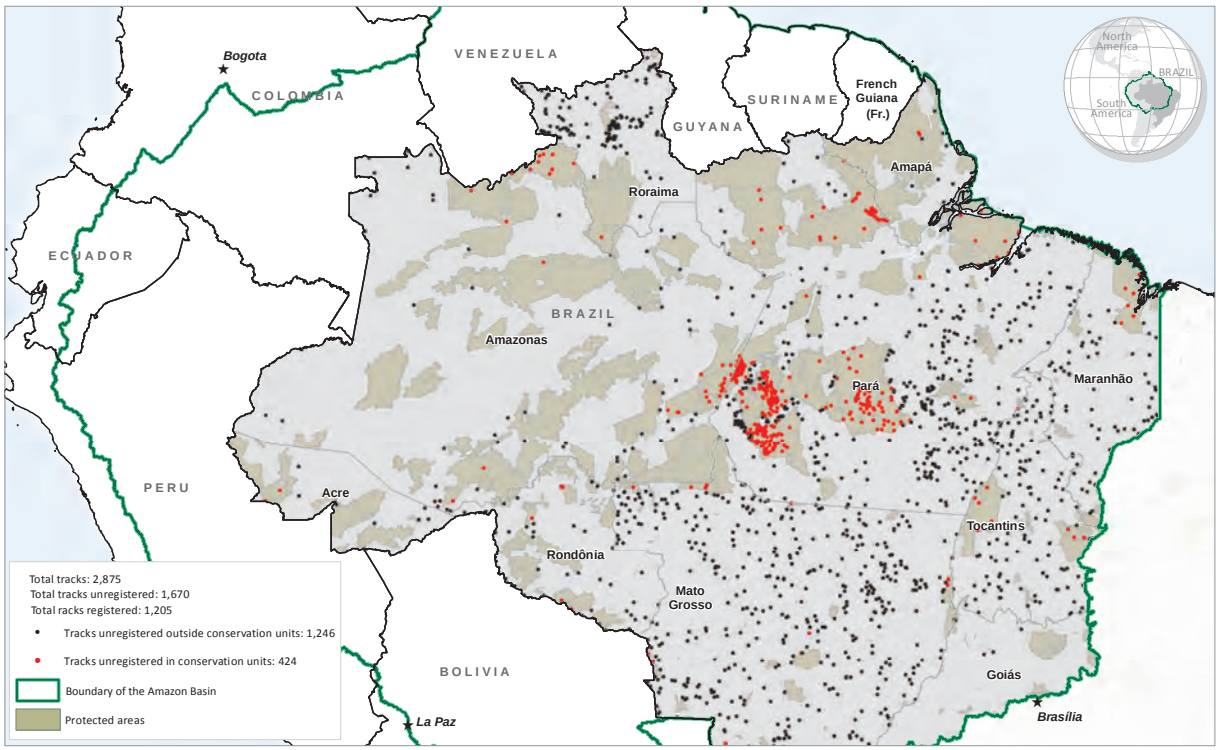
Source:Internal administrative boundaries of Colombia: the National Geostatistical Framework of the National Administrative Department of Statistics (DANE, 2021). Boundary of the Amazon Basin: the Amazon Network of Georeferenced Socio-environmental Information (RAISG, 2020). Protected areas of Colombia: National Natural Parks, 2022. Forest and forest loss: Global Land Analysis y Discovery, 2021 and the Amazon Network of Georeferenced Socio-environmental Information (RAISG, 2020).

Road infrastructure is not only used by drug traffickers to move illegal products but is also strongly linked with crimes that affect the environment across the Amazon Basin. According to recent studies, the vast majority of illegal deforestation in the Amazon appears to occur within approximately 5 kilometres of an official road.[154] Roads may increase fragmentation and generate "edge effects", where areas of forest exposed to human clearance become more vulnerable to additional threats, including land-grabbing, illegal logging, illegal mining and trafficking in wildlife.[155, 156] It is not only official roads that are destructive: for every kilometre of *legal* road there are an estimated 3 kilometres of *illegal* road that penetrate deep into the forests.[157]

Clandestine airstrips constitute an infrastructure that facilitates long-distance trafficking

Illegal airstrips and runways are another common feature of the Amazon Basin.[158] Clandestine airstrips and unregistered aircraft are routinely intercepted and destroyed in Bolivia (Plurinational State of), Brazil,[159] Colombia and Peru.[160, 161, 162, 163] As is the case with roads, there is a robust relationship between the presence of clandestine runways with forest clearance, illegal mining and drug trafficking,[164, 165, 166] suggesting that these constitute an important infrastructure to facilitate long-distance trafficking of drugs and other illegally sourced commodities. Airstrips have long been used by farmers when spraying pesticides and surveying crops. In recent decades, however, these airstrips

MAP 10 Clandestine airstrips, Brazil, 2023



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Unregistred airstrips: plataforma.brasil.mapbiomas.org, 2023. Protected areas of Brazil: Ministry of the Environment, 2023. Unregistred airstrips: MapBiomas Brazil. "Plataforma - Pistas de Pouso Na Amazônia Brasileira", March 2023. Protected areas of Brazil: Ministry of the Environment, 2023.

have also facilitated the movement of fuel, food and personnel for mining operations, including clandestine ones, and the movement of drugs and other contraband within and across borders.[167, 168]

In order to track overflights and disrupt criminal activities such as drug and timber trafficking, Brazil established a major radar constellation called the Integrated System for the Vigilance of the Amazon (SIVAM) in the 1990s.[169] Brazil, Colombia and Peru have also expanded remote sensing monitoring and intelligence-sharing to detect the location of illegal runways and track small planes.[170, 171] With the advent of accessible new technologies, non-governmental organizations have also expanded their surveillance activities. For example, a 2023 study determined that approximately 58 per cent of the 2,986 private airstrips identified in the Brazilian Amazon do not appear in official records. A further 28 per cent are purportedly built on environmental and Indigenous territories, most of the latter located in the Yanomami land (75), Raposa Serra do Sol (58), Kayapó (26), Mundurukú (21) and Xingu National Park (21).[172,173]

Waterways are important natural corridors for trafficking

Notwithstanding the critical role of roads and airstrips in enabling criminal markets in the Amazon Basin, it is the region's more than 1,100 rivers and tributaries that play a dominant role as vectors of drug trafficking and crimes that affect the environment. Most of the illegal trafficking of commodities occurs using waterways and ports, including for the transportation and exportation of cocaine and cannabis, rare hardwood, illegally extracted gold, and endangered plants,

animals and insects. Brazil is estimated to have as many as 60,000 kilometres of inland waterways, with just 13,000 kilometres regularly used, and very few of them subject to any routine monitoring from air or land.[174] The abundance of rivers, vessels and ports coupled with extremely limited oversight means that products are comparatively easily concealed and transported between countries and routed onward to global markets.[175, 176, 177, 178]

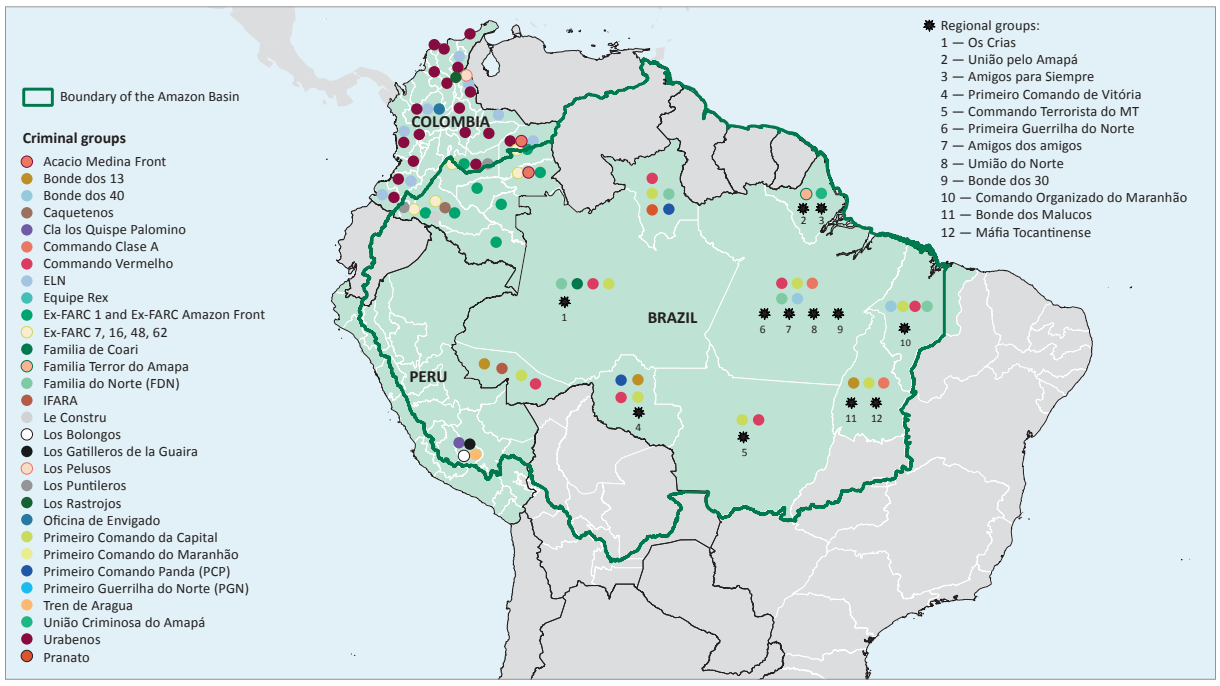
Given the wider economic dependence of residents on rivers for all manner of transportation and commerce, seasonality shapes the ebb and flow of drug trafficking and other illegal activities in the Amazon Basin. The Federal and state police of Brazil claim that criminal groups organize their operations in relation to the rainy season.[179] For example, when water levels are high, traffickers typically take advantage of labyrinthine river networks, making it more difficult for police and environmental authorities to monitor and respond to their activities. The wet season falls between November and March producing as much as 1.8 to 3 meters of rainfall.[180] In some cases during dry seasons, drug traffickers and other smugglers may delay transporting their cargo, keeping their product in warehouses in neighbouring countries until water levels rise.[181]

Criminal actors

A multitude of actors involved

There is a constellation of common actors spanning the supply chains of drug-related crime, crimes that affect the environment and convergence crime. Alongside drug traffickers, organized criminal groups and other criminal and militia actors, there is an array of political and economic backers who facilitate and finance illegal activities. Also involved are brokers, fixers and shipping agents, who are responsible for

MAP 11 Transnational ecosystem of drug trafficking groups in the Amazon Basin



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: *Cartografias das violências na região amazônica* (Fórum Brasileiro de Segurança Pública, 2021); InSight Crime (2022); and Amazon Network of Georeferenced Socioenvironmental Information (RAISG, 2022).

ensuring that illicit commodities reach their intended destination. On the frontline, there are local populations, often poor and lacking alternative opportunities for livelihoods, who are recruited voluntarily, or forced, to work in unhealthy and dangerous conditions, extracting trees, mining rivers and poaching endangered species.

The criminal markets are deeply connected to both formal and informal economies, including companies and individuals who provide services for the extraction and processing of illegal goods. Such individuals include merchants who source precursor chemicals, fuel, food, caterers, drivers, pilots and sex workers for criminal actors operating in remote frontier and forested areas. Given the many connections between drug trafficking and crimes that affect the environment, these actors also frequently make use of shared transportation routes and hubs, including rivers and ports, highways and irregular roads, and official and clandestine runways.

Some drug trafficking organizations that have operated in traditional coca-growing areas of Bolivia (the Plurinational State of), Colombia and Peru have opened new sections of the Amazon rainforest for coca and cannabis cultivation. As a means of expanding revenue and laundering profits, these groups frequently diversify into a range of legal and illegal activities. In some cases, their operations may be directly and indirectly facilitated by local communities because they generate employment opportunities.

Mapping drug trafficking organizations

A constellation of drug factions and criminal groups are both colluding and competing across the Amazon Basin. Many of the largest and most established drug trafficking organizations in the region – including PCC and CV of Brazil and factions of FARC – have influence across most of the countries and territories that make up the Amazon Basin. Some of them oversee vast transnational operations spanning multiple countries in the Americas and Europe.[182] Powerful drug factions are particularly active in the region's triple border area where Brazil, Colombia and Peru meet, including in and around cities such as Leticia in Colombia, Tabatinga in Brazil, and Santa Rosa de Yavarí in Peru. Given the central role in cocaine production and the abundance of exploitable natural resources of the Amazon Basin region, the region has probably among the densest concentration of organized crime groups on earth.

The dominant drug trafficking organizations in Brazil have deepened their presence in the Legal Amazon in recent years. CV and PCC have expanded from their strongholds in Rio de Janeiro and São Paulo, respectively, after several leaders were relocated to Federal and state prisons in the region. Over time, CV and PCC spread to cities, towns and the countryside of the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins.[183] They have aligned with a significant number of local drug trafficking organizations and criminal factions and have expanded their transnational operations, collaborating with partners in Colombia, Peru and Venezuela (Bolivarian Republic of). A former ally of CV, the *Familia do Norte* (FDN) once held sway over the Solimões river route that enabled the transportation of drugs from Colombia and Peru to Manaus in Brazil, though the group has been severely weakened.[184]

Although they periodically fight among themselves, there is often pragmatic cooperation between Colombian, Peruvian and Brazilian drug factions regarding cross-border dealings.[185] For example, FARC and its dissident factions have long traded with Brazilian groups such as PCC, CV and FDN.[186, 187] Less widely known Colombian drug trafficking organizations such as *Los Comandos de la Frontera* and *Carolina Ramires* also trade in drugs with criminal groups in neighbouring countries.[188, 189] These same groups often compete bitterly, however, for control over routes. For example, rival drug trafficking organizations frequently contest control over movements up and down the Caquetá and Putumayo rivers.[190, 191] PCC and CV and their partners routinely clash over drug routes, with outbreaks of violence often occurring in prisons and jails.[192, 193, 194, 195, 196] By contrast, Peruvian criminal groups, which often comprise clans or families across the VRAEM, appear to have reached an uneasy equilibrium in the interests of preserving business continuity, although overall levels of homicide and violent crime in areas where trafficking occurs, which were historically low, are rising.[197, 198, 199]

Notes and references

1 Convergent crime refers to criminal activities that connect, overlap, enable and co-locate with drug-related crime and crimes that affect the environment including corruption, money-laundering, fraud, extortion, violence and other forms of victimization.

2 The Amazon Basin is the largest watershed on earth and includes over 40 per cent of the South American continent. The term has several distinct and overlapping geopolitical, geographic, geopolitical, biological and hydrological definitions.

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6 UNODC, "UNODC and Censipam to Formalise Partnership to Combat Drug Cultivation in the Amazon," September 4, 2019.

7 Proinde, "Proinde Circular 04-05-2021: Drug Smuggling on Bulk Carriers out of Brazil on the Rise," May 4, 2021.

8 UNODC, *World Drug Report 2022, Booklet 5, Drugs and the Environment* (United Nations publication, 2022).

9 The chapter is informed by a literature review and interviews with representatives of government, international agencies and civil society groups, and subject matter experts (for more details see the methodological annex).

10 See for example the case of the Superior Court of Justice of Lima, "File No. 00591-2017, 23 December 2019", available at http://www.keneamazon.net/Documents/Press-Release/Nota-de-Prensa-001-2020-KENE/Nota-de-Prensa-001-2020-KENE.pdf.

11 For more details on the role of corruption see the forthcoming UNODC publication "Rooting out corruption: an introduction to addressing corruption fuelling forest loss".

12 UNODC, *Global Report on Cocaine 2023 – Local Dynamics, Global Challenges*.

13 Victoria Bechara, "Facções criminosas levam o terror para dentro da Terra Indígena Yanomami," VEJA, May 19, 2023.

14 A recent assessment in Brazil by Agencia Publica identified 16 seizures of cocaine between 2017 and 2021, with approximately 9 tons of drugs hidden in timber shipments.

15 Ciro Barros, "A íntima relação entre cocaína e madeira ilegal na Amazônia," *Agência Pública*, August 16, 2021.

16 Ciro Barros, "The Intimate Relationship Between Cocaine and Illegal Timber in Brazil's Amazon," *InSight Crime*, October 14, 2021.

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19 Interview #1, interview by UNODC, March 2023; Interview #2, interview by UNODC, March 2023; Interview #3, interview by UNODC, March 2023; Interview #5, interview by UNODC, March 2023; Interview #7, interview by UNODC, March 2023; Interview #8, interview by UNODC, March 2023; Interview #9, interview by UNODC, March 2023; Interview #10, interview by UNODC, March 2023; Interview #11, interview by UNODC, March 2023.

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SUBSTANCE USE DISORDERS IN HUMANITARIAN SETTINGS

SUBSTANCE USE DISORDERS IN HUMANITARIAN SETTINGS

This chapter discusses the risk factors for and vulnerability to substance use disorders among forcibly displaced populations, as people who are forcibly displaced are among the marginalized groups that suffer physical and psychological trauma and elevated levels of socioeconomic vulnerability, which elevates their risk of developing mental health and substance use disorders.

The research presented in this chapter shows that substance use patterns among displaced populations are heterogenous and not dissimilar to those observed among the general population. People who are forcibly displaced may develop a resilience to substance or drug use, carry over their drug use patterns from their place of origin, adapt to the drug use patterns of their new location, or intensify their initial pattern of drug use. For these reasons, knowledge of the unique challenges faced by forcibly displaced populations is fundamental in understanding the specific needs for the prevention of substance use and treatment of substance use disorders within humanitarian settings. Even if the needs of people who are forcibly displaced do not generally differ a great deal from those of the general population, special efforts are needed if those needs are to be addressed in the context of limited health infrastructures and constrained social and economic resources.

SOCIOECONOMIC DISADVANTAGES AND DRUG USE DISORDERS

Although people in higher socioeconomic groups have a greater propensity to initiate drug use than those in lower socioeconomic groups, people in lower socioeconomic groups pay a higher price for drug use as they are more likely to progress from drug use to drug user disorders. Population groups that face socioeconomic disadvantages such as poverty, conflict and a lack of opportunities for education and employment are particularly vulnerable to mental health problems and drug use disorders. Socioeconomic disadvantages can also limit the access of disadvantaged or marginalized population groups to health, health promotion, prevention and drug treatment services.[a]

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The vicious cycle of socioeconomic disadvantages and drug use disorders

Source: UNODC, *World Drug Report 2020*, Booklet 5, *Socioeconomic Characteristics and Drug Use Disorders.*

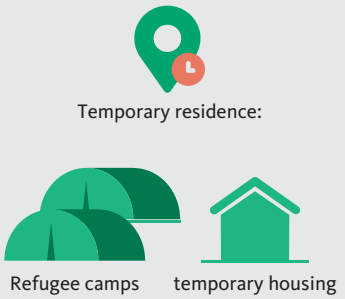
More than 100 million people displaced by humanitarian emergencies in 2022

Humanitarian emergencies can be caused by epidemics or natural disasters such as earthquakes, tsunamis, flooding and drought, some of which are the result of climate change.[1, 2]

They can also be cused by human-made events such as armed conflict, violence and related forced displacement, accidents and fire. Other, more complex emergencies can be caused by a combination of natural and human-made factors. All types of humanitarian emergencies disrupt and threaten the safety, health and well-being of communities and populations and usually require immediate action and international support to protect the affected population.[3] Overall, the elderly population may be more affected by humanitarian emergencies, but women, children, ethnic and religious minorities and gender-diverse groups are most at risk of suffering from the adverse consequences of being displaced for a prolonged period.[4, 5]

Humanitarian emergencies lead to large numbers of people being forced to leave their home or country and becoming displaced, either temporarily or over a protracted period. Displaced populations are not homogenous and may include refugees, asylum seekers, stateless people or internally displaced persons, that is, people who are forced to leave their home but who remain within their own country.[6, 7] The number of people who were forcibly displaced worldwide in

HUMANITARIAN EMERGENCIES, DISPLACED PEOPLE AND SETTINGS IN WHICH THEY ARE PLACED



HUMANITARIAN EMERGENCIES AND SETTINGS:

Natural disasters: earthquakes, tsunamis, flooding, drought or famine, or epidemicss

Human-made: armed conflict, civil unrest, violence, human rights violations, persecution or the forced displacement of a population group (ethnic or religious)

DISPLACED POPULATION REQUIRING PROTECTION AND SUPPORT:

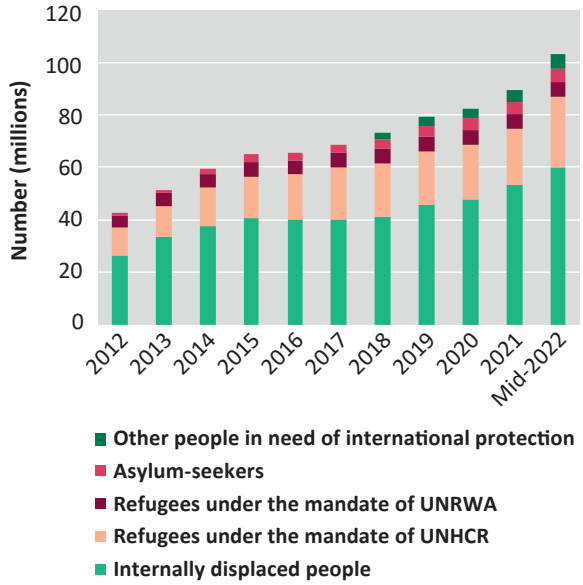
Internally displaced population, refugees, asylum seekers and stateless persons

SETTINGS IN WHICH DISPLACED POPULATION IS PLACED:

Places of temporary residence (refugee camps or internment camps), temporary housing or makeshift settlements for externally or internally displaced people, and sometimes with host communities

Source: UNODC elaboration.

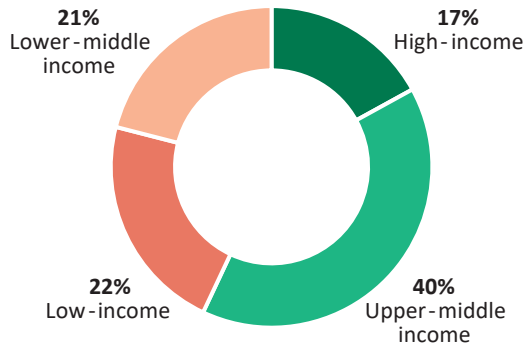
FIG. 7 People forcibly displaced, 2012–2022



Source: UNHCR, "Global Trends Report in Forced Displacement in 2021" (Geneva, Switzerland: UNHCR, 2022).

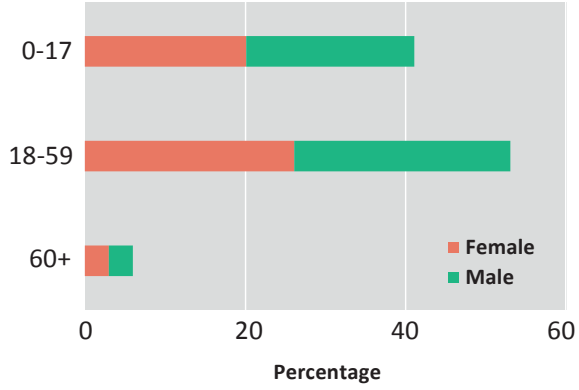
Note: The data shown for 2022 comprise data available until mid-2022, except for the data on internally displaced persons, which comprise data available until the end of 2021. UNRWA is the United Nations Relief and Works Agency for Palestine Refugees in the Near East.

FIG. 8 Distribution of forcibly displaced people, by income level of host country, end of 2021



Source: UNHCR, "Global Trends Report in Forced Displacement in 2021" (Geneva, Switzerland: UNHCR, 2022).

FIG. 9 Global distribution of forcibly displaced people, by age group and sex, 2021



Source: UNHCR, "Global Trends Report in Forced Displacement in 2021" (Geneva, Switzerland: UNHCR, 2022).

the first six months of 2022 exceeded 100 million, which was more than double the nearly 43 million people who were forcibly displaced in 2012 and which was the largest number since the Second World War.[8]

The majority of people who are displaced by humanitarian emergencies are hosted in low- and middle-income countries. Although children (0–17 years) comprise 30 per cent of the world's population, they account for 41 per cent of all forcibly displaced people.[9] In 2022, an estimated 274 million people were considered to be in need of humanitarian assistance and international protection as a result of being forcibly displaced, a significant increase from the 235 million in the previous year, which was already the highest figure recorded in recent decades.[10]

People displaced within their own countries owing to armed conflict, generalized violence and human rights violations continue to constitute the majority (60 per cent) of the forcibly displaced population worldwide.[11]

At the end of 2021, the Syrian Arab Republic (6.6 million people), the Democratic Republic of the Congo (5.3 million people) and Colombia (5.2 million people) were among the countries that each had about 10 per cent of the global population of internally displaced persons.[12] In many countries in Latin America, in recent years, a substantial number of people have also been forcibly displaced as a result of violence perpetrated by organized crime groups.[13, 14]

Displaced people suffer elevated levels of social and mental health problems

Although the social and health problems experienced by people who have been forcibly displaced are not necessarily different in nature from those experienced by the general population, people who have been forcibly displaced experience elevated levels of such problems, including mental health stressors.[15] Most people affected by emergencies witness or personally experience stress, trauma, including the loss of their home and livelihood, family separation, and even violence and torture. Therefore, it is not unusual for displaced people to suffer from elevated levels of distress, including feelings of anxiety and sadness, hopelessness, difficulty sleeping, fatigue, irritability and anger, although such issues may be temporary in nature.[16]

Moreover, people who have been displaced and are living in a new environment or social context may have to deal simultaneously with pre-existing social and health issues and post-displacement stressors, including stigma.[17,18] As has been observed in other population groups, there also tends to be a high degree of heterogeneity in the prevalence of mental health disorders, including substance use disorders, among displaced people.[19] Conceptually, the social and mental health problems that displaced people experience may either be pre-existing conditions exacerbated by a humanitarian emergency or the result of the protracted displacement of such people from their home environment and issues related to their placement elsewhere, both in the short and long term.[20]

Social and mental health problems faced by displaced people in humanitarian settings, by stage

	Possible pre-existing conditions	Conditions precipitated by being displaced (immediate and medium term)	Conditions resulting from protracted displacement (medium to long term)
Social problems	Low social capital, poverty, discrimination as marginalized groups	Family separation, parenting under stress, lack of safety, loss of livelihoods, disrupted social networks, low trust, limited resources, lack of food, water or shelter	Overcrowding, parenting under stress, lack of privacy, and the undermining of community or traditional support/norms and social capital (structural and cognitive)
Mental health problems	Mental health disorders such as depression, schizophrenia and the harmful use of alcohol or drugs	Grief, acute stress reactions, depression and anxiety, and PTSD; harmful patterns of substance use; no access to or continuation of treatment services	Anxiety and depression owing to the uncertainty of the situation or future prospects, stigma and fear of losing legal status (e.g. as a refugee) when seeking support for substance use problems

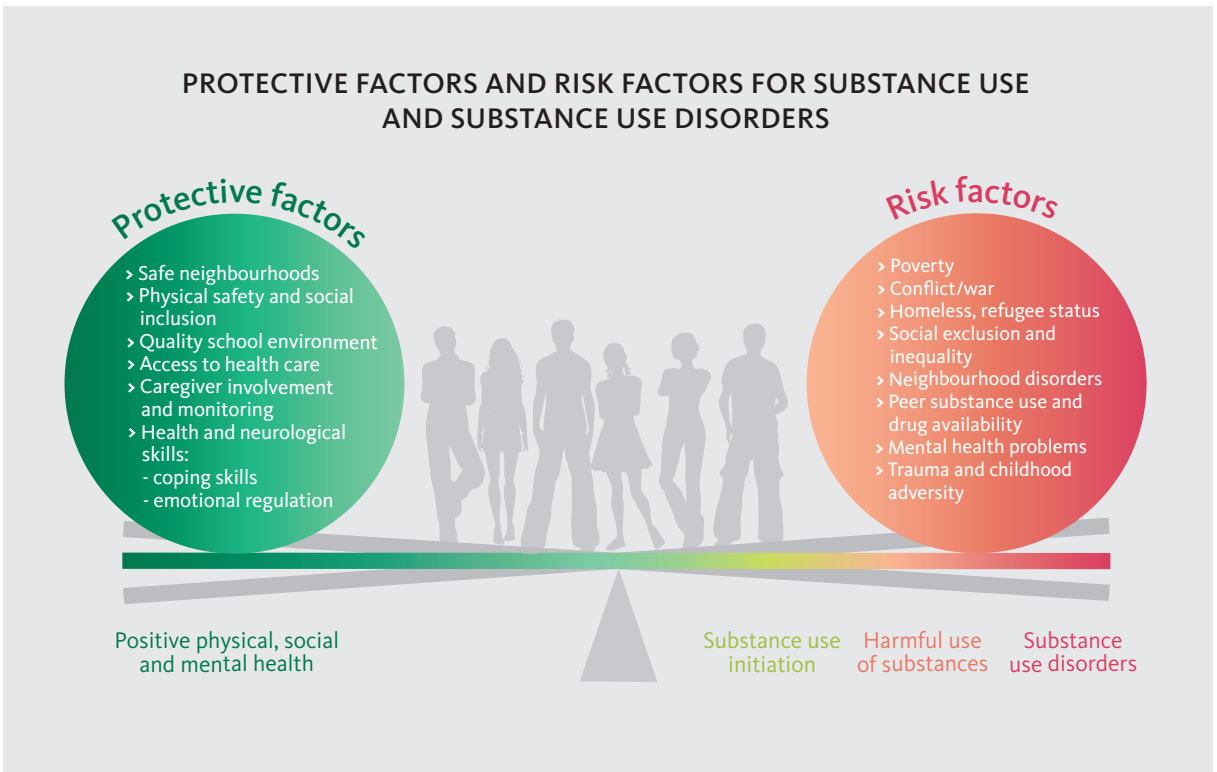
Source: Adapted from "Mental health in Emergencies" (WHO, 16 March 2022).

Displaced people experience an elevated level of vulnerability to substance use disorders

The individual, family and environmental risk and protective factors for and the aetiologies of initiation into substance use, the transition to harmful use of substances and the development of substance use disorders among displaced people are not necessarily different from those among the population at large.[21] [22] As the literature shows, significant individual, family, community and broader neighbourhood-level characteristics are in general associated with drug use and drug use disorders.[23, 24] In addition to family and individual risk factors such as pre-existing mental health issues, adverse childhood experiences such as abuse, emotional neglect and trauma are strongly associated with mental health disorders, including substance use disorders.[25, 26, 27] It is the critical combination of the presence of risk factors and the absence of protective factors that make a person vulnerable to initiation of substance use and progression to substance use disorders.[28]

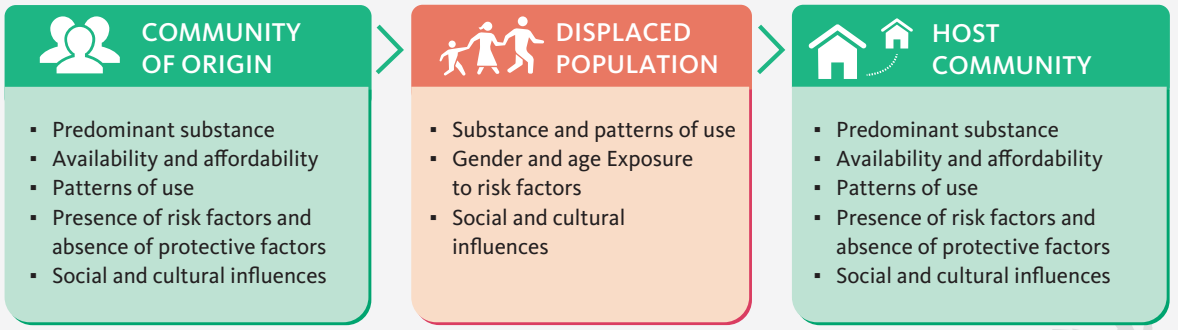
Compared to the general population, displaced populations experience an elevated level of vulnerability to substance use and substance use disorders. This may result from greater exposure to the risk factors for substance use and substance use disorders, such as family disruption and elevated levels of stress, and the absence of protective factors, such as monitoring by caregivers or a safe neighbourhood. Moreover, given that a sizeable proportion of displaced people are children, the adverse experiences they suffer and the trauma of displacement can also make them vulnerable to substance use and mental health disorders.

In addition, for displaced populations, the initiation of or the transition to harmful use of substances is complex and appears to reflect a combination of pre- and post-displacement exposure to risk and protective factors and patterns of substance use.[29] The initiation



Source: UNODC, *World Drug Report 2018*, Booklet 4, *Drugs and Age*.

FACTORS THAT INFLUENCE SUBSTANCE USE AND PATTERNS OF USE AMONG DISPLACED PEOPLE



Source: UNODC, *World Drug Report 2018*, Booklet 4, *Drugs and Age*.

to substance use and transition to harmful use of substances may also be influenced by exposure to risk factors such as trauma or traumatic events at different stages of the displacement process and during adaptation to a new environment. Post-displacement factors that may underlie the transition to substance use include a combination of psychosocial distress and stressors, such as changes in social norms and social networks, socioeconomic adversity, inequality, disrupted social networks and family support, and marginalization.[30, 31, 32, 33, 34, 35, 36]

Conversely, protective factors, including social and psychological adequacy, social norms and social and family support systems, as well as integration into the host community, can prevent substance use among displaced populations. Furthermore, the refugee or immigrant paradox, also referred to as the "healthy immigrant effect", has been observed among displaced populations, whereby immigrants or displaced people tend to use substances at levels lower than or similar to those of the host population, despite being exposed to various sociodemographic risk factors.[37, 38, 39]

Anxiety, depression and post-traumatic stress disorder are common among displaced populations

Displaced people may experience varying degrees of mental health disorders, from mild to severe. Among those affected by conflict, the burden of mental health disorders is generally extremely high. Nearly one in five people in conflict settings were estimated to be suffering from depression, anxiety, PTSD, bipolar disorder or schizophrenia in a systematic review carried out in 2019 of 129 studies conducted in 39 countries.[40] By comparison, in the same year, one in eight people worldwide was living with a mental health disorder, while about 4 per cent of the global population was estimated to be suffering from an anxiety disorder and 3.6 per cent was estimated to be suffering from depression.[41]

In another review, more than three quarters of the people who had been internally displaced by local conflicts in Iraq, the Philippines and South Africa were estimated to be suffering from PTSD.[42, 43] Moreover, nearly half of the internally displaced persons screened in the Philippines were suffering from severe anxiety[44] and severe depression.[45] Elsewhere, about 4 per cent of young internally displaced persons studied in Nigeria

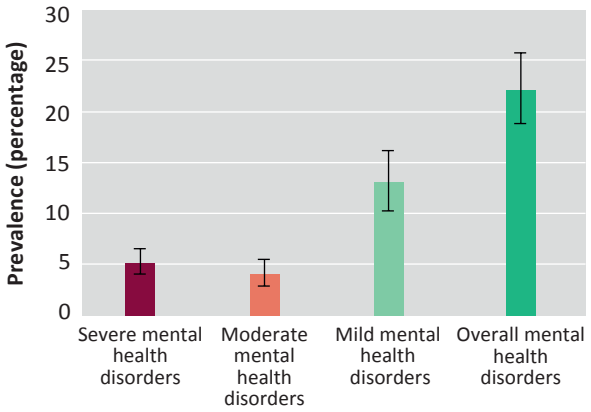
were diagnosed with severe anxiety, 25 per cent were diagnosed with moderate anxiety and 35 per cent were diagnosed with mild anxiety.[46] Another study, conducted in three cities in Colombia among the population displaced as a result of armed conflict, reported a high prevalence of mental health disorders and substance use. The past-year prevalence of mental health disorders among the study participants was 7.3 per cent in the case of PTSD, 7.1 per cent in the case of major depression and 4.2 per cent in the case of separation anxiety disorder. The diagnosis of any mental disorder was associated with being a woman and experiencing more than one forced displacement.[47] Other studies have also revealed a high prevalence of mental health disorders among displaced populations in different settings.[48, 49, 50]

Diverse patterns of substance use observed among displaced populations are not generalizable to all displaced populations

A number of studies have examined the prevalence of substance use and substance use disorders among displaced people in humanitarian settings. Most of those studies have been conducted using small, non-representative samples in different regions and have demonstrated diverse patterns of substance use among displaced populations that are not generalizable per se. Displaced populations are also diverse in nature and vary in demographic composition. The extent of substance use among displaced people, therefore, also reflects the extent and patterns of use among those demographic groups in general; for example, an overall higher prevalence of substance use among men than among women and children. In general, the extent and patterns of substance use and substance use disorders among people in humanitarian settings may be influenced by the predominant type of substance use in either their home or host country or by changes in the availability and affordability of substances.[51, 52]

One systematic global review of the literature on substance use among displaced populations, including refugees, internally displaced persons and asylum seekers, showed that the prevalence of hazardous or harmful use of alcohol ranged from 4 to 36 per cent; the prevalence of alcohol dependence ranged from less than 1 to 42 per cent; and the prevalence of drug dependence ranged from 1 to 20 per cent, highlighting the substantial heterogeneity in patterns of substance use across the studies.[53] Substance use disorders were considered more prevalent among displaced populations living in refugee camps than among displaced populations living in community settings. The studies included in the systematic review did not, however, report validated measures of the prevalence of drug use among the displaced population.[54]

FIG. 10 **Extent of mental health disorders among population affected by conflict, 2019**



Source: Fiona Charlson et al., "New WHO Prevalence Estimates of Mental Disorders in Conflict Settings: A Systematic Review and Meta-Analysis", *The Lancet* 394, no. 10194 (July 2019), pp. 240–248.

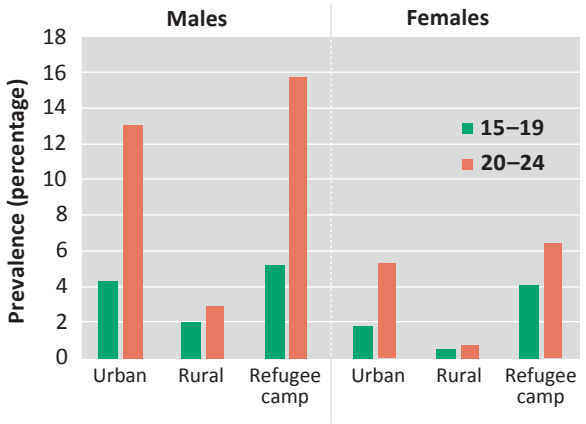
Note: People in conflict settings are a subpopulation of those displaced.

Drug use can be higher among displaced populations living in urban refugee camps than among refugees living in community settings: selected case studies

Among Palestinian young people (aged 15 to 19 and 20 to 24) living in the West Bank and East Jerusalem in 2014, the prevalence of substance use among those living in refugee camps was reported as comparable

with that among other Palestinian young people living in urban areas, but higher than substance use among those living in rural areas.[55] A total of 6.5 per cent of male and 3.5 per cent of female young Palestinians had used any drug, including cannabis, inhalants, the non-medical use of pharmaceutical drugs, heroin or cocaine, on at least one occasion.

FIG. 11 Lifetime drug use among Palestinian young people in different settings, by age group and by sex, 2014



Source: Peter Glick et al., "Health Risk Behaviours of Palestinian Youth: Findings from a Representative Survey", *Eastern Mediterranean Health Journal* 24, no. 2 (1 February 2018), pp. 127–136.

A study carried out in 2017 of high-risk drug use among Palestinians living in Gaza and the West Bank revealed that about 1.8 per cent of the male population aged 15 and above were high-risk drug users; tramadol and pregabalin were reported as the most commonly misused substances among this group. The majority of high-risk drug users in the study, living in Gaza and the south and middle regions of the West Bank, had refugee status and were either living in the urban centre or a refugee camp in those areas.[56]

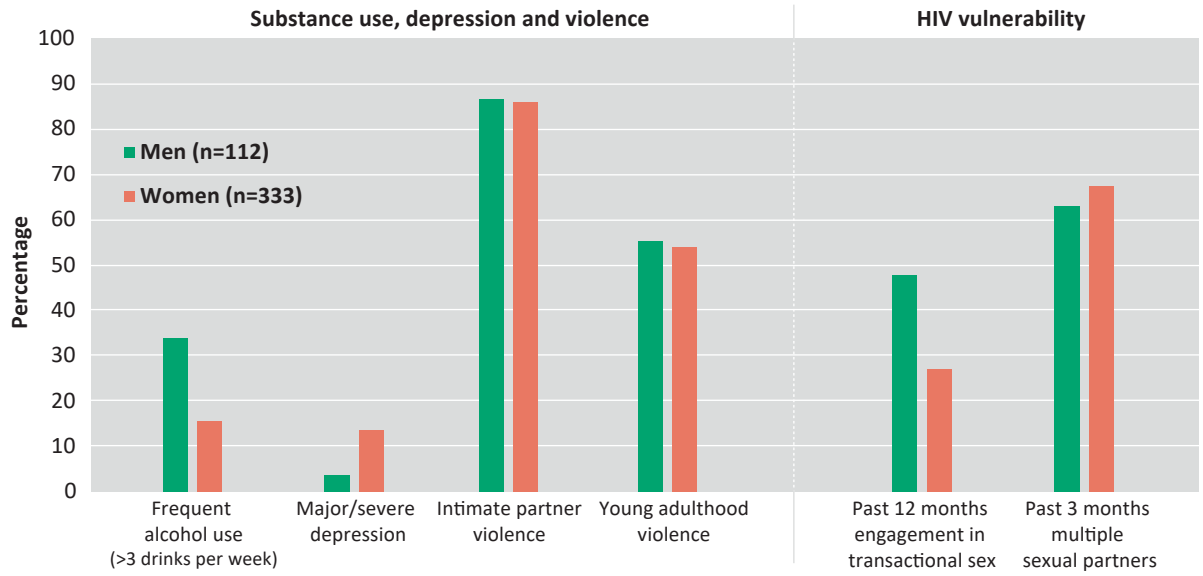
In a cross-sectional study conducted over six months in 2015, the lifetime use of substances was estimated to be higher among Palestinians born in Lebanon who were residing in refugee camps in that country than among Palestinian and Syrian adults (aged 18 and older) who had recently been displaced from the Syrian Arab Republic and were now living in refugee camps in Lebanon.[57] The same was true of the moderate and high-risk use of cannabis and cocaine in the previous three months; women had lower lifetime use of substances and substance use in the previous three months than men. It seems that the Palestinian refugees who had been born in Lebanon and who were residing in refugee camps there had adopted the substance use patterns of the host community, whereas those who had recently been displaced there from the Syrian Arab Republic partly demonstrated pre-displacement patterns of substance use and partly demonstrated the refugee paradox.

An assessment carried out in 2018 of refugees from South Sudan and Somalia living in camps in Uganda also showed that although substance use among refugees predated their displacement, in the wake of weakened parental and community control resulting from that displacement, substance use patterns among young displaced people, in particular those in urban camp settings, echoed the substance use patterns common in the host community. In urban areas of Uganda, alcohol, cannabis and khat (also known as miraa) were reported as the three most commonly used substances.[58, 59] Somali refugees in Ethiopia have also been observed to have transitioned from occasional pre-displacement use of khat to more regular or daily use of the substance following their displacement.[60]

In another study conducted in 2018 among internally displaced population groups living in camps in north-central Nigeria, about 10 per cent of the study participants had used substances (alcohol, non-medical use of tramadol, tranquillizers, amphetamines and cannabis) in the past year.[61] The extent and pattern of substance use among the displaced population did not differ from the general population in the same geographic zone, although nearly 5 per cent of the displaced people who reported using substances suffered from substance use disorders – a proportion higher than that observed in the host population.[62] The harmful use of substances among the displaced people in the study was considered a coping mechanism to deal with the traumatic experience of being forcibly displaced.

Another study, conducted in 2018 among young refugees (aged 16 to 24) living in urban camps in Uganda, reported a high prevalence of and association between

FIG. 12 Association between substance use (alcohol), depression and violence, and HIV vulnerability among young refugees in Uganda, by sex, 2018



Source: Carmen H. Logie et al., "Examining the Substance Use, Violence, and HIV and AIDS (SAVA) Syndemic among Urban Refugee Youth in Kampala, Uganda: Cross-Sectional Survey Findings", BMJ Global Health 7, no. Suppl 5 (July 2022).

Note: Substance use comprises only alcohol use.

substance use, violence and vulnerability to HIV and AIDS (SAVA syndemic) among the study participants.[63] There was also a strong association between frequent alcohol use, interpersonal violence, including young adulthood violence (at 16 years of age or younger), severe depression and transactional sex with multiple partners.[64]

Displacement caused by humanitarian emergencies can exacerbate pre-existing drug use patterns

Patterns of drug use demonstrated by Afghan refugees reflect those of their origin and host communities

Opium use has long been reported as being common among the Afghan population. A review published in 2014 revealed that opium use among Afghan refugees in the Islamic Republic of Iran and Pakistan has mirrored the pre-displacement pattern.[65] In the years following displacement, however, the pattern of opiate use among Afghan refugees changed: the use of opiates increased among Afghan youth and women, which was attributed in part to changes in social norms and in part to an intensification of their pre-displacement patterns of drug use;[66] there was a transition to the use of heroin in the form of "kerak" (a concentrated form of heroin used in the Islamic Republic of Iran)[67] and the initiation of injecting heroin use (in Pakistan and the Islamic Republic of Iran); and these patterns of use were continued upon repatriation to Afghanistan.[68, 69, 70]

An assessment conducted in 2018 among Afghan refugees living in Pakistan found that the use of cannabis, opium, heroin and methamphetamine was common. It was also found that the transition to injecting heroin use and, later, to the use of crystal methamphetamine among those refugees was associated with their mixing with the host community. Although the extent and patterns of use of various drugs among Afghan refugees were not quantified, they were assessed to be in line with those among the host population.[71]

High levels of substance use reported among the displaced population in Colombia

A study mentioned above, conducted in three cities in Colombia among the population displaced as a result of armed conflict, reported a high prevalence of substance use in addition to mental health disorders. The study showed that the annual prevalence of alcohol, tobacco and cannabis use among the study participants was respectively 46, 33 and 3 per cent. However, the pattern of substance use among the displaced population was similar to that reported among the general population in Colombia.[72]

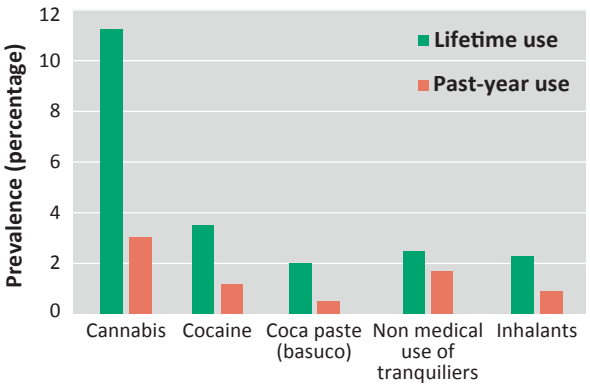
People who were displaced by Hurricane Katrina and who experienced high resource loss were more likely to increase their drug use

A study among low-income African Americans who used drugs and who were displaced to Houston, Texas, from New Orleans, Louisiana, before and after Hurricane Katrina hit New Orleans in August 2005[73] showed that those who had left the city before the hurricane hit were 1.5 times more likely to have increased their drug use than those who had been evacuated afterwards. Those who had left New Orleans before the hurricane were considered to have greater monetary resources and relational social capital than those who had left after the hurricane hit, enabling them to establish connections and maintain a relatively stable supply of drugs.

High resource loss[74] was associated with an increase in drug use among all the study participants displaced by the hurricane, whether they had left before the hurricane hit or had been evacuated afterwards. This perceived resource loss may have reflected their emotional and social attachments to the home neighbourhoods that they were forced to abandon. In line with their previous pattern of use, most of their increase in drug use was reported to be of cannabis, but there were also modest increases in the use of "ecstasy", tranquillizers and cocaine or "crack" cocaine.

Conversely, those who had been evacuated after rather than before the hurricane hit and had therefore been highly exposed to the disaster, were twice as likely to have decreased their drug use as those who had been moderately exposed to the disaster. As part of a context-related adaptive process, respondents who had been highly exposed to the disaster appeared to have adapted to their changing social environment by decreasing their drug use. The disruption and lack of accessibility of the drug market in New Orleans, in combination with the exposure of the displaced population to a new drug market or opportunities in Houston, could have contributed to their decreased or increased drug use.

FIG. 13 **Extent of drug use among the displaced population in three cities in Colombia, 2017**



Source: Castaño et al., "Trastornos Mentales y Consumo de Drogas En La Población Víctima Del Conflicto Armado En Tres Ciudades de Colombia." *Biomédica* 38 (28 August 2017): 77–92.

Adolescents displaced without their families are susceptible to higher drug use

In a study conducted in 2021 among adolescent asylum seekers (aged 11 to 18) residing in asylum centres in Serbia, about 13 per cent reported that they used alcohol, and 5 per cent reported that they used cannabis. The adolescents also reported using a range of other drugs, including amphetamines, cocaine, tranquillizers and LSD. Patterns of use across age and gender were not necessarily different from those in the host population, but older study participants (aged 15 to 18) reported using substances more than younger participants, and more boys than girls reported using different substances. Moreover, adolescents who had

travelled with strangers used substances (alcohol and other drugs) significantly more than those who had travelled with members of their family, indicating that the company of family members can be considered a protective factor against alcohol and drug use among displaced adolescents.[75]

Availability and accessibility of mental health services, including drug use disorder services, remain a challenge for displaced people

The availability and accessibility of mental health services, including drug use disorder treatment services, remain a challenge in most humanitarian settings. As a result of ongoing emergencies, violent conflict and a lack of infrastructure for providing such services, people who are internally displaced, for instance, often have limited, if any, access to health-care services.[76] Refugees face further barriers to accessing mental health services and services for the prevention of substance use and treatment of drug use disorders. Difficulties for refugees in accessing drug treatment services can stem from issues related to navigating a new and unknown health-care system, an insufficient command of the language of the host country, different views to those held in the host country about substance use disorders and their treatment, and a lack of trust in such services.[77] Moreover, the services available may not provide culturally sensitive interventions that encourage access to care within a religious and cultural context for the displaced population.[78] Furthermore, the availability of drug treatment and mental health services, especially in low- and middle-income countries, where the majority of displaced people are hosted, is often just as limited for the host population itself as for the refugee or displaced population.[79, 80]

People who have been displaced as a result of a humanitarian emergency and who use drugs or suffer from drug use disorders may experience a double stigma that acts as a barrier to accessing and utilizing substance use disorder treatment and other services. This may be the result of being part of a population group that may not be accepted by host communities or recognized by national Governments and health systems, as well as the stigma they may face because of their substance use. The intersectionality of belonging to different groups affected by marginalization and discrimination (for example, being a female refugee from an ethnic minority with a substance use disorder) may further increase stigma and suffering and act as an additional barrier to accessing and utilizing services.[81]

The actual number of recently displaced Ukrainians who use drugs and have accessed low threshold and infectious disease services in bordering European Union countries has been reported as lower than originally projected. Most of the people displaced from Ukraine were women and two thirds of those who accessed opioid agonist treatment services in Poland, for example, were women. This has raised questions regarding the availability and accessibility of gender-responsive services for women, given that the displaced women are often accompanied by children and therefore require a range of social support services in addition to opioid agonist treatment.[82]

Since humanitarian emergencies may change pre-existing risks and patterns of substance use and substance use disorders, services and interventions for people displaced by humanitarian emergencies are effective only if they address pre-existing conditions, conditions induced by emergency situations and conditions induced by being in a prolonged humanitarian crisis.

Although there have been increased efforts to integrate mental health, neurological and substance use disorder services in humanitarian settings into refugee primary health-care services over the past 10 years, overall service utilization rates for mental health and substance use disorders do not appear to have increased.[83, 84, 85] Health-care service utilization rates have been reported as being particularly low for common mental health disorders such as depression, anxiety, PTSD and substance use disorders. This may be related to the existence of different health-seeking behaviours for those disorders among refugees or because such services are often offered outside of formal health-care settings, notwithstanding the low levels of availability or uptake of such services in host communities.

Need for prevention and treatment interventions for people forcibly displaced		
Addressing pre-existing conditions	**Addressing needs in emergency situations (immediate and medium term)**	**Addressing needs in a protracted displaced situation (medium to long term)**
Addressing existing substance use disorders, precipitation of withdrawal or continuation of treatment, e.g. access to opioid agonist treatment, identification and management of withdrawal, overdose prevention, identification and management of overdose	Linking people with existing prevention and treatment servicesthat address initiation of substance use, progression to harmful use of substances and continued care for those with pre-existing substance use disorders	Long-term support; age-appropriate prevention interventions and treatment programmes; and management of social and mental health issues among the displaced and the host population.

Source: UNODC elaboration.

Source: WHO and UNODC, *International Standards for the Treatment of Drug Use Disorders: Revised Edition Incorporating Results of Field-Testing* (Geneva: WHO, 2020).

In general, the paradigm of services for the prevention of drug use and the treatment of drug use disorders is the same as in any population, in line with the public health principles of drug service provision.[86, 87] Under the holistic pyramidal structure, brief, low-level universal services and resources are made available to most people in need, at the bottom of the pyramid, and more specialized interventions be provided for those with a particularly high level of need, at the top of the pyramid.[88] There is also a consensus among experts that key principles for delivering substance use disorder treatment in humanitarian settings should, as in other settings, be centred around community engagement, the building of trust, integrated service delivery models, the reduction of stigma, the consideration of culture and context in service delivery, and an ethical, "do no harm" approach.[89]

In the context of humanitarian emergencies, the provision of food and shelter are typically prioritized. Often, the psychosocial issues experienced by displaced populations are indicators of the collective trauma and distress that they have experienced.[90] Therefore, ignoring these aetiologies in the prevention of substance use and the provision of mental health interventions can have unintended consequences, such as exacerbating existing psychosocial problems for the displaced population. As mentioned above, prevention programmes follow the same paradigm of interventions that are age-appropriate and culturally sensitive.[91, 92] Moreover, for children who have been exposed to stressful situations, such as humanitarian settings, the need for strong, healthy, nurturing caregiver relationships assumes even greater importance than in normal circumstances.[93] In this context, family programmes that build skills among parents and children and help to protect children from current and future challenges they may face in stressful situations in humanitarian settings are of the utmost importance.[94, 95, 96, 97]

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SERVICE INNOVATIONS DURING COVID-19

SERVICE INNOVATIONS DURING COVID-19

Innovations and modifications of services for people who use drugs during the COVID-19 pandemic: what are the interim outcomes?

In response to the COVID-19 global public health emergency (declared a pandemic on 11 March 2020), most countries in the world introduced measures to curb the spread of the virus in the form of movement restrictions and stay-at-home orders.[1] Such restrictions, together with the overburdening of health-care systems due to COVID-19 infections,[2] compromised access to services aimed at preventing and treating drug use and its consequences.[3] Routine surveillance of drug use, drug-related harms, drug treatment and other interventions may also have been affected;[4] drug-related treatment data that can be used to compare the pre-pandemic situation with the situation during the pandemic have been reported to UNODC by only 46 countries. The majority of these countries[5] reported a decline in the number of persons in drug treatment between the periods 2018–2019 and 2020–2021, with further declines from 2020 to 2021 in 18 of the 21 countries that provided data for both years.[6, 7] The disruption of services for people who use drugs and who have needed these services during the COVID-19 pandemic has been well documented,[8, 9] as have concerns over the likely negative impact resulting from this disruption.[10]

In an attempt to mitigate this negative impact, there is evidence that numerous service providers and policymakers have actively and creatively sought ways to continue to provide services for people with drug use disorders during the emergency situation created by the COVID-19 pandemic. This is especially relevant in the case of opioid use disorders, which often require a daily intake of internationally controlled medicines. A number of different strategies have been implemented across the globe to ensure continuity in service provision, in addition to measures adopted by services aimed at directly curbing the spread of COVID-19 on-site, such as the use of personal protective equipment, social distancing and COVID-19 testing.[11] Such strategies can be broadly categorized as the introduction or scaling up of the use of telehealth approaches, the provision of (uninterrupted) access to medication or sterile injecting equipment and other approaches.

Interim evaluation of implemented adaptations to drug service provision

Adaptations implemented during the COVID-19 pandemic to services for people who use drugs or with drug use disorders have been evaluated in at least 37 countries in all regions of the world,[12] although rigorous studies are mostly available from high-income countries.

Telemedicine

The use of telemedicine approaches has thrived worldwide during the COVID-19 pandemic, although notable gaps in its utilization and challenges still remain.[13, 14, 15] In some countries, telehealth has been implemented for the first time during this period,[16] the most commonly used approaches being telephone calls, followed by free video services.[17]

Telehealth approaches were recommended by WHO and UNODC[18] for the care of people who use drugs, and have been among the most used approaches during the pandemic.[19] Studies have shown their feasibility and acceptability and increased patient satisfaction,[20] as well as a positive perception by clinicians.[21] However, evaluations of such approaches in the case of people who use drugs have, to date, rarely been published outside of North America. Favourable clinical outcomes, including higher patient compliance, improved or unchanged treatment retention and improved abstinence rates,[22] were reported. Telehealth has proved to help not only in overcoming the challenges of the COVID-19 pandemic, but also in addressing traditional barriers to treatment such as childcare or work commitments, transportation challenges and even stigma.[23] A review of studies conducted

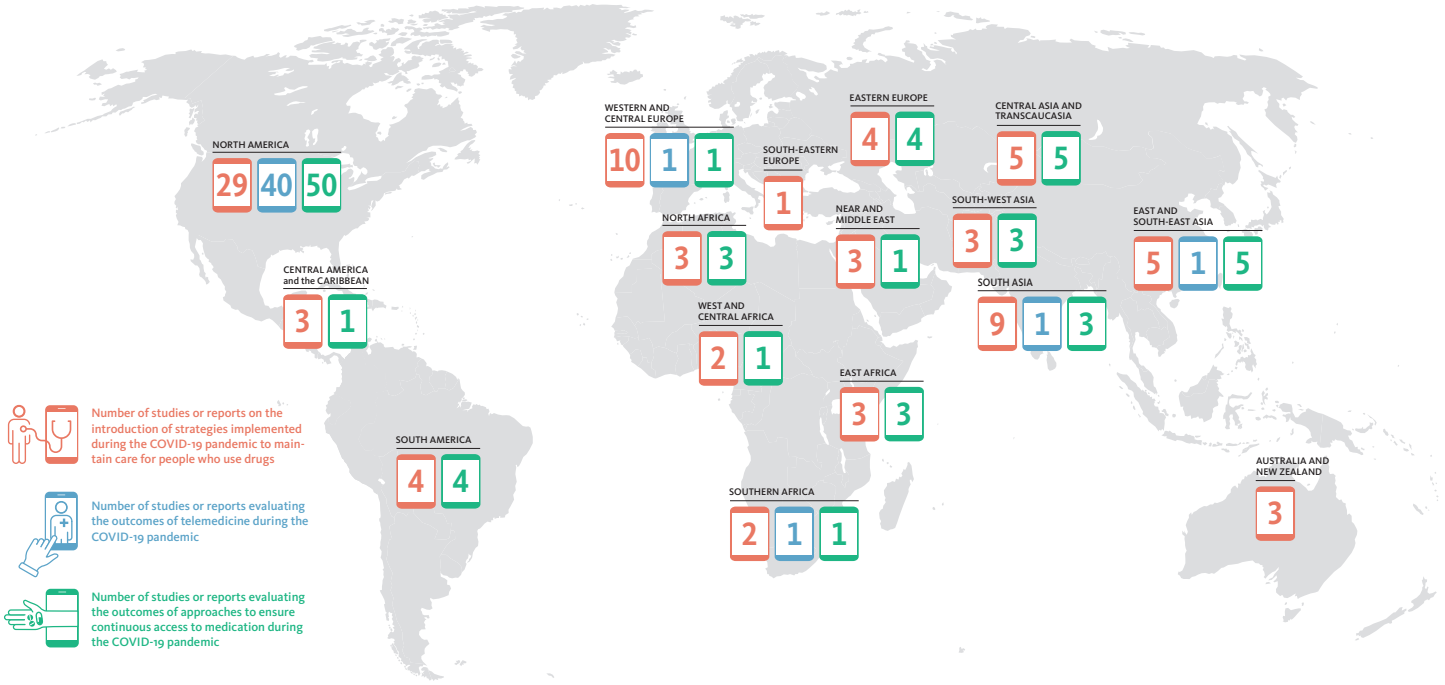
TABLE 4 Brief overview of strategies implemented during the COVID-19 pandemic to maintain care for people who use drugs[24, 25, 26, 27, 28, 29]

Type of strategy	Examples described in the scientific literature
Telehealth	24-hour telephone lines
	Smartphone applications for contact
	Psychosocial services, counselling, individual and group therapy, and sometimes medical consultations online
	Patient assessment and triage via phone/video calls
	Distribution of electronic equipment (e.g. donated phones to patients and laptops to clinicians), installation of computers in prison units
	Distribution of prepaid cards and devices with prepaid services
	Text messaging with patients
	Access to sanitized telephone booths placed outside the facility, allowing private video calls
	Setting up of a sanitized private room with phone communication to providers in another room of the facility
	Use of virtual platforms for outreach and education (e.g. on naloxone use)
	Prescription via telemedicine, including teleconference
Ensuring access to medication and sterile injecting equipment	Electronic prescription
	Introduction or increase in the number of take-home dosages
	Home delivery of medications (including via a mobile van)
	Decentralization of medication distribution and support via primary care
	Dispensing of medications to a trusted contact (e.g. a patient's family member)
	Increased use of extended-release medicines, including depot buprenorphine
	Provision of a pharmaceutical quality substitution for various street drugs
	Drive-through events for naloxone education and distribution
	Distribution of naloxone kits by mail
	Drop-off basket regularly refilled with naloxone kits
	Development of emergency plans to maintain the continuity of needle and syringe exchange programmes and opioid agonist therapy
	Lifting of restrictions on the number of needles and syringes allowed to be distributed
	Allowing of secondary distribution of needles and syringes by peers
Other	Adjustment of the legal framework to allow for telehealth and longer take-home dosages
	Urine drug screening via mobile van near patients' homes
	Suspension of urine drug screening
	Provision of electronic pillboxes with a telephone support line

mostly in the United States provided evidence that telehealth innovations during the COVID-19 pandemic have led to higher access to and improved use of medication.[30] An overall reduction in health-care costs was an additional benefit.[31]

The implementation of and experimentation with telemedicine has also raised some challenges; besides the impersonal experience and reduced privacy reported by some patients,[32] there were limited possibilities of physical examination[33] and limited access to and skills in using appropriate devices or the Internet in some client groups. Populations facing increased difficulties in accessing telehealth-based care were persons experiencing homelessness[34] and people who inject drugs.[35] The lack of integration of a telehealth modality with the remainder of the health-care system was another problem reported in multiple studies.[36] One exception was in the Province of Alberta, Canada, where the system in place allows many stakeholders (such as various addiction professionals, including from local services, laboratories and pharmacies) to manage the delivery of opioid agonist therapy entirely virtually.[37]

MAP 12 Number of data collections or studies (including as part of reviews) in countries referred to in the present chapter, by subregion



Sources: UNODC.

In contrast with North American studies, a study in South Africa concluded that telemedicine was feasible only for a minority of the patients treated for substance use disorders: apart from the lack of availability of appropriate technology or connectivity, patients often did not answer phone calls, probably due to privacy concerns, among other barriers to the implementation of these approaches.[38] On the other hand, a pan-Malaysian study reported an increase in the utilization of telehealth approaches after "movement control orders" were nationally imposed; such approaches were instrumental in decreasing treatment disruption or discontinuation.[39]

Overall, the implementation of telemedicine approaches in mental health services in order to overcome service disruption during the pandemic was lower in countries with lower incomes.[40] Studies beyond the drugs field found that specific subregions and countries may face additional challenges in the implementation of telehealth services, for example, a lack of infrastructure (sometimes including electricity) and connectivity and the digital or even complete illiteracy of some population groups – the "digital divide" related to inequalities affecting also high-income countries. The cost of some of the approaches was also highlighted, as were the lack of national policies, legislation (including to protect patients' privacy) and guidelines, and issues related to insurance reimbursement or resistance to change among clinicians and patients.[41, 42, 43, 44, 45]

Take-home medication

In contrast, approaches that ensured continued access during the pandemic to medication for people who use drugs have been evaluated on a wider geographical scale. Research findings suggest that new or expanded access to take-home dosages was successful in ensuring continuity of treatment for drug use disorders and has led to increased interest in opioid agonist therapy,[46] and even successful initiation of treatment in new patients in many countries, including in UNODC high-priority countries for drug use and

HIV.[47] However, data on treatment uptake, which would provide definitive confirmation of these findings, are not always available.

Studies have shown that a decrease in quality of treatment or patient outcomes was not recorded,[48] while patient satisfaction increased,[49] alongside improved quality of life and a sense of accomplishment and self-confidence among patients (perceived autonomy with increased self-esteem).[50] Savings in resources (including clinicians' working hours) were also often reported.[51]

The main concerns of clinicians regarding take-home dosages have long been potential diversion and overdose, often with a fatal outcome. Early studies did not show an increase in the number of overdose deaths among opioid agonist therapy patients, while an increase in the number of incidents of diversion to the illicit market was rarely reported; however, few rigorous and individual-level studies have been conducted to date.[52, 53, 54, 55, 56] Recent studies in two countries showed an increase in methadone-related mortality following the first wave of COVID-19 in persons to whom methadone had not been prescribed (but not in those who had been prescribed the substance)[57] in the United Kingdom and at the general population level in the United States,[58, 59] even though methadone-related mortality remained low in both countries and the reasons for the increase are not clear. This raises the question of possible methadone diversion or the non-adherence by patients to prescription instructions, but the available data do not allow definitive conclusions to be drawn yet.[60, 61, 62]

A few challenges related to the expanded provision of take-home dosages have been highlighted in a number of studies, including more frequent dropouts,[63] lower access of disadvantaged groups to support through telehealth interventions,[64] and the perception of routine and treatment stability disruption in some patients.[65] The abrupt interruption of the new guidelines for take-home dosages as soon as the state of emergency was lifted is an issue that was also raised.[66]

Implications for future services for people who use drugs or with drug use disorders

The COVID-19 pandemic has created a "natural experiment" situation which has provided, out of the necessity of curbing the spread of the infection, opportunities for testing new approaches. It has also accelerated innovations in drug service provision. Scientific evaluations remain disproportionally concentrated in high-income countries and the long-term evaluations of the innovations have not been completed yet; therefore, definitive conclusions cannot be drawn, even if the interim outcomes of adjustments to services during the pandemic were – in places where their implementation was feasible and followed by an evaluation – to a great extent positive. Some aspects, however, such as the balancing of benefits and risks of different approaches to methadone delivery (i.e. extending take-home dosage policies for long periods of time or to non-stable patients),[67] need more research. Most of the studies and reports reviewed concluded that innovations should be maintained in the future,[68, 69] chiefly in order to improve access to evidence-based treatment,[70] in particular where it was, or still is, lacking. This, however, collides with a number of obstacles, including entrenched routines in clinical practice (resistance to change), as well as inappropriate financing rules (e.g. reimbursement of in-person visits only)[71] and legislative obstacles,[72] which would require financing and legislation changes in some countries.

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USE OF THE DARK WEB AND SOCIAL MEDIA FOR DRUG SUPPLY

USE OF THE DARK WEB AND SOCIAL MEDIA FOR DRUG SUPPLY

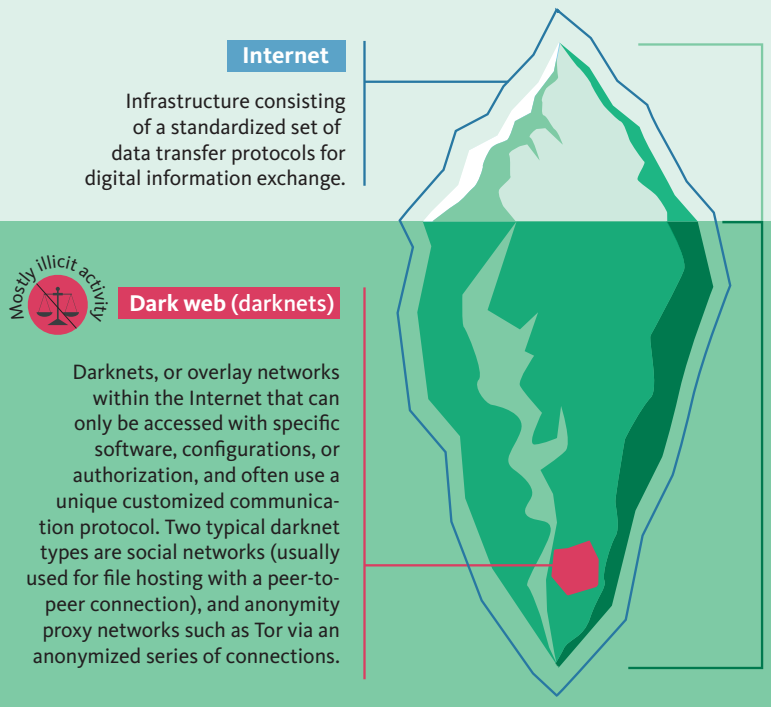
Online drug sales mirror the increase in Internet use

Use of the Internet and social media continues to spread across the globe, to the extent that two thirds of the global population now have access to the Internet (66 per cent)[1] and more than half use social media (59 per cent).[2]

Increased digital interconnectivity has brought about innovations in how supply chains operate, but *t*he ongoing growth of online shopping is not limited to the purchase of licit goods. The increase in the use of the Internet among the general population is mirrored in the increase the use of the open Internet, also known as the clear web, as well as the deep web to procure drugs. Developments in digital communications platforms have added a new dimension to drug distribution. In principle, almost everyone can now order drugs online and have them delivered directly to their door, thereby cutting out intermediaries, reducing costs and shortening supply chains.

The marketing and sale of controlled drugs and NPS on the Internet can take place at different levels: on the clear web, sometimes using encrypted communications tools; on certain social media applications; and on darknet markets, which form part of the deep web. Measurements – such as the number of websites, terabytes stored on such websites or cryptocurrency

THE INTERNET: CLEAR WEB, DEEP WEB AND DARK WEB



Internet

Infrastructure consisting of a standardized set of data transfer protocols for digital information exchange.

Mostly licit activity

Clear web (surface web)

Content indexed by standard web-search engines, accessible to anyone using the Internet.

- social networks
- public pages /profiles

Mostly illicit activity

Dark web (darknets)

Darknets, or overlay networks within the Internet that can only be accessed with specific software, configurations, or authorization, and often use a unique customized communication protocol. Two typical darknet types are social networks (usually used for file hosting with a peer-to-peer connection), and anonymity proxy networks such as Tor via an anonymized series of connections.

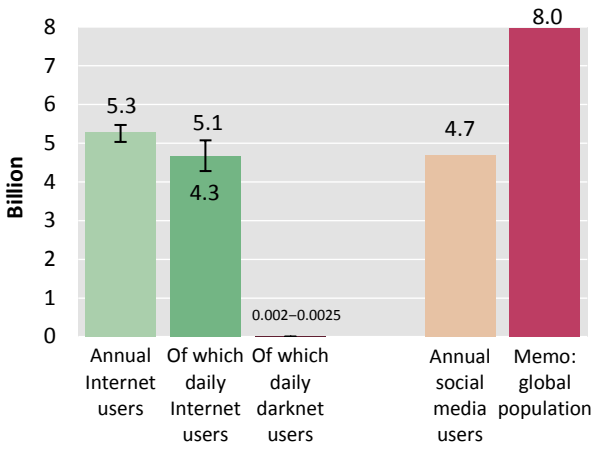
Mostly licit activity

Deep web

Content not indexed by standard web-search engines; content can be located and accessed by a direct URL or IP address but may require a password or other security access to get past public-website pages; includes many very common uses such as web mail, online banking, private or otherwise restricted access content and profiles.

- online banking
- social networks
- restricted pages /profiles

FIG. 14 Estimates of the global number of Internet and social media users, 2022



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transactions – used to assess the relative importance and use of these Internet segments for licit or illicit purposes are complex and are noted here only to provide some likely orders of magnitude.

The vast majority of Internet connections take place on the deep web (accounting for an estimated 96 per cent of all websites indexed by search engines, versus 4 per cent on the clear web).[3, 4, 5] The deep web has a wide range of legitimate uses, but also hosts the dark web,[6] which – depending on the measurements used (addresses or terabytes) – is estimated to represent either 0.01 per cent,[7] or between 5 and 10 per cent, of the Internet.[8, 9, 10, 11] The dark web hosts a number of illegal activities, but it seems that a large proportion of the activities carried out on it, such as communications among dissidents and critical journalists, could, depending on the legal system, be considered to be legitimate or at least semi-legal.[12]

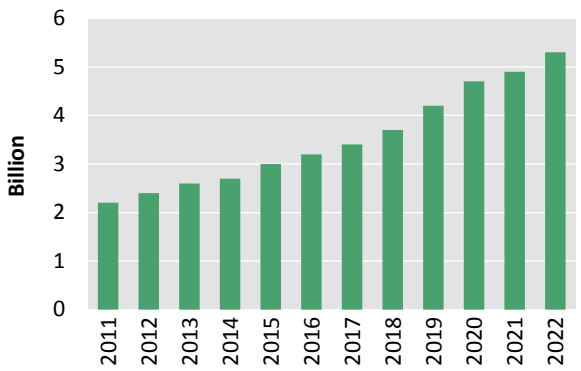
Most cryptocurrency transactions are not illegal. A blockchain analysis of cryptocurrencies suggests that only between 0.1 and 1.9 per cent of the volume of all cryptocurrency transactions in recent years (2017–2022) involved transactions linked to illegal goods and services (0.24 per cent in 2022).[13] The proportions of illegal transactions are different if only transactions involving darknet markets are considered, however. Transactions involving darknet markets (mostly drug-related markets) accounted for 0.02 per cent of all cryptocurrency transactions in 2022, the majority of which can be considered to have been illegal.[14]

Following years of an upward trend, drug sales on the dark web seem to have declined in 2022

An Internet survey conducted simultaneously in 10 European Union countries in the period 2017–2018 among some 20,000 Internet-using drug consumers,[15] using various recruitment strategies,[16] found that 8 per cent of survey respondents had bought drugs on the dark web.[17] This was a far smaller proportion than those who had bought drugs from a drug dealer (59 per cent), but a significantly larger proportion than those who had bought drugs from an online shop (3 per cent) or a specialized NPS shop (1 per cent).[18]

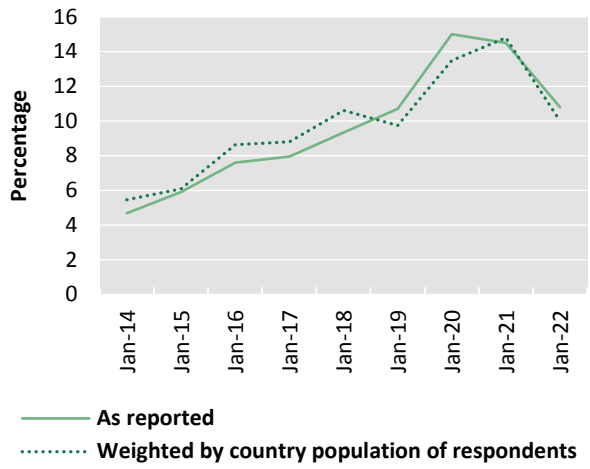
Another online survey, based on a convenience sample of more than 100,000 participants in 35 countries worldwide, suggested that the proportion of Internet-using drug consumers who had purchased drugs on the dark web in the previous 12 months had more than doubled between 2014 and 2022, from 4.7 to 10.8 per cent.[19] Although plausible, these findings should

FIG. 15 Global number of Internet users, 2011–2022



Source: ITU, Statistics – Individuals using the Internet.

FIG. 16 Proportion of drug-consuming Internet users reporting drug purchases on the dark web, 2014–2022



Source: UNODC calculations based on Global Drug Survey 2022 data (and previous years): detailed findings on drug cryptomarkets.

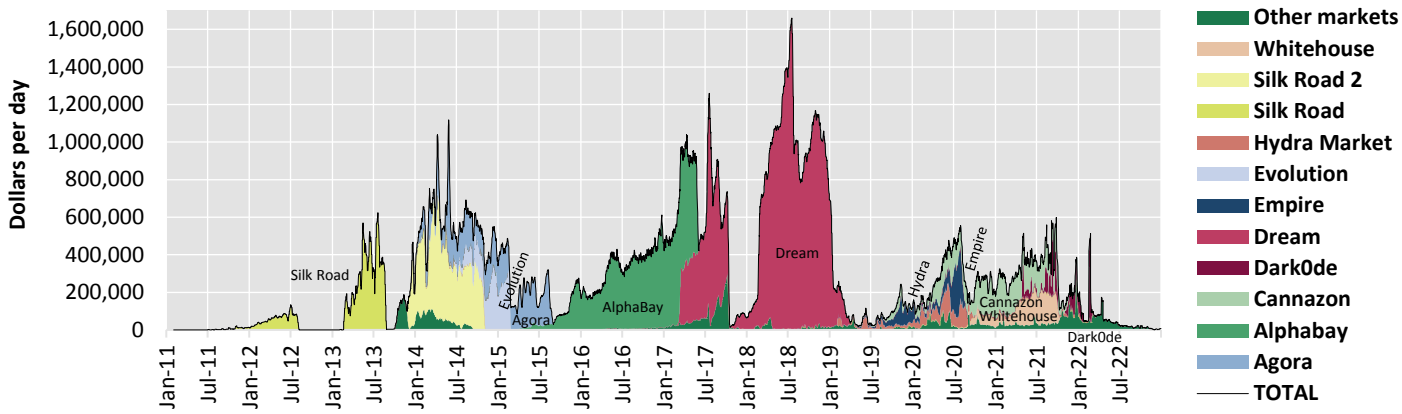
Note: The dotted line is the result of ex-post stratification whereby country data were weighted by the actual population of the respective countries. Missing data by country for specific years were also interpolated from adjacent years and that data was assumed to have remained stable since the last survey.

be interpreted with caution, because they are not based on representative global samples but on convenience samples that are characterized by an overrepresentation of Internet users in Europe, the Americas and Oceania.

Estimating the size of drug markets on the dark web is challenging. An analysis of major darknet markets using web-crawling techniques has shown that they are highly volatile and have a propensity to disappear at short notice as a result of both law enforcement successes in dismantling such markets and exit scams.[20]

Another approach has been to systematically investigate the existing blockchains of various cryptocurrencies for suspicious addresses involved in illegal transactions, and the resulting money flows between such addresses (cryptocurrency wallets). The analysis of various blockchains of cryptocurrencies suggests that darknet markets (mostly selling drugs) continued growing up until 2021, when their combined revenue reached a record high of an estimated $2.7 billion (equivalent to an estimated 1.5 per cent of retail drug sales in North America and Europe),[21] before declining by half, to around $1.3 billion in 2022, mostly

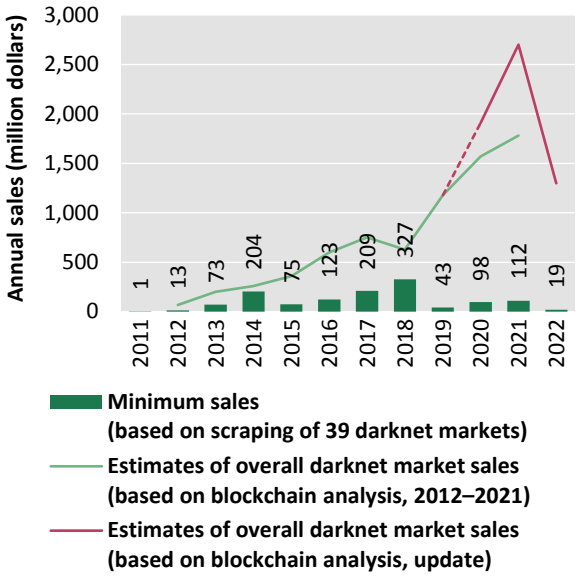
FIG. 17 Daily minimum sales (mostly drug-related: >90 per cent) on 39 major global darknet markets, 2011–2022



Source: UNODC analysis based on Hikari Labs data (see online Methodological Annex).

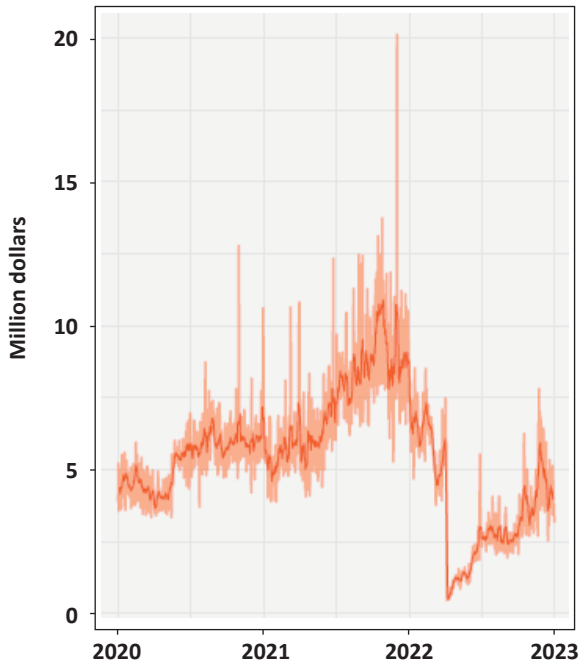
Note: Data refer to minimum stacked market sales of different products and services, of which drugs accounted for more than 90 per cent, and are presented as seven-day averages. All data shown reflect minimum sales, as the current web-crawler techniques do not cover all sites on a specific market and because not all customers leave feedback. The coverage ratios (sites actually scraped as a proportion of all sites found on the dark web) declined, however, from an average of 65 per cent for older darknet markets that ended their mid-life prior to 2018 to some 6 per cent for newer darknet markets. This is mainly a consequence of the very low coverage ratio of Hydra Market (less than 1 per cent). Such a decline in coverage results has led to major underestimates for more recent darknet sales.

FIG. 18 Observed minimum sales on 39 major darknet markets (mostly drug-related: >90 per cent) and estimates of overall darknet market sales (mostly drug-related) based on blockchain analysis, 2011–2022



Sources: UNODC calculations based on Hikari Labs data and Chainalysis; Crypto Crime Report 2023 (and previous years).

FIG. 19 Daily revenue for (mostly drug-related) darknet market sales, based on blockchain analysis, 2020–2022



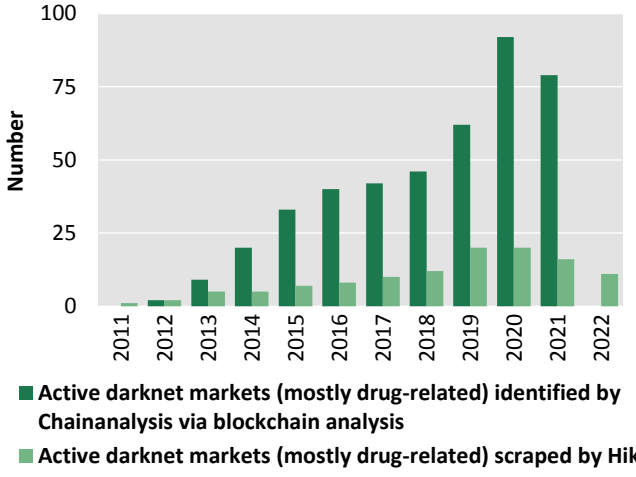
Source: Chainalysis, Crypto Crime Report 2023 (and previous years).

as a result of the dismantling of the darknet platform Hydra Market in April 2022.[22] Nonetheless, darknet markets continue to show resilience and started to recover in the second half of 2022.

Darknet drug sales may be shifting towards wholesale

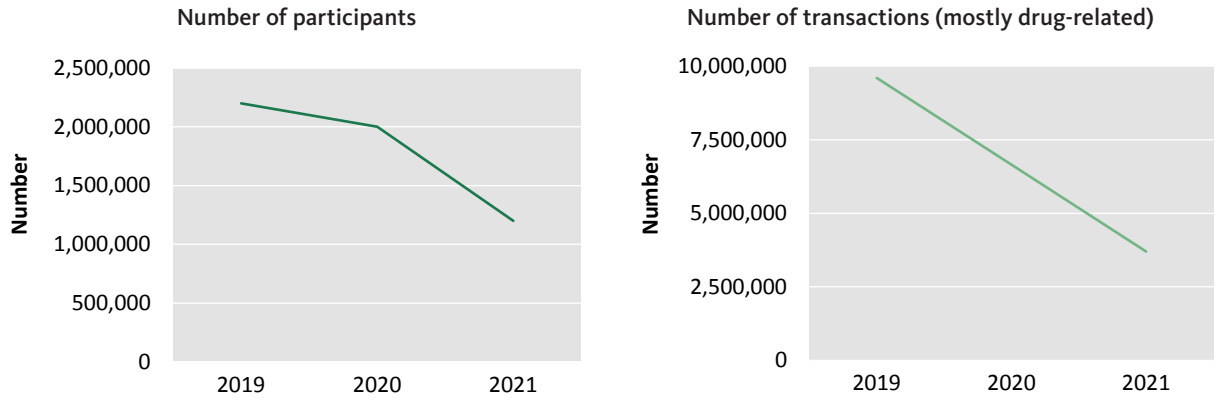
International experts, meeting in late 2022,[23] highlighted a possible shift in darknet markets, away from primarily retailing drugs to end users towards selling them wholesale as well – a trend that seems to have been confirmed by blockchain analysis[24] more recently. The recent decline in active darknet markets (mostly drug-related), their participants[25] and transactions[26] has occurred in a context where overall darknet sales nonetheless continued to rise until 2021, the consequence of a marked increase in average payments per transaction and an indication that some vendors may

FIG. 20 Number of active darknet markets (mostly drug-related), 2011–2022



Sources: UNODC calculations based on Hikari Labs data and Chainalysis, Crypto Crime Report 2023 (and previous years).

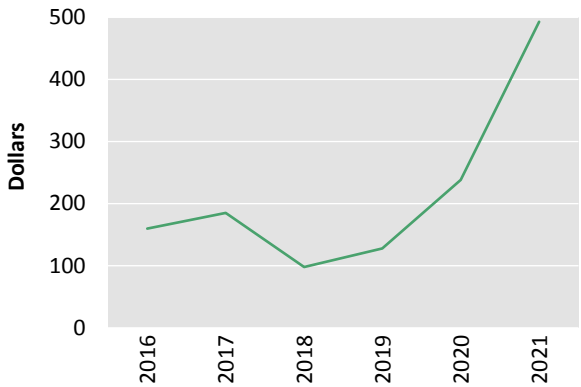
FIG. 21 Number of active darknet market participants (mostly drug-related) and transactions (mostly drug-related) on darknet markets, 2019–2021



Source: Chainalysis, The 2022 Crypto Crime Report, February 2022

Note: Participants are "active users", which is defined as a wallet that has sent or received more than $5 worth of cryptocurrency to or from darknet markets over the course of a year.

FIG. 22 Average size of transactions (mostly drug-related) on the blockchain, 2016–2021



Source: Chainalysis, The 2022 Crypto Crime Report, February 2022.

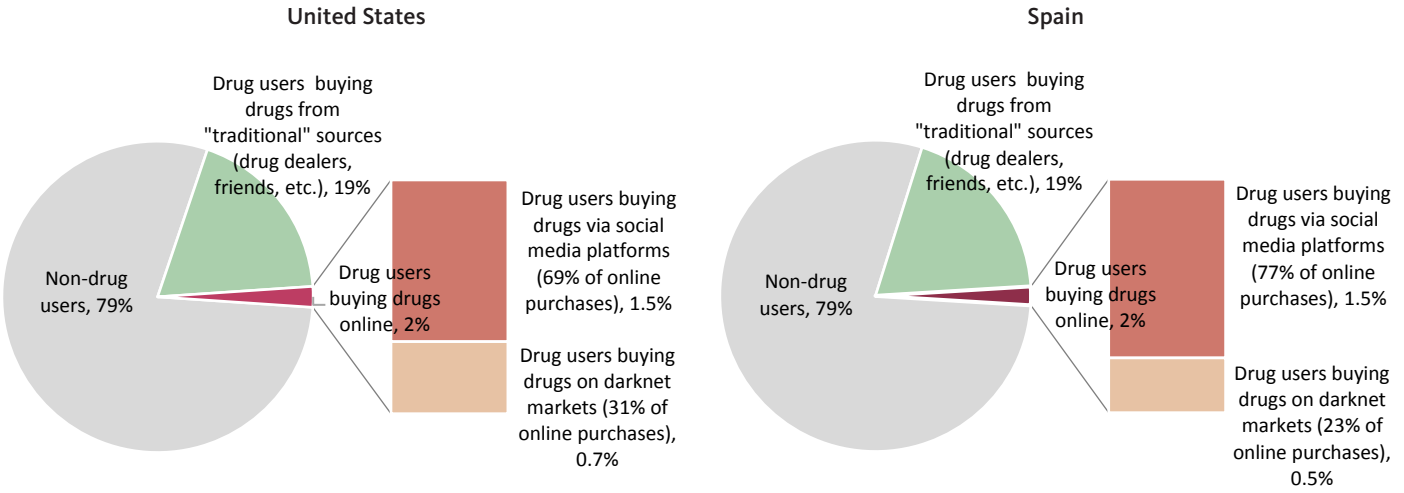
have started selling their drugs to drug distributors while others may have widened their portfolio to increasingly sell other products and services in addition to drugs.[27]

Use of social media for buying and selling drugs appears to be growing

End users seem to be buying their drugs on the dark web to a lesser extent than in previous years.[28] Qualitative information provided by people who use social media suggests that the use of such media for drug purchasing purposes has been increasing, especially at the retail level.[29] This is occurring in a context in which the use of social media, typically accessed via the clear web (although not exclusively) is increasing more rapidly than the use of the Internet in general.

In a study conducted in the United States (2018) and Spain (2019), in which about one tenth of all Internet-using drug consumers aged 15–25 bought drugs online, large proportions (69 per cent in the United States and 86 per cent in Spain) of online purchases were made via social media, and the remainder on darknet markets.[30] Another study, conducted in Ireland in 2021, suggested that around 64 per cent of online drug purchases among the general population were made using social media, 28 per cent occurred on darknet markets and 8 per cent were made via online shops.[31] That pattern applied to most drug types.[32] A previous comparison of social media and darknet markets in Denmark, carried out in 2017, had also suggested that

FIG. 23 Use of traditional sources versus online purchases of drugs among Internet-using drug users aged 15–25, the United States and Spain



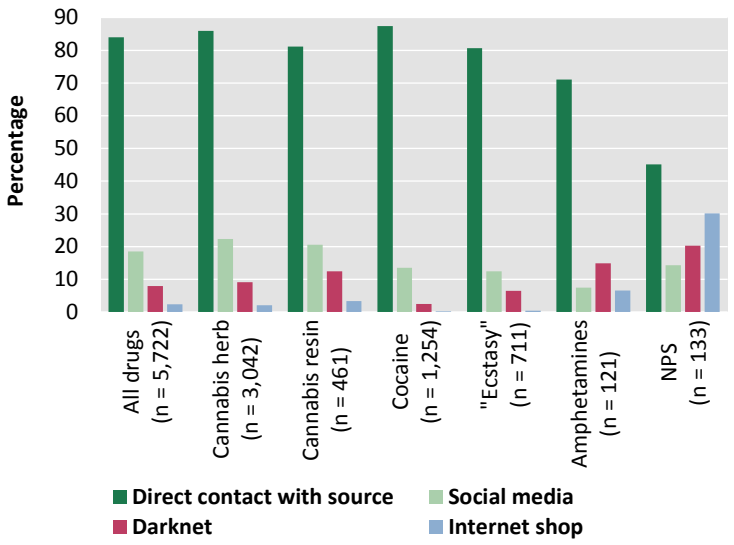
Source: Atte Oksanen, Bryan L. Miller, Iina Savolainen, Anu Sirola, Jakob Demant, Markus Kaakinen and Izabela Zych, "Social Media and Access to Drugs Online: A Nationwide Study in the United States and Spain among Adolescents and Young Adults", *The European Journal of Psychology Applied to Legal Context* (9 December 2020).

most online drug purchases were made via social media (71 per cent).[33]

Drugs are sold on a number of social media platforms, including mainstream platforms such as Facebook, Instagram, Snapchat and WhatsApp.[34] Platforms that enable social networking between strangers, such as Tinder, Grindr, Instagram, Facebook and Discord, allow sellers to openly "advertise" their products to unknown buyers by constructing a public profile. Conversely, messaging platforms, both encrypted and unencrypted, facilitate more private drug transactions between people who already know one another, via direct message or within the confines of a group chat.[35]

The two main social media platforms identified for drug purchases in the above-mentioned study conducted in the United States and Spain in 2018/2019 were Facebook and Instagram.[36] Findings from a study in Nordic countries in the period September–December 2017 show that Facebook and Instagram were also the social media platforms most commonly used for drug dealing in Denmark, Iceland and Sweden. There were no indications of drug dealing on open social media platforms such as Facebook in Norway, however. The same was

FIG. 24 Use of traditional sources versus online purchases of drugs, by drug type, among Internet-using drug users aged 18 and older, Ireland, 2021



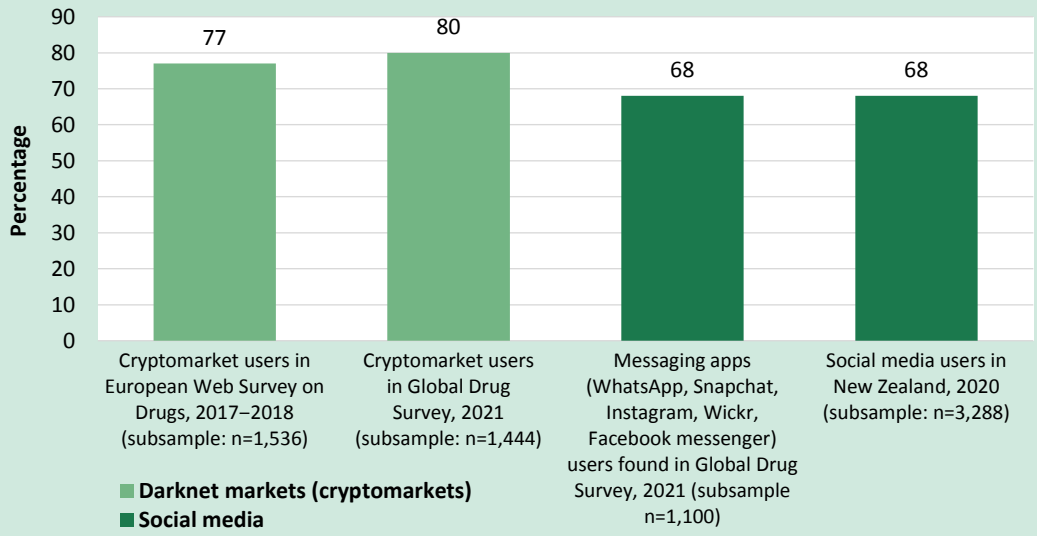
Source: Deirdre Mongan, Nicki Killeen, David Evans, Seán R. Millar, Eamon Keenan and Brian Galvin, European Web Survey on Drugs 2021: Irish Results.

Note: There can be more than one source reported.

Drug users who purchase drugs online are predominantly men

Most drug users in the samples illustrated in the graph below who purchased drugs online were men: more than three quarters of respondents did so on darknet markets, and slightly fewer (two thirds) used social media.

Proportion of men among survey respondents who were Internet-using drug users purchasing drugs online: darknet markets (cryptomarkets) versus social media, 2017–2021



Sources: Monica J. Barrat et al, "Exploring Televend, an Innovative Combination of Cryptomarket and Messaging App Technologies for Trading Prohibited Drugs", Drug and Alcohol Dependence 231 (2022); and UNODC calculations based on Alexandra Karden and Julian Strizek, Monitoring Drug Use in the Digital Age: Studies in Web Surveys – The potential for using web surveys to investigate drug sales through cryptomarkets on the darknet, EMCDDA Insights (Lisbon 2022).

true in Finland, where the majority of online drug purchases were made on darknet markets. One-on-one social media forums such as Reddit seem to be preferred in Norway.[37] However, different social media platforms may also be used for different drugs, as seen in Latin America and the Caribbean.[38]

User-friendliness of social media raises new challenges

Sales on the dark web (on darknet markets) are, in general, fully anonymous transactions between sellers and buyers that are dispatched by mail. Drug sales via social media, although initiated anonymously, tend to require hand-to-hand transactions, so end up in face-to-face meet-ups arranged via one-on-one social media apps such as Snapchat, Wickr or Facebook Messenger.[39]

The need for face-to-face transactions means that the use of social media for buying and selling drugs is more of a localized phenomenon,[40] in which different social media platforms dominate the scene in different countries and buyers and sellers often live in the same country. In contrast, the use of darknet markets for those purposes is more of a regional and, partly, global phenomenon.[41, 42, 43, 44, 45]

The growing popularity of social media platforms for purchasing drugs[46] reflects a certain reluctance among people to access the dark web, possibly because it is

often perceived as requiring sophisticated IT skills to use and as being increasingly targeted by law enforcement authorities. Social media and encrypted messaging apps are thus seen as faster, more convenient and more user-friendly local alternatives for purchasing drugs than the complex and volatile darknet drug markets.[47, 48] Moreover, social media users lean more towards the use of pictures, icons or emojis that resemble the products that consumers are looking for, thereby offering an alternative method of communicating and identifying illicit products – one that does not require the use of conventional text and which may be more difficult for law enforcement authorities to identify quickly.[49]

The proliferation and ubiquity of social media, coupled with its increasing use for buying and selling drugs,[50, 51, 52] suggest that the availability and accessibility of drugs are also on the increase for people with less access to traditional drug markets.[53] Sections of the population can now be reached who otherwise may not have had easy access to drug markets. In the United States – and probably in other countries as well – the growth of social media and access to smartphones have led to the emergence of new threats, as criminal drug networks have started using social media to create new illicit markets and target a new clientele.[54] Perhaps even more problematic is that, in addition to drugs becoming more accessible, as reported in some studies,[55, 56, 57] drug supply is now more varied in terms of the compounds and doses on offer.[58, 59]

This may be a particular issue for young people, as the use of social media correlates strongly with age;[60] the youngest age groups (those aged 16 to 24)[61] seem to show the strongest inclination towards using social media to purchase drugs,[62] while the use of the dark web for drug purchases seems to be more popular among young adults aged 25 to 34.[63, 64]

Even though the available data are still not sufficiently robust to arrive at final conclusions, published studies suggest that drug sales via social media have grown markedly and may already be more significant than drug sales via darknet markets on the dark web, notably at the retail level.[65, 66]

Sales on the dark web and on social media platforms are, at the same time, strongly interwoven. Reports claim that social media platforms are often used in parallel, sometimes in addition to purchases on the dark web.[67] There are a multitude of social media platforms that play a role in the drug-purchasing process: first of all in establishing contacts (such as Facebook groups or Instagram), then in offering the drugs using photos (such as Snapchat), while subsequent deals are often concluded on more secure social media apps (such as Telegram) or closed channels (such as Wickr or Facebook Messenger).[68] A single app might also fulfil more than one of the roles discussed above. On Telegram, for instance, there may be groups dedicated to the illicit supply of drugs. In other words, that social media platform is not only a means of concluding purchases but, simultaneously, may be also used as a platform where contacts are established and illicit drugs are offered (including photos of them).[69, 70, 71, 72, 73] Research also suggests that some sellers obtain their drugs from the dark web and then resell them on social media platforms.[74]

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16 For the purposes of these European Web surveys on drugs coordinated by EMCDDA, national partners were encouraged to develop a variety of recruitment strategies to reach a range of different user groups. Sampling strategies were devised by each national partner based on their own networks and experience. Recruitment strategies varied substantially and included dedicated web pages, flyers distributed in clubs and bars, general promotion through a variety of channels (e.g. student health insurance websites, magazines, universities, social and counselling service websites, and web pages targeting people who use specific drugs), advertising in drop-in and outreach centre premises, advertising on the darknet, offering participants the incentive of entry in a lottery, and paid ads on social media sites. Source: João Matias, Monitoring Drug Use in the Digital Age: Studies in Web Surveys – European Web Survey on Drugs: an overview of the project, EMCDDA Insight (December 2022).

17 Alexandra Karden and Julian Strizek, "The Potential for Using Web Surveys to Investigate Drug Sales through Cryptomarkets on the Darknet," Monitoring Drug Use in the Digital Age: Studies in Web Surveys (EMCDDA Insights, 2022).

18 Ibid.

19 UNODC calculations based on Global Drug Survey 2022 data (and previous years): detailed findings on drug cryptomarkets.

20 UNODC, *World Drug Report 2022* (United Nations publication, 2022).

21 UNODC, *World Drug Report 2021* (United Nations publication, 2021).

22 Chainalysis, "The Chainalysis 2023 Crypto Crime Report."

23 "UNODC Global Partnership Event: Countering the Use of Cyber Assets and Online Platforms in Synthetic Trafficking" (Vienna, December 7, 2022).

24 Transactions involving the use of cryptocurrencies are usually entered into a ledger, called a blockchain. The content of such blockchains can subsequently be analysed.

25 UNODC calculations based on Global Drug Survey 2022 data (and previous years): detailed findings on drug cryptomarkets; and Chainalysis, The 2022 Crypto Crime Report (February 2022).

26 Ibid.

27 Ibid.

28 UNODC calculations based on Global Drug Survey 2022 data (and previous years): detailed findings on drug cryptomarkets; Chainalysis, The 2022 Crypto Crime Report (February 2022).

29 Robin van der Sanden et al., "'Choice' of Social Media Platform or Encrypted Messaging App to Buy and Sell Illegal Drugs," *International Journal of Drug Policy* 108 (October 2022): 103819.

30 Atte Oksanen et al., "Social Media and Access to Drugs Online: A Nationwide Study in the United States and Spain among Adolescents and Young Adults," *The European Journal of Psychology Applied to Legal Context 13*, no. 1 (December 22, 2020): 29–36.

31 Deirdre Mongan, Nicki Killeen, David Evans, Seán R. Millar, Eamon Keenan, Brian Galvin, "European Web Survey on Drugs 2021: Irish Results" (Dublin: Health Research Board, August 4, 2022).

32 Ibid.

33 Jakob Demant et al., "Drug Dealing on Facebook, Snapchat and Instagram: A Qualitative Analysis of Novel Drug Markets in the Nordic Countries," *Drug and Alcohol Review 38*, no. 4 (May 2019): 377–85.

34 van der Sanden et al., "'Choice' of Social Media Platform or Encrypted Messaging App to Buy and Sell Illegal Drugs."

35 Ibid.

36 Oksanen et al., "Social Media and Access to Drugs Online."

37 Demant et al., "Drug Dealing on Facebook, Snapchat and Instagram."

38 UNODC, "The Online Trafficking of Synthetic Drugs and Synthetic Opioids in Latin America and the Caribbean," 2022.

39 Ibid.

40 Ibid.

41 UNODC analysis of Hikari Labs data.

42 UNODC, "The Online Trafficking of Synthetic Drugs and Synthetic Opioids in Latin America and the Caribbean."

43 Oksanen et al., "Social Media and Access to Drugs Online."

44 Demant et al., "Drug Dealing on Facebook, Snapchat and Instagram."

45 van der Sanden et al., "'Choice' of Social Media Platform or Encrypted Messaging App to Buy and Sell Illegal Drugs."

46 Ibid.

47 Ibid.

48 UNODC, "The Online Trafficking of Synthetic Drugs and Synthetic Opioids in Latin America and the Caribbean."

49 Ibid.

50 van der Sanden et al., "'Choice' of Social Media Platform or Encrypted Messaging App to Buy and Sell Illegal Drugs."

51 United States Drug Enforcement Administration, "Social Media Drug Trafficking Threat," January 2022.

52 UNODC, "The Online Trafficking of Synthetic Drugs and Synthetic Opioids in Latin America and the Caribbean."

53 van der Sanden et al., "'Choice' of Social Media Platform or Encrypted Messaging App to Buy and Sell Illegal Drugs."

54 United States Drug Enforcement Administration, "Social Media Drug Trafficking Threat."

55 Jakob Demant and Silje A. Bakken, "Technology-Facilitated Drug Dealing via Social Media in the Nordic Countries," Background Paper Commissioned by the EMCDDA for the EU Drug Markets Report 2019, November 26, 2019.

56 Demant et al., "Drug Dealing on Facebook, Snapchat and Instagram."

57 Silje Anderdal Bakken and Jakob Johan Demant, "Sellers' Risk Perceptions in Public and Private Social Media Drug Markets," *International Journal of Drug Policy* 73 (November 2019): 255–62.

58 United States Drug Enforcement Administration, "Social Media Drug Trafficking Threat."

59 Teodora Groshkova, Andrew Cunningham, Paul Griffiths, Roumen Sedefov, "Digitally Enabled Drug Markets: Signs of Diversification" (Lisbon: EMCDDA, February 21, 2022).

60 Robin van der Sanden et al., "Predictors of Using Social Media to Purchase Drugs in New Zealand: Findings from a Large-Scale Online Survey," *International Journal of Drug Policy 98* (December 2021): 103430.

61 Deirdre Mongan, Nicki Killeen, David Evans, Seán R. Millar, Eamon Keenan, Brian Galvin, "European Web Survey on Drugs 2021: Irish Results."

62 van der Sanden et al., "Predictors of Using Social Media to Purchase Drugs in New Zealand."

63 Deirdre Mongan, Nicki Killeen, David Evans, Seán R. Millar, Eamon Keenan, Brian Galvin, "European Web Survey on Drugs 2021: Irish Results."

64 van der Sanden et al., "Predictors of Using Social Media to Purchase Drugs in New Zealand."

65 Oksanen et al., "Social Media and Access to Drugs Online."

66 van der Sanden et al., "'Choice' of Social Media Platform or Encrypted Messaging App to Buy and Sell Illegal Drugs."

67 UNODC, "The Online Trafficking of Synthetic Drugs and Synthetic Opioids in Latin America and the Caribbean."

68 Demant et al., "Drug Dealing on Facebook, Snapchat and Instagram."

69 Matthijs Blankers et al., "Changes in Online Psychoactive Substance Trade via Telegram during the COVID-19 Pandemic," *European Addiction Research 27*, no. 6 (2021): 469–74.

70 Adi Bleih, "Telegram: A Cybercriminal Hotspot - Illicit Items for Sale," Cybersixgill News, January 24, 2022.

71 Navene Elangovan, "Selling Narcotics over Telegram: An inside Look at a Drug Raid," TodayOnline.com, December 1, 2021.

72 Molly Clayton, "Encrypted App Where You Can Buy Cocaine and a Gold Plated AK-47 with Delivery to the UK within Four Days," Mail Online, October 2, 2021.

73 Yang Wong and Zaihan Mohamed Yusof, "Telegram Chat Groups Become Online Marketplace for Illegal Drugs in Singapore," *The Straits Times*, September 5, 2021.

74 Demant et al., "Drug Dealing on Facebook, Snapchat and Instagram."

DEVELOPMENTS AND EMERGING TRENDS IN SELECTED DRUG MARKETS

DEVELOPMENTS AND EMERGING TRENDS IN SELECTED DRUG MARKETS

New trends in cannabis products

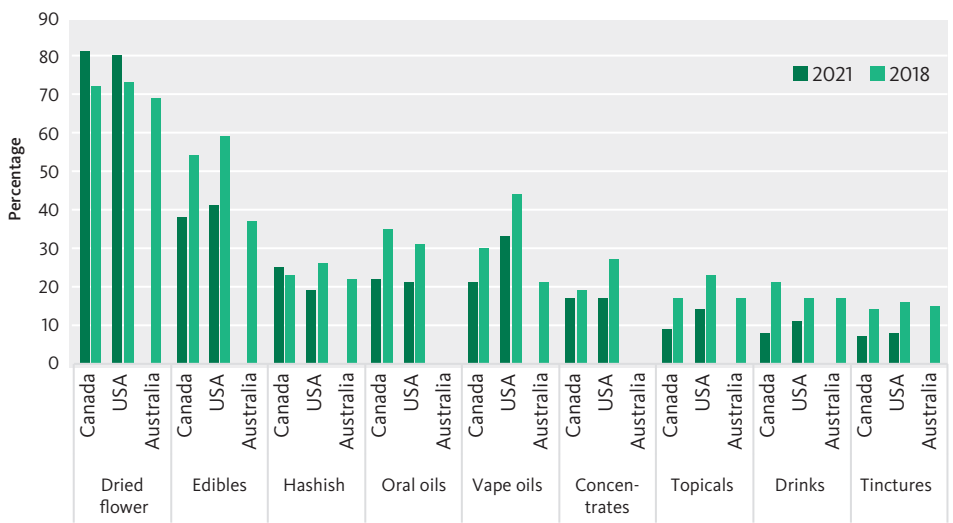
By several measures, the cannabis market remains by far the largest drug market worldwide, with nearly 219 million estimated users in 2021 and production reported in almost every country.[1] In the past few decades, there has been a diversification in the types of cannabis products available to users, particularly in jurisdictions that have legalized the supply of cannabis for non-medical use.[2]

The *Cannabis sativa* plant contains more than one hundred phytocannabinoids and terpenoids,[3, 4] including the main psychoactive cannabinoid in cannabis, *delta*-9-THC. Some of these compounds are psychoactive, and some have the potential to be used in medicine.[5]

In the last few years, the market has also seen a number of naturally occurring psychoactive cannabinoids being synthesized, in some cases in an attempt to circumvent cannabis laws, particularly those that focus specifically on *delta*-9-THC. These substances are mostly produced from CBD through a series of chemical reactions.[6]

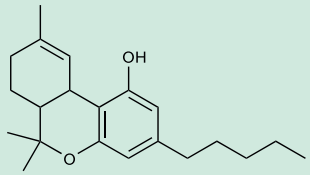
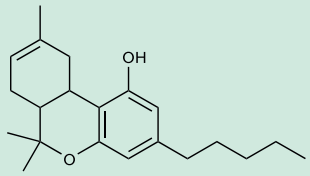
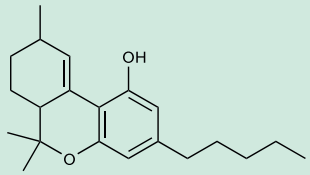
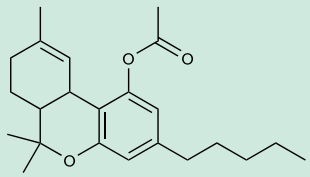
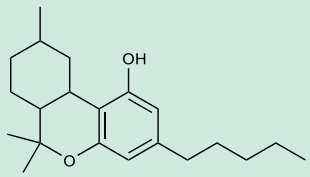
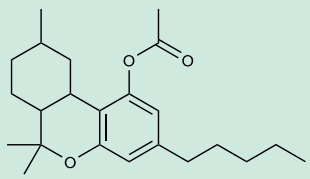
In the last 15 years, the drug market has seen the emergence of wholly synthetic cannabinoid receptor agonists (or "synthetic cannabinoids"[7]), most of which are not structurally related to phytocannabinoids and do not occur naturally in the cannabis plant. They are a diverse group of substances whose common feature is that they bind to the same cannabinoid receptors in the human body as *delta*-9-THC and thus produce somewhat similar psychoactive effects in the user, but often with heightened health risks.[8, 9, 10]

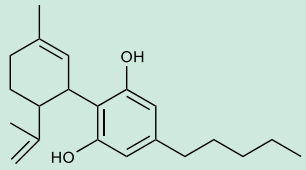
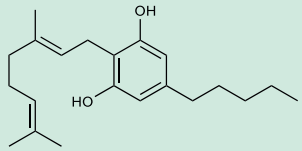
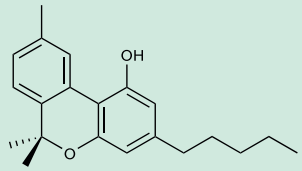
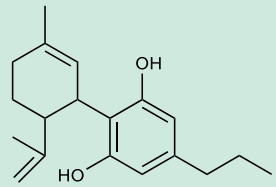
FIG. 25 **Types of cannabis products used by past-year users of cannabis in Canada, the United States of America and Australia, 2018–2021**



Source: David Hammond et al., "International Cannabis Policy Study - Canada 2021 Summary" (Waterloo, 2022); David Hammond et al., "International Cannabis Policy Study - United States 2021 Summary" (Waterloo, 2022); and David Hammond et al., "International Cannabis Policy Study - Australia 2021 Summary" (Waterloo, 2022).

TABLE 5 Selected cannabinoids recently sold on different markets

	Molecular structure	Psychoactive effects
Delta-9-tetrahydrocannabinol (*delta*-9-THC)		Main psychoactive compound in cannabis
Delta-8-tetrahydrocannabinol (*delta*-8-THC)		Psychoactive, estimated to be 50–75 per cent as potent as *delta*-9-THC[a, b, c]
Delta-10-tetrahydrocannabinol (*delta*-10-THC)		Psychoactive, likely to be less potent[d] than *delta*-9-THC (limited evidence)
Delta-9-THC acetate ester (THC-O or THCOA)		Psychoactive, likely to be more potent than *delta*-9-THC (limited evidence)
Hexahydrocannabinol (HHC)		Psychoactive, likely to be less potent than *delta*-9-THC[e] (limited evidence)
Hexahydrocannabinol acetate		Psychoactive

	Molecular structure	Psychoactive effects
Cannabidiol (CBD)		Non-psychoactive
Cannabigerol (CBG)		Non-psychoactive
Cannabinol (CBN)		Non-psychoactive
Cannabidivarin (CBDV)		Non-psychoactive

a Alyssa F. Harlow, Adam M. Leventhal and Jessica L. Barrington-Trimis, "Closing the Loophole on Hemp-Derived Cannabis Products: A Public Health Priority", *JAMA* 328, no. 20 (22 November 2022): 2007.

b Michael Tagen and Linda E. Klumpers, "Review of *Delta*-8-tetrahydrocannabinol (Δ -8-THC): Comparative Pharmacology with Δ 9-THC", *British Journal of Pharmacology* 179, no. 15 (August 2022): 3915–33.

c Leo E. Hollister and H. K. Gillespie, "*Delta*-8- and *Delta*-9-Tetrahydrocannabinol; Comparison in Man by Oral and Intravenous Administration", *Clinical Pharmacology & Therapeutics* 14, no. 3 (May 1973): 353–57.

d Karen Jaynes and Chad Johnson, "A Hemp Field Day for Psychoactive Effects: The Science of Δ8 & Δ10-THC" (University of Maryland, School of Pharmacy, Maryland, USA, 2022).

e EMCDDA, *Hexahydrocannabinol (HHC) and Related Substances* (Luxembourg: Publications Office of the European Union, 2023).

Signs of increases in cannabis potency in South America

Cannabis potency – the *delta*-9-THC content of cannabis products – has been increasing in Western and Central Europe and in North America.[a] It is important to track the *delta-9*-THC content of cannabis products because it may affect the level of risk that they pose to health, including the risk of acute harm (such as accidents, psychotic symptoms and paediatric poisonings) and of chronic harm (such as cannabis use disorders and cognitive impairment).[b, c]

There are no systematic data on levels of and long-term trends in the *delta-9*-THC content of cannabis products outside Europe and North America, so it is challenging to determine whether and to what extent cannabis products are evolving elsewhere. However, sporadic information from South America suggests that the potency of cannabis may also be increasing in this subregion.

By 2011, a new strain of cannabis that was reported to be genetically modified and to contain high levels of THC had appeared in Colombia with the name "Creepy".[d] Other names used for the product there and in surrounding countries include "Crippy", "Cripi", "Krippy", "Kreepy" and "Cripa".[e] Since 2013, both the consumption and seizures of "Creepy" have been increasingly reported in Colombia,[f] Ecuador,[g, h] Chile,[i, j] Peru[k] and, occasionally, other[l] countries in South America.[m] Recently, Guyana reported the appearance of a product with a similar name – "Poppy" or "Creppy".[k] It is possible, however, that the name has been used for several hybrids or varieties with a higher THC content than that of typical cannabis herb in the subregion. Chile has reported the penetration of "Creepy" into virtually all of its regions, and Colombia has observed an increase in people seeking medical attention as a result of using the product for recreational purposes.[n] More recently, interceptions of "Creepy" seem to have increased; in Chile, for example, such seizures rose by 700 per cent between 2017 and 2020.[o] In addition, in 2019 Colombia reported the presence of highly potent cannabis "wax" on its drug market.[e]

Data on the potency of "Creepy" are scarce. Analyses from 2017 revealed a *delta*-9-THC content of 18 to 42 per cent in Colombia while a 2021 study in Chile found an average potency of 17 per cent, with some samples having a *delta-9*-THC content of up to 80 per cent.[e] These levels contrast with the potencies of 2 to 5 per cent typically reported in South and Central America and the Caribbean in the past decade.[e]

a UNODC, *World Drug Report 2022* (United Nations publication, 2022).

b PRSC Cannabis Concentration Workgroup, *Cannabis Concentration and Health Risks: A Report for the Washington State Prevention Research Subcommittee (PRSC)* (Seattle, WA, USA: University of Washington, 2020).

c Wayne Hall, Janni Leung and Beatriz H. Carlini, "How Should Policymakers Regulate the Tetrahydrocannabinol Content of Cannabis Products in a Legal Market?", *Addiction*, 2 February 2023, add.16135.

d Elyssa Pachico, "Potent Colombian Pot Could BeBig Earner for FARC", *InSight Crime*, 21 June 2011.

e Inter-American Drug Abuse Control Commission (CICAD) and Organization of American States (OAS), *Information Bulletin: Cannabis with a High Concentration of Tetrahydrocannabinol (THC) and Synthetic Cannabinoids in Latin America and the Caribbean* (Washington, DC, USA, 2023).

f Gloria Rose Marie de Achá, *Stock de Cannabis En América Latina: Radiografía Del Microtráfico y La Venta al Menudeo* (Colectivo de Estudios Drogas Y Derecho, 2019).

g Genesis Geannine Bazurto Estupinan, *Factores Que Influyen En El Consumo De Drogas En Estudiantes De Bachillerato De La Unidad Educativa Rocafuerte* (Esmeraldas, 2021).

h Irma Coraima Pacheco Diaz, *Consumo de Creepy y Su Influencia En La Conducta Disocial En Un Adolescente de 16 Años* (Babahoyo, Ecuador: Universidad Técnica de Babahoyo, 2019).

i Carmen Paz Castañeda et al., "Uso de Cannabis En Jóvenes Hospitalizados Por Un Primer Episodio de Psicosis: Un Estudio Caso-Control", *Revista Médica de Chile* 148, no. 11 (November 2020): 1606–13.

j Antonia Sateler et al., "Nombres Populares y Clasificación de Las Drogas de Abuso Ilícitas En Chile", *Revista Médica de Chile* 147, no. 12 (December 2019): 1613–20.

k Inter-American Drug Abuse Control Commission and Inter-American Observatory on Drugs, *Report on Drug Supply in the Americas*, 2022.

l "Police Discover Powerful Cripa Marijuana", *Now Grenada*, 11 October 2018.

m de Achá, *Stock de Cannabis En América Latina: Radiografía Del Microtráfico y La Venta al Menudeo*.

n Inter-American Drug Abuse Control Commission (CICAD) and Organization of American States (OAS), *Information Bulletin. Data from the Early Warning System for the Americas*, vol. 1, 1, 2020.

o Inter-American Drug Abuse Control Commission (CICAD) and Organization of American States (OAS), *Information Bulletin: Early Warning System of the Americas* (Washington, DC, USA, 2022).

GROWING HEALTH CONCERNS

associated with increasing *delta*-9-THC content of cannabis-related products achieved through:

Agricultural methods to obtain natural cannabis material (especially the flower) containing higher levels of *delta*-9-THC

Infusing of cannabis products with cannabis concentrates, for example, pre-rolled cannabis cigarettes (joints) infused with various cannabis concentrates

Availability of concentrated, natural cannabis-based products such as "dabs" and vaping cartridges

Proliferation of novel hemp-related products

A number of (sometimes illegal) entrepreneurs have introduced to the market substances with psychoactive effects that are intended to mimic those of *delta*-9-THC, often in order to evade cannabis-related laws.[11, 12] Some are wholly synthetic substances (synthetic cannabinoids), while others are semi-synthetic or of natural origin. At the time of writing, the most commonly sold semi-synthetic cannabinoids, typically synthesized from CBD, but sometimes from THC, include *delta*-8-THC,[13] hexahydrocannabidiol and, occasionally, others such as *delta*-10-THC[14] and THC-O acetate.

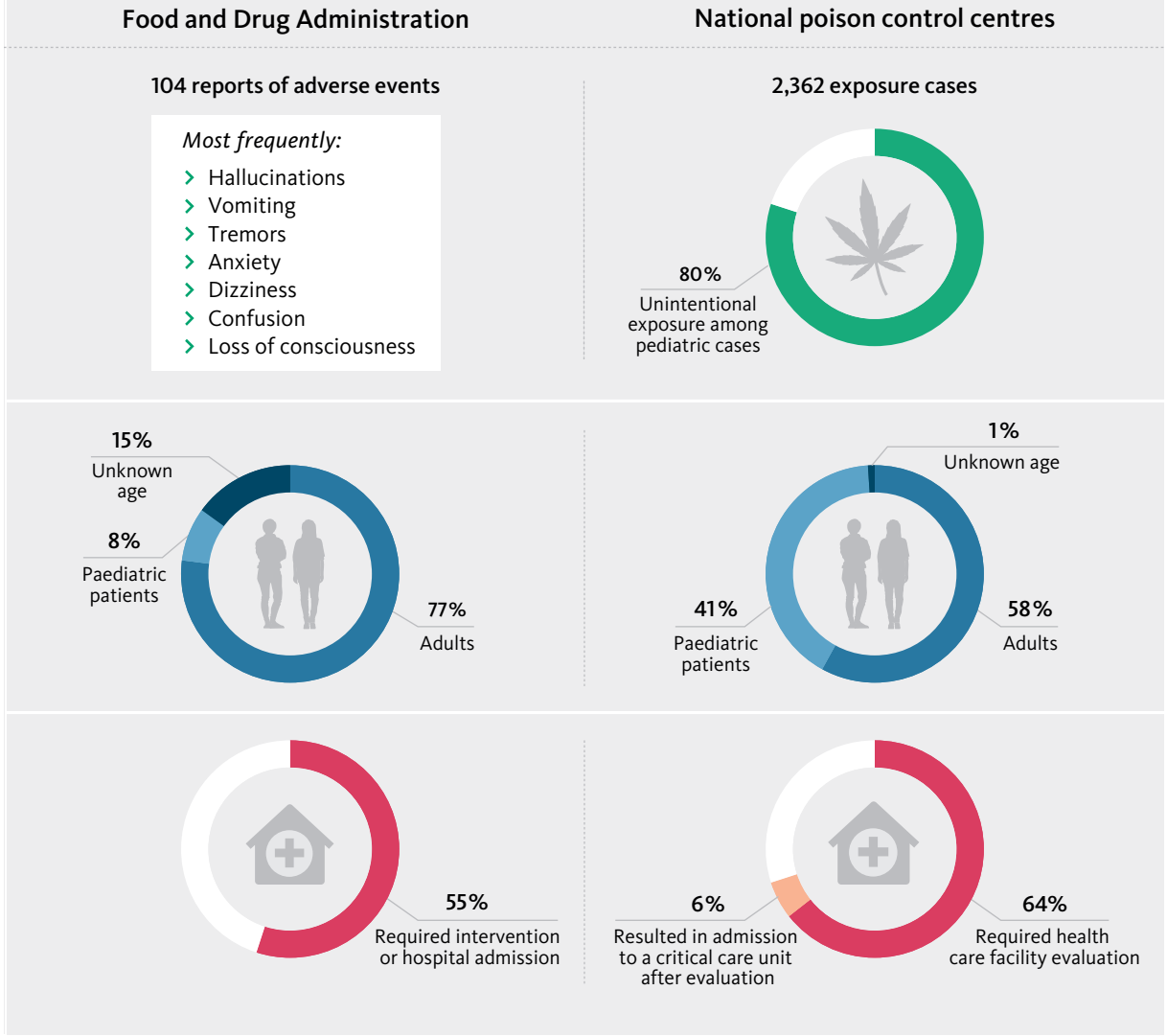
Interest in *delta*-8-THC in the United States grew during 2020.[15, 16] The compound was not controlled under United States drug legislation at that time, which contributed greatly to its popularity, especially in states where recreational cannabis had not been legalized.[17, 18] An additional factor that may have added to the substance's appeal is its relatively lower price (in terms of milligrams per dollar ratio) compared with *delta*-9-THC.[19] Numerous products containing *delta*-8-THC became available on the market within a short period of time, mainly in the form of edibles and vaping cartridges,[20] but also concentrates and tinctures.[21] Users report experiencing, at a comparable dose, a lower subjective psychoactive effect[22] than *delta*-9-THC and fewer adverse reactions.[23] This is consistent with experimental evidence[24] and could be related to several possible pharmacokinetic mechanisms.[25] However, owing to several factors, the doses that people use may differ widely and thus lead to health risks, which may also arise from impurities.[26] The characteristics of people who use *delta*-8-THC are only beginning to emerge; a study conducted in the United States found that among past-month cannabis users, men were more likely than women to report *delta*-8-THC use.[27]

Little is known about the safety of *delta*-8-THC and its effects in humans.[28] The existing evidence is rather anecdotal,[29] and at the time of writing, no national regulations on dosing or age restrictions could be located in any country. Products containing *delta*-8-THC that have been designed to appeal to young people, such as chocolates, gummies and cookies, many of which are marketed with bright and colorful designs and appealing flavours, are being sold in the United States[30] in a manner similar to that of cannabis products sold in jurisdictions where products that contain *delta*-9-THC have been legalized. In the absence of regulations and quality controls,[31] a number of harmful contaminants (by-products of the synthesis of *delta*-8-THC)[32] and unlabelled adulterants[33] have been found in *delta*-8-THC products sold to consumers, including *delta*-9-THC, residual solvents, pesticides and heavy metals.[34] Adverse health consequences have started to be reported,[35] and case analysis also suggests a surge in *delta*-8-THC-related psychosis.[36] In August 2021, 21 states of the United States restricted or banned *delta*-8-THC, and warnings to consumers were issued in September 2021.[37]

Delta-8-THC use has appeared sporadically elsewhere, for example in Italy, Spain[39] and Sweden,[40] but the selling of and trade in the compound may remain illegal in many countries, depending on national legislation, thereby limiting its availability.

Other THC-related products that are currently on the market include *delta*-10-THC and THC-O acetate.[41, 42] The little that is known from the scientific literature

HARM TO HEALTH RELATED TO DELTA-8-THC RECORDED IN THE UNITED STATES FROM 1 DECEMBER 2020 TO 28 FEBRUARY 2022[38]



suggests that the acetate group within the molecule increases its bioavailability and that the potency can be three times higher than that of the *delta*-9-THC molecule, and have hallucinogenic properties.[43]

Although HHC was originally described 80 years ago,[44] the non-medical use of the substance is new; it was first reported in the United States in late 2021.[45] HHC can be synthesized from CBD, but can also be derived from *delta*-8-THC or *delta*-9-THC. Data on the health effects of HHC use are almost non-existent,[46,47] because the pharmacology and toxicology of the substance in humans has not been studied to date.[48] Moreover, products containing HHC also often contain contaminants, other intentionally added cannabinoids and diluents.[49]

HHC is increasingly found on the European market,[50], [51, 52] where it was first seized by the Danish police in May 2022.[53] The substance had been reported in 22 European countries by 31 March 2023,[54] where it is sold openly and marketed as a supposedly "legal" replacement for products containing THC in a range of brick-and-mortar and online shops.[55] Products containing HHC range from low-THC cannabis flower and resin sprayed with HHC and vaping cartridges or pens, to edibles (especially flavoured sweets such as gummies and marshmallows), oils and tinctures; their form and packaging resemble those of *delta*-8-THC in North America.[56, 57] The emergence of HHC, like that of *delta*-8-THC, is likely related to legislative changes in the United States in 2018.[58] Law enforcement data suggest that HHC oils and finished products containing HHC are often shipped to European countries in bulk from the United States.[59] Moreover, between August 2022 and March 2023, two other related semi-synthetic cannabinoids, HHC acetate and hexahydrocannabiphorol, were reported in five European Union countries.[60]

In addition, pre-rolled cannabis cigarettes (joints) are reported to be infused with various substances. In the United States, for example, joints infused with concentrates containing *delta*-9-THC have been reported.[61] The adulteration of cannabis herb containing low concentrations of THC with synthetic cannabinoids has also been reported in the European Union. The substances most often detected were MDMB-4enPINACA in 2020 and ADB-BUTINACA in 2021 (in eight countries). The resulting product has been sold to unsuspecting persons as cannabis herb; its use has been associated with considerable harm, including poisonings, some of which proved fatal.[62]

The role of the cannabis industry in the popularization of cannabinoids

The rapid emergence on the market, in particular the online market, of the multitude of products containing *delta*-8-THC- and HHC testifies to the involvement of the industry in making them available. For example, according to a recent business report, in the United States *delta*-8-THC products have generated profits of about 2 billion dollars in two years and accounted for about 50 per cent of the cannabinoid market by the end of 2022.[63] As an indication of the complexities of the market, there seems to be a significant overlap between consumers of CBD, cannabis, *delta*-8-THC and other emerging cannabinoid products: in a survey conducted in the United States in 2022, a total of 35 per cent of current users of CBD and 30 per cent of users of cannabis had purchased psychoactive hemp-derived products (such as those containing *delta*-8-THC) in the previous six months. As a result, many companies that market CBD add *delta*-8-THC and similar products to their portfolios.[64]

There are indications that the commercial companies involved in marketing cannabis medicinal products and CBD wellness products are often linked with the companies that invest in the legal recreational cannabis market; in fact, sometimes they are the same entities.[65] These companies, driven by profit maximization, favour policies and approaches that are likely to increase consumption.[66, 67] A recent analysis has shown, for example, how the corporate social responsibility practices of major North American cannabis companies are aimed at normalizing and legitimizing the industry.[68] As has been the case with the "Big Alcohol", "Big Tobacco" and "Big Pharma" industries, concerns have been raised, in particular in jurisdictions that have legalized the non-medical supply of cannabis, about "Big Cannabis"[69] and the practices of lobbying, aggressive marketing and the potential influencing of scientific research.[70]

However, not all cannabis products emerging on the market are driven by the same segments of the expanding industry. For example, there is not a clear link between the emerging companies that sell products containing *delta*-8-THC and HHC and "Big cannabis"; they may currently represent different and potentially competing[71] segments of the industry.

Ketamine – a marginal or a mainstream drug?

Phencyclidine derivative ketamine is a dissociative anaesthetic[72] that was first synthesized in 1962.[73]

It is a non-competitive antagonist of N-methyl-D-aspartate (NMDA) receptors,[74] but also interacts with other receptors (e.g. opioid receptors).[75]

Ketamine is an NPS; it is not under international control,[76] but the substance is controlled at the domestic level in a number of countries.[77] However, the debate surrounding the possible international control of ketamine is ongoing, and the issue remains a drug policy dilemma, given the need to ensure access to ketamine as an essential medicine on the one hand, and growing evidence of its misuse and related harms on the other hand.[78]

Ketamine is on the WHO Model List of Essential Medicines. It is used in human and veterinary medicine mainly as an anaesthetic with a wide safety margin,[79, 80] but also for the treatment of pain. More recently, it has been studied (in controlled trials) as a possible treatment for (treatment-resistant) depression, bipolar disorder, post-traumatic stress disorder, suicidality and substance use disorders (alcohol and cocaine).[81]

1967

The first accounts of the non-medical use of ketamine date back to 1967.[82]

Acute ketamine administration may result in the blocking of sensory input, the impairment of memory and cognitive function, tachycardia, increased blood pressure, visual alterations, psychological dissociation and hallucinations.[83] Its non-medical use can lead to depersonalization, derealization and, at high doses, a "K-hole" – a state of complete dissociation, sometimes accompanied by an out-of-body experience.[84] Deaths related to accidental ketamine poisoning are rare, but do occur.[85] In addition, ketamine intoxication may have lethal consequences because the drug impairs the user's judgment, leading to lethal accidents.[86]

Effects vary depending on the route of administration and the dose administered (various doses have been documented in non-medical users, from 10 to 300 mg[87, 88]). At low doses, stimulant effects predominate; at high doses, psychedelic effects prevail.[89]

Ketamine can increase violent behaviour and sexual impulses.[90] It is one of the drugs used during "chemsex" encounters, in particular among men who have sex with men.[91] It is also used as a "date rape" drug.[92, 93]

Chronic, non-medical use of ketamine may lead to impaired cognition (memory, learning and executive functions), mental disorders,[94] cystitis ("ketamine bladder") and an intense abdominal pain that is known as "K cramps" and that is caused by prolonged, heavy use.[95, 96] Renal damage can be so extensive as to require dialysis;[97] upper gastrointestinal symptoms and cholestasis are also frequent,[98] as are structural and functional abnormalities of the brain in long-term users.[99] Female users may experience greater levels of severity of cognitive impairment and urinary discomfort than male users of the substance.[100]

There is evidence of the development of tolerance and withdrawal syndrome,[101] and of ketamine use disorders,[102] including ketamine dependence.[103] The experience of withdrawal symptoms may be more severe in women.[104]

The most common routes of administration (non-medical use) are oral and nasal,[105] but there are also reports of the drug being smoked,[106] injected and administered rectally[107] and, more recently, vaped.[108]

User groups of ketamine include regulars on the electronic dance music scene, "psychonauts", injecting drug users and opioid users, and LGBTQI+ persons on the club scene.[109] Users are typically young people.[110]

Historical overview of the non-medical use of ketamine: a main drug of use in parts of South-East Asia

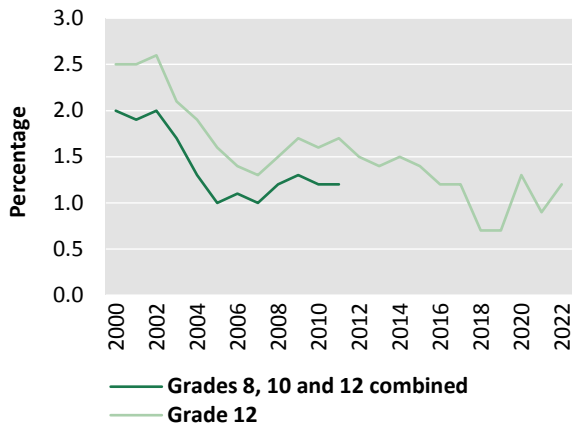
The non-negligible non-medical use of ketamine started to emerge in the United States of America in the 1980s, in connection with the rave dance scene, and in Western Europe in the 1990s. Hard data from that period are available only for North America and Western Europe, although the non-medical use of ketamine at alternative dance parties on beaches in Goa, India, in that early period has also been reported.[111]

Surveys conducted in Western Europe in the early 1990s suggest that ketamine was used in relatively high doses,[112, 113] often in private settings,[114] by recreational users wanting to experience the psychedelic effects of the drug rather than its stimulant effects as a dance drug.[115] Towards the end of the 1990s, ketamine may have acquired a bad reputation on the European dance scene as a result of it being sold as "ecstasy", leading to it being used inadvertently[116] and having effects that were potentially markedly different from users' expectations.

In the early 2000s, while the use of ketamine was lower than the use of internationally controlled drugs in Europe and was decreasing among young people in the United States,[117] a surge in ketamine use was occurring in East and South-East Asia. Also in connection with the dance scene,[118] the non-medical use of the substance in Asia was initially documented in China in 1997.[119] From the early 2000s, such use was also documented in Hong Kong, China, Taiwan Province of China,[120] Macao, China, and Malaysia.[121]

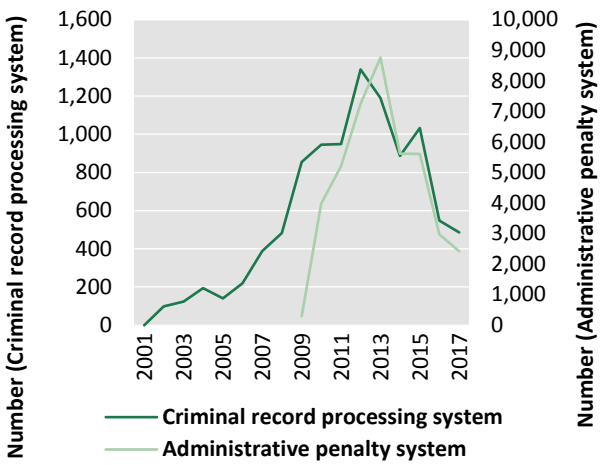
Indicators of ketamine availability rose sharply in that period and the popularity of ketamine in Hong Kong, China, increased so steeply that within three years of the introduction of the substance on the illicit market, it became the first drug of choice among people under 21 years of age.[122, 123, 124] In Taiwan Province of China, the popularity of ketamine soared in the early 2000s;[125] in a series of surveys among middle- and high-school students in the early 2000s, ketamine was one of the most commonly used drugs, along with "ecstasy".[126, 127] By 2014, 222,000 people, or more than 15 per cent of all registered drug users in China, were officially registered by the police as users of ketamine.[128] The non-medical use of ketamine was placing a health

FIG. 26 Trends in past-year ketamine use among high school students, United States, 2000–2022



Source: Richard A. Miech et al, *Monitoring the Future National Survey Results on Drug Use, 1975–2022: Secondary School Students* (Michigan: Ann Arbor: Institute for Social Research, University of Michigan, 2023).

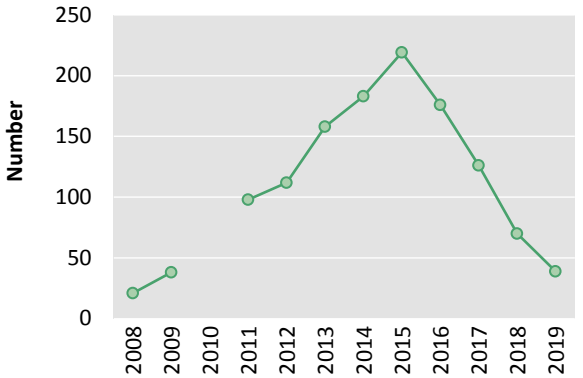
FIG. 27 First-time offenders who were arrested in Taiwan Province of China, in relation to ketamine, 2001–2017



Source: Criminal Record Processing System and Administrative Penalty System for Schedule III/IV Substances, Taiwan Province of China.

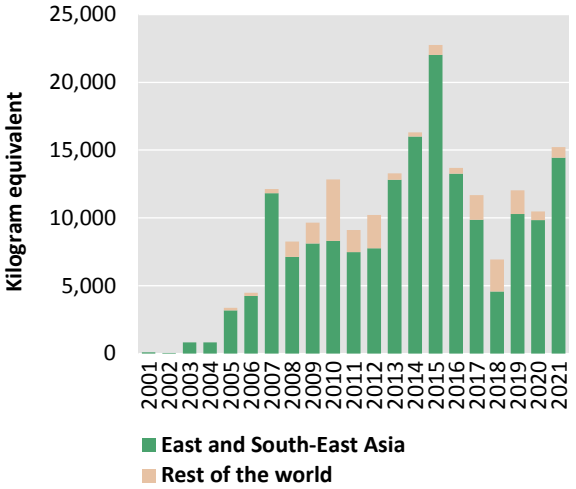
Note: Since 2009, only those possessing 20 g or more of ketamine are subject to criminal prosecution, while those possessing less than 20 g of ketamine are subject to a fine and obligation to attend a drug seminar.

FIG. 28 Persons treated for the non-medical use of ketamine as their primary drug in Macao, China, 2008–2019



Source: UNODC, responses to the annual report questionnaire.

FIG. 29 Quantities of ketamine and phencyclidine-type substances seized worldwide by subregion, 2001–2021



Source: UNODC, responses to the annual report questionnaire.

Note: The quantities of ketamine reported as having been seized can be significantly influenced by the fact that the substance is not under international control, and the variation in national policies can result in different interception rates.

burden on Chinese society, as described in a study on ketamine cystitis published in 2015.[129]

The patterns of ketamine use and, to some extent, the user groups observed in East and South-East Asia in the early 2000s were different from those described in early studies in Europe.[130] In 2004, ketamine users and even health-care workers in Taiwan Province of China, were largely unaware of the out-of-body, "K-hole" experience[131] that could be induced by ketamine, which was mostly smoked with tobacco there.[132] Around the same time, in Hong Kong, China, the drug was being consumed mainly by young, working-class people in mainstream dance settings.[133] This suggests that ketamine was being used in lower dosages, primarily for its "stimulant" properties.[134] This was confirmed by descriptions of the effects experienced by interviewed users.[135] Other factors that seem to have contributed to the growing popularity of ketamine in the subregion in the early 2000s were its lower price and the less strict regulations to which it was subject compared with other drugs.[136]

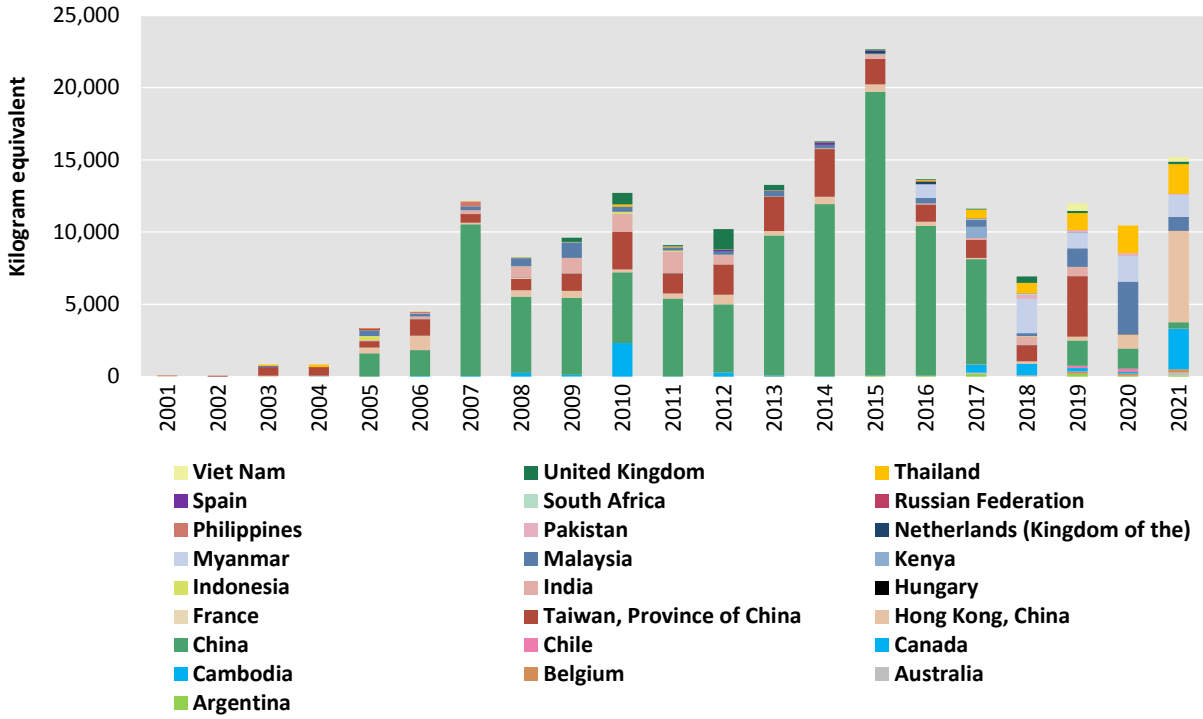
To combat the health burden of ketamine, numerous countries in the subregion introduced stricter regulations on the drug and the precursors used in its manufacture. In China, for example, ketamine was reclassified as a category-I psychotropic substance in 2013. Subsequently, between 2009 and 2016, China, Taiwan Province of China, Hong Kong, China, and Macao, China, seem to have recorded peaks in ketamine popularity; after that, clear decreases in the indicators of ketamine use were observed, likely a consequence, at least partially, of the new regulations.

Trends in ketamine supply: recent diversification in source countries

Although ketamine can be diverted from the medical supply chain, the illicit manufacture of the drug appears to have become the main means of its illicit supply in recent years.[137] Trends in ketamine seizures are challenging to analyse, given that the substance is not under international control; however, significant seizures of the drug began to be reported after 2000.[138] Given that some countries have placed ketamine under national control at different points in time, annual fluctuations in the quantity of the drug seized may be a reflection of that rather than of changes in its supply.

On the basis of the quantities of ketamine seized, it appears that trafficking in the drug in China accounted

FIG. 30 Quantities of ketamine seized by countries, territories or geographical areas reporting to UNODC, 2001–2021



Source: UNODC, responses to the annual report questionnaire.

Note: Only countries, territories or geographical areas that reported seizures of 100 kg or more during the entire period were included.

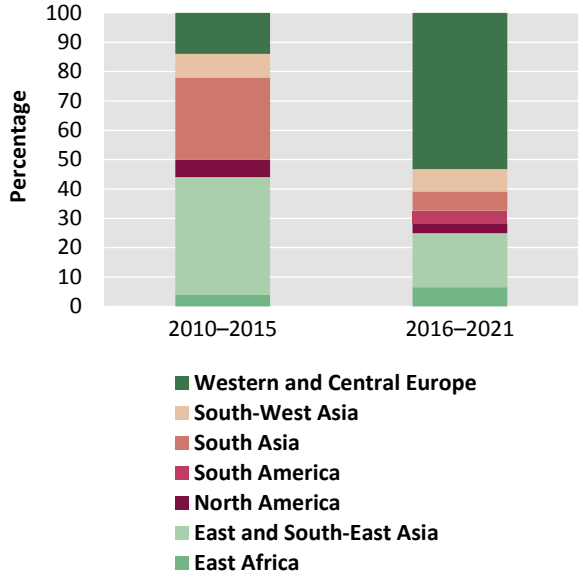
for an increasingly large majority of the quantities trafficked worldwide until 2015. After that time, trafficking in ketamine in China declined dramatically, and other countries, mostly located in geographical proximity to the country, began to dominate. In recent years, for example, there has been a surge in seizures of ketamine in other countries in East and South-East Asia, primarily driven by the illicit manufacture of substantial quantities of the drug in the subregion, in particular in Cambodia and Myanmar.[139]

There has been a marked change not only in terms of the quantities of ketamine seized but also in the trafficking routes and source countries of the drug, with countries outside Asia increasingly reported as countries of departure. INCB also reported a diversification in trafficking routes beyond East and South-East Asia in 2019, on the basis of official reports of ketamine seizures in the Project Ion Incident Communication System.[140, 141]

Further accounts of the geographical expansion of trafficking in ketamine beyond East and South-East Asia exist. A number of seizures of ketamine have been made in Africa in the last five years, attesting to trafficking in the drug in the region. While such events suggest that countries in West and Central Africa, Southern Africa and East Africa are being used as transit countries for ketamine destined mostly for the United States, but also for countries in Western and Central Europe, Australia and Hong Kong, China,[142, 143] it remains unclear whether a local market for the drug is emerging in Africa.

As is the case with seizures of ketamine, the dominance of China in terms of illicit manufacture of the drug has

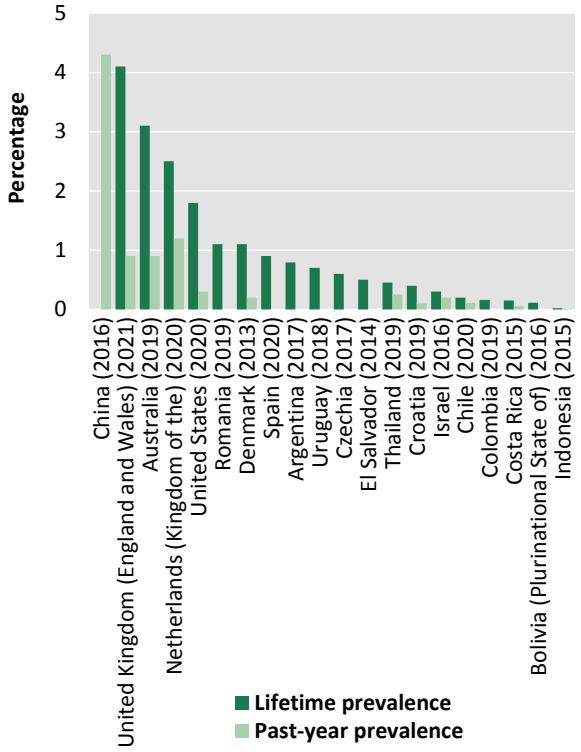
FIG. 31 Numbers of mentions as "country of departure" of trafficked ketamine by authorities in transit or destination countries, by subregion, 2010–2021



Source: UNODC, responses to the annual report questionnaire.

Note: The figures are based on reports from Member States regarding the most frequent departure countries for the ketamine on their markets. Only countries mentioned at least three times during the entire period were included.

FIG. 32 Use of ketamine, most recent data from population surveys, 2013–2021



Source: UNODC, responses to the annual report questionnaire.

Note: Prevalence estimates are based on the population aged 15–64 or similar. Data were included provided that the data collection was carried out no later than in the past decade.

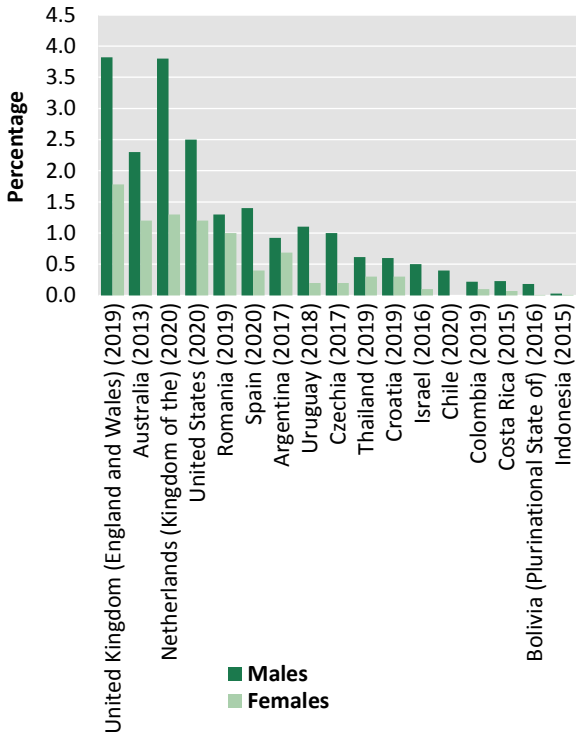
also declined. The country accounted for 83 per cent of the 500 illicit ketamine-manufacturing laboratories worldwide that were dismantled and reported to UNODC in the past decade, but the number of laboratories dismantled in China peaked in 2013 before decreasing gradually, with only a handful being dismantled in recent years.

Use of ketamine seems to remain below that of controlled drugs but is increasing in some countries, in particular among young people

The limitations of the available data make estimating the global prevalence of ketamine use challenging. It is clear, however, that use of the substance remains below that of internationally controlled drugs such as cannabis, opioids, cocaine, amphetamines and "ecstasy". Likewise, in most countries with available data, the lifetime prevalence of ketamine use is also markedly higher among men than among women.

Ketamine was the fourth[144] or fifth[145] most commonly used drug reported to UNODC in several countries in 2020 or 2021, but no country reported it to be the most commonly used drug. That said, responses to an international online survey,[146] comprising a convenience sample of Internet users in dozens of countries located mainly in Western and Central Europe, North America and Oceania, indicated that there had been an increase in ketamine use among respondents between 2017 and 2020.[147] The data collected in 2021 revealed that the annual prevalence of ketamine use was 13.7 per cent, which was almost identical to the prevalence of ketamine use found in a similar web-based survey focusing on Europe conducted in the

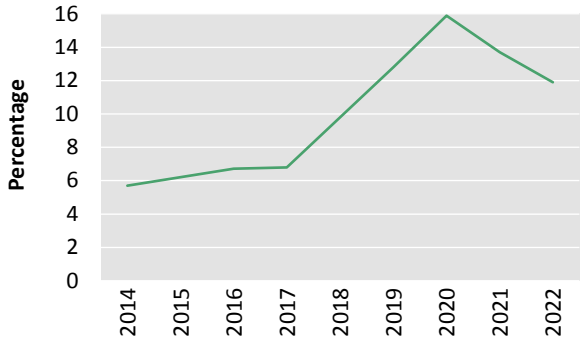
FIG. 33 Lifetime use of ketamine, most recent data from population surveys, by sex, 2013–2020



Source: UNODC, responses to the annual report questionnaire.

Note: Prevalence estimates are based on the population aged 15–64 or similar. Data were included provided that the data collection was carried out no later than in the past decade. The median annual prevalence was 0.23 per cent (the first and third quartiles being 0.10 and 0.68 per cent, respectively). The scale of ketamine use in East and South-East Asia is not well documented owing to a lack of data from the majority of countries in the subregion, although East and South-East Asia has accounted for a significant share of total global ketamine seizures in recent years, and anecdotal evidence of use exists.

FIG. 34 Trend in past-year use of ketamine among Internet users, 2014–2022



Source: Global Drug Survey reports, various years.

same year (13 per cent),[148] although the annual prevalence of ketamine use was considerably lower in South-Eastern Europe, at 4 per cent. In contrast, there was an exceptionally high proportion of ketamine users in the Internet respondents from Georgia (30 per cent),[149] Ireland (24 per cent in total, 36 per cent among males aged 18–24)[150] and Lebanon (21 per cent).[151]

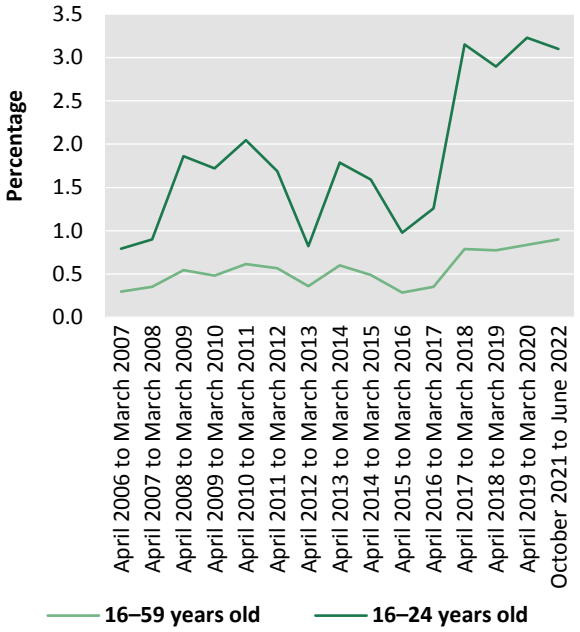
In some countries, the increase in ketamine use seems to have been driven by use among young people. For example, since 2015, ketamine use has increased in England and Wales, United Kingdom, as reflected by the increasing prevalence of past-year use among people aged 16–24 in particular.[152] The Kingdom of the Netherlands has also reported a recent increase in ketamine use,[153] most notably among young people in nightlife settings, which was reflected by a sharp rise in ketamine use reported in a large nightlife survey conducted between 2016 and 2019, as well as a rise in ketamine intoxication requiring medical care.[154]

Weight is added to those findings by a longitudinal survey of young people (aged 18–34) on the nightlife scene in five European countries, which found that the use of ketamine clearly increased over the period 2017–2018, both in terms of the number of people using the drug (increase by 21 per cent) and the frequency of its use (increase by 15 per cent), although regular use of the drug[155] did not increase.[156]

Despite signs of increased ketamine use in several European countries, however, the resulting level of acute harm to health tends to be relatively low compared with that of other drugs, with ketamine involved in 1.3 per cent of acute drug toxicity presentations in 2020.[157]

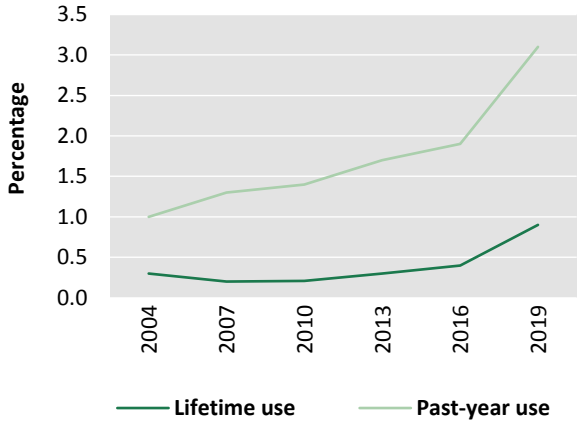
The increase in ketamine use has also occurred in countries outside Europe. It occurred in Australia, for example, between 2016 and 2019, mainly owing to a doubling of prevalence rates among people in their 20s,[158] with a similar increase recorded among regular "ecstasy" users after 2015. Ketamine use remains low in general, however.[159, 160]

FIG. 35 Past-year use of ketamine in England and Wales, United Kingdom, 2007–2022



Source: United Kingdom Office for National Statistics, Crime Survey for England and Wales.

FIG. 36 Ketamine use among the population aged 14 and older in Australia, 2004–2019



Source: Australian Institute of Health and Welfare, National Drug Strategy Household Survey 2019.

Ketamine use and availability have been documented in South America at an even lower level since the mid-2010s. Past-year use among university students in the Plurinational State of Bolivia, Colombia, Ecuador and Peru in the period 2019–2021 was, for example, 0.1 per cent or lower.[161] Nevertheless, the quantities of ketamine seized were clearly on the rise in the subregion between 2015 and 2019 (increasing from more than 50 to more than 300 kg) and a laboratory that was illicitly producing ketamine was dismantled in the nearby Dominican Republic in 2017.

In Argentina, Chile, Colombia and Uruguay,[162] ketamine was recently identified as an ingredient in concoctions such as "pink cocaine", which has a number of different street names,[163] including "tuci" and "tucibi".[164] Moreover, ketamine was identified in the oral fluids of almost one third of attendants at electronic music events held in Brazil between September 2018 and January 2020.[165] More recently, in the period 2019–2022, "pink cocaine", or "tuci", containing ketamine has also been identified by law enforcement agencies and drug-checking services outside South America, including in North America and Europe.[166]

Since 2021, ketamine has also been identified as an ingredient in concoctions such as "happy water"[167] in Singapore,[168] Thailand[169] and Myanmar,[170] and "k-powdered milk" in Thailand, which resulted in 13 deaths in January 2021.[171] In the same year, the substance was found to be an adulterant in "ecstasy" pills in Singapore and Thailand.[172]

As a result of ketamine being sold in concoctions with various street names, the use of the substance may be underreported in surveys, owing to users being unaware of using it.

Recent shift in ketamine demand and supply in East and South-East Asia

Ketamine use appears to be stable or declining in some countries, territories and geographical areas[173] in East and South-East Asia.[174] In China, for example, 37,449 users of ketamine were registered in 2021,[175] down from 222,000 in 2014.[176] This massive decrease coincided with a fall in the number of manufacturing facilities for the drug being dismantled in the country. Ketamine continues to pose significant challenges in the subregion, however.[177] In parallel to a shrinking market in

China, increases in use have been reported in Cambodia and Hong Kong, China,[178] and ketamine manufacture has increased in other countries in East and South-East Asia, in particular Myanmar. Authorities in Myanmar and neighbouring countries, most notably Thailand, started seizing significant quantities of the drug after 2016, suggesting that the market has expanded. The use of ketamine has also been confirmed in nightclubs in Thailand, although the extent of its use there is unknown.[179, 180]

In addition, since the early 2020s, the presence of criminal groups involved in the illicit manufacture of ketamine is likely to have been increasing in Cambodia.[181] Seizures of the drug in that country have increased significantly in recent years, amounting to nearly 2.8 tons in 2021 and 13.5 tons in 2022.[182] Increased seizures have also been recorded in Myanmar (2.3 tons) and the Lao People's Democratic Republic (1.9 tons) in 2022.[183]

Does ketamine have the potential to become a mainstream drug?

The expansion of the ketamine market in East and South-East Asia over the past two decades suggests that, under certain circumstances, ketamine has the potential to become a mainstream drug. Contributing factors in this subregion have been the use of smaller doses,[184] at which the stimulant effect of the drug is more pronounced than its psychedelic effect,[185] its low price and its relatively easy availability.[186] Only time will tell whether the recently observed increases in ketamine use in some European countries and Australia will result in an expansion of the non-medical market for the drug and greater harm to users. The recent proliferation of concoctions containing ketamine in South America and East and South-East Asia is a possible attempt by drug traffickers to expand the market base by making products containing ketamine attractive to new user groups through their diversification.

Nitrous oxide misuse – a cause for concern in some subregions?

In addition to ketamine, another dissociative anaesthetic, nitrous oxide, a colourless gas with a sweet taste and smell and legitimate medical and even culinary uses,[a] may have become a cause for concern in some subregions. Its non-medical use has been documented since the early 19th century,[b] when it was nicknamed "laughing gas",[c] owing to its short-term immediate effects such as euphoria, which may be accompanied by giggling or laughter, relaxation, calmness and distortions of perception.[d]

Although used less and less for that purpose,e when nitrous oxide is used medically (chiefly as a sedative and analgesic)[e], it is considered to have a wide safety margin.[f] But when used non-medically, the side effects associated with "heavy use" (typically defined by poison centres in the Kingdom of the Netherlands and Denmark as the use of 50 or more balloons in a single session)[g] can be significant. While the non-medical use of the gas is not new, it has recently become a phenomenon of concern in Western and Central Europe.g The scientific literature in this field has recently expanded, in particular since 2017,[g] providing more evidence on the health impact of nitrous oxide.

For the purpose of non-medical use, a rapid but short-lasting effect (of up to 5 minutes)[g] is usually achieved by inhaling from a balloon filled with nitrous oxide taken from a gas cartridge (like those used for dispensing whipped cream or soda), although other, more risky methods of non-medical use, such as inhaling directly from a larger cylinder, have appeared recently.[g, h] This method of administration poses a risk of pressure injury to the lungs and frostbite.[g] Other short-term side effects are generally mild and disappear within 30 minutes. However, "excessive use" for longer periods of time (chronic use) leads to inactivation of vitamin B12[i] and a wide range of haematological, neurological, cardiovascular and psychiatric harms,[g] including neurotoxicity, which, if not treated in a timely manner, may result in irreversible neurological damage.[j] Littering of the cartridges and balloons has recently caused significant public concern in Western and Central Europe.[g]

The global extent of the non-medical use of nitrous oxide cannot be quantified at the moment, because population level estimates are limited and concentrated in high-income countries. The non-medical use of the gas is usually

not included in large drug use surveys or is grouped together with other substances (most often inhalants). The available information suggests that non-medical users of nitrous oxide are often young: teenagers and people in their twenties. Most of this information relates to the non-medical use of the gas in Western and Central Europe, North America and Australia, with few medical studies documenting its health impact in countries in Asia and Africa.[g, h k, l, m, n, o] In some countries, such as France and the United Kingdom, nitrous oxide has become the second most popular drug after cannabis among students.[p, q] In addition, between 2017 and 2020, there was an increase in the number of toxicity cases involving nitrous oxide presented at poison centres in the European Union, for example in Belgium, France and Netherlands (Kingdom of the).[r]

The situation is complicated by the lack of awareness among young people and most medical professionals about the risks and harms associated with the non-medical use of the gas,[s] as intensive use of the substance seems to be a relatively new phenomenon. Moreover, there is no diagnostic marker to identify the presence of the gas in biological samples after its use;[t] therefore, when users do not disclose their use of the gas, such use may go undetected, leading to underreporting of cases and suboptimal treatment.

In Western and Central Europe, concerns have been raised about changes in availability and supply, including relating to the intentional supply of nitrous oxide for non-medical use. For example, in France, the increased availability of nitrous oxide from 2017 coincided with the sale of gas cartridges in convenience stores, bars and nightclubs; in Denmark, until recent changes in the legislation, such cartridges were being sold in large boxes in kiosks; and in the Kingdom of the Netherlands, there was open advertising of the gas on leaflets or online banners, for recreational use as "laughing gas" or "party gas".[g]

Some countries in Western and Central Europe have recently introduced legislation to regulate and restrict access to gas cartridges (regulating the maximum quantity that can be sold, the minimum age of buyers, points of sale and advertising),[g] and have developed other strategies, such as information campaigns, to prevent further harm.[u]

[a] PubChem, National Library of Medicine, "Nitrous Oxide," n.d., accessed April 4, 2023.

[b] John B. West, "Humphry Davy, Nitrous Oxide, the Pneumatic Institution, and the Royal Institution," *American Journal of Physiology-Lung Cellular and Molecular Physiology* 307, no. 9 (November 1, 2014): L661–67.

[c] David M. Knight, *Humphry Davy: Science & Power*, Cambridge Science Biographies Series (Cambridge; New York: Cambridge University Press, 1996).

[d] EMCDDA, *Recreational Use of Nitrous Oxide: A Growing Concern for Europe.* (LU: Publications Office, 2022).

[e] Wolfgang Buhre et al., "European Society of Anaesthesiology Task Force on Nitrous Oxide: A Narrative Review of Its Role in Clinical Practice," *British Journal of Anaesthesia* 122, no. 5 (May 2019): 587–604.

[f] Gurman Pal Mallhi, "Nitrous Oxide Sedation: A Review," *MAR Dental Sciences* 3, no. 2 (August 1, 2021).

[g] EMCDDA, *Recreational Use of Nitrous Oxide*.

[h] Jordan Weastell and Karl Ng, "Whipping up Public Policy Discussion: Australia's Problem with Recreational Nitrous Oxide Use," *Internal Medicine Journal* 52, no. 5 (May 2022): 708–10.

[i] W. Krajewski et al., "Impaired Vitamin B12 Metabolic Status in Healthcare Workers Occupationally Exposed to Nitrous Oxide," *British Journal of Anaesthesia* 99, no. 6 (December 2007): 812–18.

[j] Yuanyuan Xiang et al., "Recreational Nitrous Oxide Abuse: Prevalence, Neurotoxicity, and Treatment," *Neurotoxicity Research* 39, no. 3 (June 2021): 975–85.

[k] Adam Winstock, Rasmus Munksgaard, Emma Davies, Jason Ferris, Ahnjili ZhuParris, Monica Barratt, *Global Drug Survey (GDS) 2022 (Forthcoming)*, n.d.

[l] Abderrahim Oussalah et al., "Global Burden Related to Nitrous Oxide Exposure in Medical and Recreational Settings: A Systematic Review and Individual Patient Data Meta-Analysis," *Journal of Clinical Medicine* 8, no. 4 (April 23, 2019): 551.

[m] Xuan Thi Dang et al., "Nitrous Oxide-Induced Neuropathy among Recreational Users in Vietnam," *International Journal of Environmental Research and Public Health* 18, no. 12 (June 9, 2021): 6230.

[n] Miao Yu et al., "Analysis of Clinical Characteristics and Prognostic Factors in 110 Patients with Nitrous Oxide Abuse," *Brain and Behavior* 12, no. 4 (April 2022).

[o] Bernd Fischer, "Laughing Gas: The Cheap High That Huffing Can Buy," February 21, 2012.

[p] Raphael Vollhardt et al., "Neurological Consequences of Recreational Nitrous Oxide Abuse during SARS-CoV-2 Pandemic," *Journal of Neurology* 269, no. 4 (April 2022): 1921–26.

[q] Jan van Amsterdam, Ton Nabben, and Wim van den Brink, "Recreational Nitrous Oxide Use: Prevalence and Risks," *Regulatory Toxicology and Pharmacology* 73, no. 3 (December 2015): 790–96.

[r] EMCDDA, *European Drug Report 2022: Trends and Developments.* (LU: Publications Office, 2022).

[s] Julaine Allan, Jacqui Cameron, and Juliana Bruno, "A Systematic Review of Recreational Nitrous Oxide Use: Implications for Policy, Service Delivery and Individuals," *International Journal of Environmental Research and Public Health* 19, no. 18 (September 14, 2022): 11567.

[t] Luigi Cipolloni and Stefania De Simone, "Nitrous Oxide Intoxication: Systematic Literature Review and Proposal of New Diagnostic Possibilities," *Egyptian Journal of Forensic Sciences* 12, no. 1 (December 14, 2022): 59.

[u] Harry Sumnall, "Recreational Use of Nitrous Oxide," BMJ, September 27, 2022, o2297.

The global cocaine market: strong acceleration on the back of major turning point

Over the past decade, the global cocaine market has seen major shifts and an unprecedented expansion, visible not only in the volume of supply and demand, but also in the consolidation of established markets and the emergence of new routes and hubs pushing the boundaries of cocaine trafficking and use beyond their traditional confines.

Major turning points in the mid-2010s leading to the expansion of major markets and the development of new trafficking routes

The unprecedented expansion of the global cocaine market followed major changes in both source and destination markets. Around 2012, the increasing involvement of groups from the Balkan region, beginning with Albanian-speaking groups, in the direct procurement of cocaine from Latin America increased competition among traffickers supplying markets in

TIMELINE OF MAIN DEVELOPMENTS IN THE GLOBAL COCAINE MARKET, 2012–2021

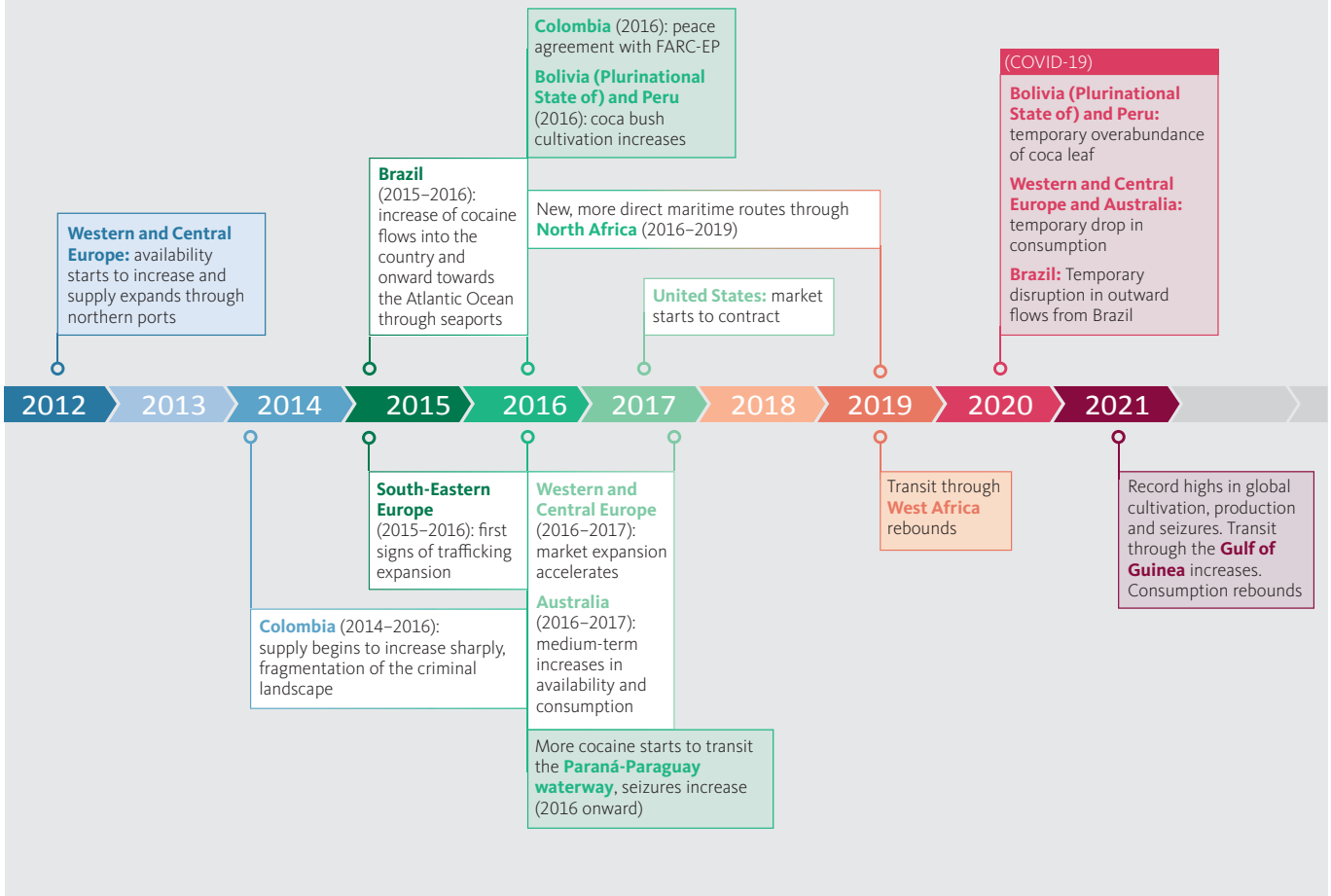
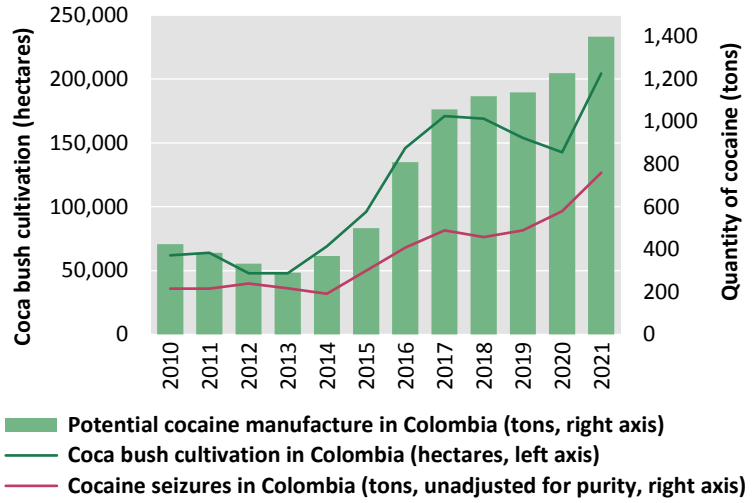
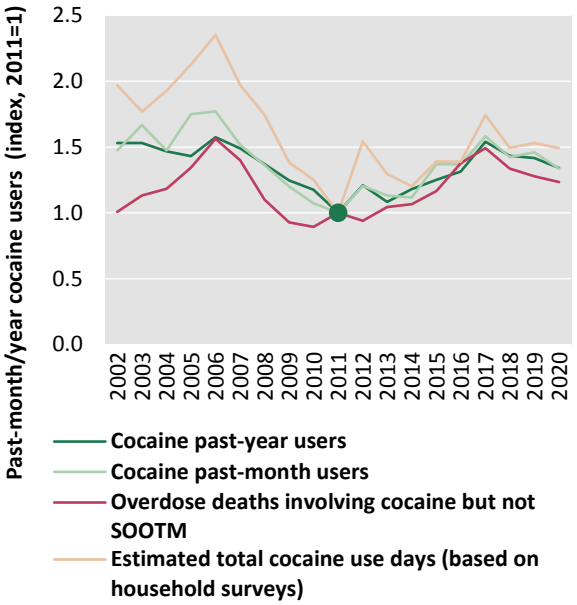


FIG. 37 Main supply-side cocaine market indicators in Colombia, 2010–2021



Sources: UNODC calculations based on UNODC data and data from the respective Governments and coca bush cultivation surveys carried out in Colombia in 2021 and previous years; and UNODC, responses to the annual report questionnaire.

FIG. 38 Selected indicators of cocaine use, consumption and harm, United States, 2002–2020 (indexed)



Source: United States *National Survey on Drug Use and Health 2020*, Detailed Tables; and United States Centers for Disease Control and Prevention, Wide-ranging Online Data for Epidemiologic Research (WONDER).

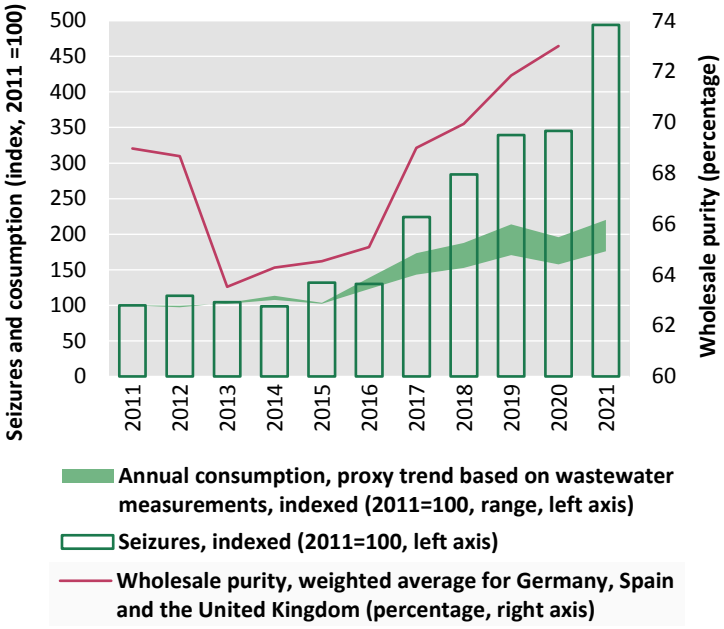
Note: SOOTM stands for "synthetic opioids other than methadone".

Western and Central Europe, the second largest destination market for the drug, triggering improvements in the efficiency of the supply chain, increasing purity and decreasing prices and paving the way for a steady increase in consumption.[187] In the United States, the first ever major market for cocaine consumption, a distinct declining trend, visible in several cocaine use indicators, came to an abrupt halt around the same time.

Supply at source reached a turning point between 2014 and 2016, as cultivation in Colombia tripled between 2013 and 2016 and coca bush cultivation started to increase in the Plurinational State of Bolivia and Peru in 2016.[188] The changes in the criminal landscape in Colombia following the demobilization of the Revolutionary Armed Forces of Colombia – People's Army (FARC-EP), formalized in 2016, had various ramifications, including a freer, more competitive market incentivizing improvements in the efficiency of the supply chain, in particular the steps in processing coca bush to cocaine hydrochloride, meaning that production continued to rise even as cultivation levelled off from 2017 to 2020.[189, 190] Between 2016 and 2020, the average quantity of cocaine hydrochloride obtained from one hectare under productive coca bush cultivation during a given year increased from 6.5 kg to 7.9 kg in Colombia, aided by improvements in agricultural practices such as the use of more productive cultivars, more frequent use of agrochemicals and optimization of the number of plants per hectare, improvements in the ability of farmers to extract the cocaine content from coca leaf, as well as larger and more efficient laboratories producing cocaine hydrochloride. During the same period, the production chain gravitated increasingly towards specific "enclaves", located close to borders or in strategic locations for trafficking routes, where these improvements occurred. By 2020, the enclaves had come to account for 40 per cent of coca bush cultivation.[191]

In the United States, cocaine seizure quantities almost tripled between 2014 and 2017, and the estimated number of past-year users of cocaine grew in parallel with the average frequency of use (increases of 42 per

FIG. 39 Trends in selected supply and demand indicators, Western and Central Europe, 2011–2021



Source: Wastewater: Sewage Analysis CORe group Europe; seizures: UNODC, responses to the annual report questionnaire, supplemented (for 2021) by data from the World Customs Organization (WCO), and UNODC, Drugs Monitoring Platform; purity: UNODC, responses to the annual report questionnaire.

Note: Seizure data for 2021 are incomplete and preliminary.

cent in the period 2013–2017 and 11 per cent in the period 2014–2017, respectively).[192] However, around 2017 the United States market began to show signs of saturation,[193] and routes towards other destination markets likely became the paths of least resistance absorbing the increases in supply.

The growth of the cocaine market in Western and Central Europe – the beginnings of which can be traced to 2012[194] – accelerated between 2015 and 2017, with marked increases in consumption (reflected in measurements of metabolites in wastewater from 2016 onward) as well as seizures (most notably from 2017).[195] By 2018, notable increases in the relative frequency of use of "crack" cocaine, as opposed to cocaine hydrochloride, among new entrants to drug treatment programmes were visible in several countries in this subregion.[196] Unlike in the United States, the expansion of the cocaine market in Western and Central Europe continued unabated through 2019, by which time consumption levels had roughly doubled in comparison with 2015. In 2020, this market saw a temporary slowdown in parallel with the onset of COVID-19, with seizure quantities levelling off at record levels, possibly due to short-lived supply-side disruptions and a dip in consumption levels.[197]

The expansion of the market in Western and Central Europe was likely facilitated by a number of emerging European organized criminal groups increasing their intercontinental reach, establishing direct ties with suppliers in South America, challenging the long-standing dominance over the transatlantic trade of a handful of brokers and organized criminal groups and ultimately rendering the cocaine supply chain more efficient, thus enabling the European market to "converge" towards that of North America. The fragmentation of cocaine production and trafficking activities in Colombia and the consequent elimination of monolithic actors may also have contributed to the formation of these new transatlantic supply chains.[198]

The supply-related turning point observed around 2015 likely had consequences in the form of new or expanding routes through South America. In particular, the expansion in the Plurinational State of Bolivia and Peru may have contributed to increasing flows into Brazil. Cocaine seizures at Brazilian seaports mushroomed between 2015 and 2019 (from 1.5 tons to nearly 67 tons),[199, 200] beginning with Sao Paolo and later extending to other ports and reflecting, to a large extent, a growing role for Brazil as a transit country. At the same time, wholesale purity levels in Brazil increased; in particular, the purity of cocaine seized in base form, likely intended for products consumed on the domestic market, rose abruptly in 2016.[201]

In the same year, there was a noticeable increase in the seizure quantities of cocaine that was linked to the Paraná-Paraguay waterway, connecting the Plurinational State of Bolivia and Paraguay with the River Plate estuary and the Atlantic Ocean, suggesting increased use of the Southern Cone route, along which cocaine originating in Peru and the Plurinational State of Bolivia is trafficked southward towards the Atlantic Ocean.[202] The first steps along this route typically involve clandestine flights on light aircraft carrying batches of up to 500 kg of cocaine, which often land in Paraguay. The consignments are then frequently

routed towards ports on the Paraná-Paraguay waterway, where they are loaded onto barge "trains" or other shallow-water conveyances and shipped southward towards the Atlantic Ocean. At some point on the waterway, from the vicinity of Rosario, Argentina, onward, the consignments are trans-shipped onto ocean-going vessels that then travel towards the final destination – often to Europe or Africa.[203] The largest ever seizure of cocaine in Europe – 16.2 tons seized in the port of Hamburg in February 2021[204] – consisted of a consignment that had been trafficked along this route.

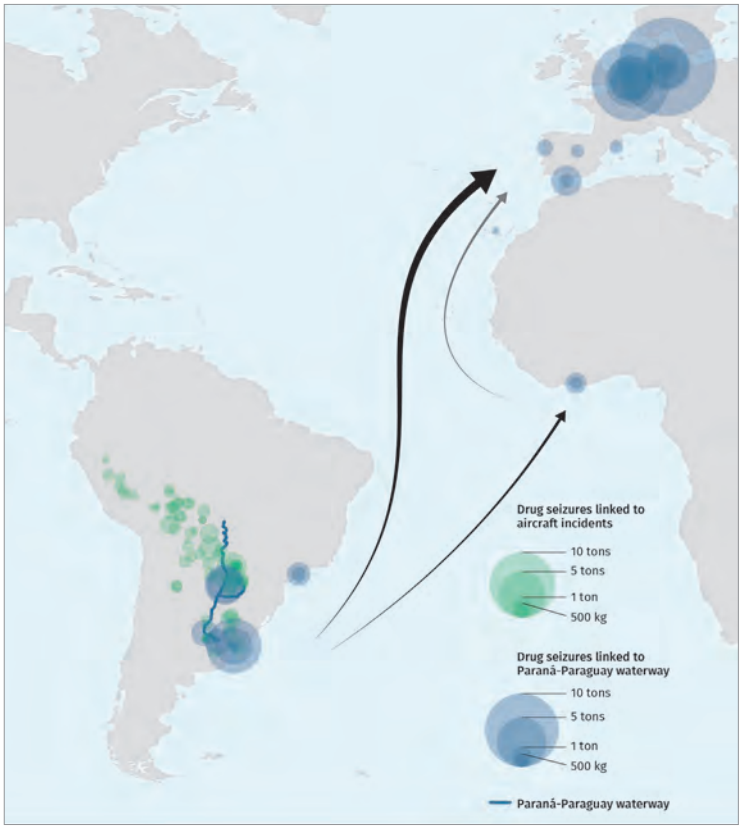
The effects of the upturn in cocaine supply around 2015 were also observed in Australia, where retail purity levels and cocaine consumption levels rose significantly between 2016 and 2019, while retail prices fell. Not only did the number of past-year cocaine users increase sharply between 2016 and 2019, but several indicators of more intensive use outpaced this growth, suggesting that use patterns may have become more harmful. For example, the number of closed treatment episodes[205] for drug use where cocaine was a principal drug of concern rose by 163 per cent between the reporting periods July 2015/June 2016 and July 2018/June 2019. [206]

Emergence of cocaine transit points in Africa

The effects of the expansion of the cocaine market were felt beyond the established markets for the drug. New maritime routes directly to North Africa had emerged by 2016,[207] when Morocco traced significant quantities of cocaine trafficked from Brazil and detected the use of a fishing boat for trafficking into its southern provinces.[208] The development of cocaine routes into and through Morocco may have been facilitated by the existence of long-standing routes for trafficking cannabis resin into Spain and the ties to Morocco of the Netherlands criminal underworld, which is responsible for channelling large quantities of cocaine to the Kingdom of the Netherlands.[209]

From 2016 onward, the majority of cocaine flows into Morocco were assessed to be entering along maritime routes.[210] Soon afterwards, maritime routes began to reach the Mediterranean coast of North Africa, including Algeria (with significant seizures in the ports of Oran[211] and Skikda[212] in 2018 and 2019, respectively) and very likely Libya,[213] with an increase in the number of consignments detected that were apparently en route to Libya, for example in Colombia (43 kg detected in the port of Buenaventura in July 2018),[214] Italy (17 kg in the port of Gioia Tauro in October 2018),[215] Ecuador (582 kg in the port of Guayaquil in December 2020),[216] Malta (612 kg in December 2020)[217] and off the coast of the Canary Islands (218 kg in January 2023).[218]

MAP 13 Seizures of cocaine linked to the Paraná-Paraguay waterway or the River Plate estuary, and aircraft-related incidents along the Southern Cone route, 2017 to September 2022

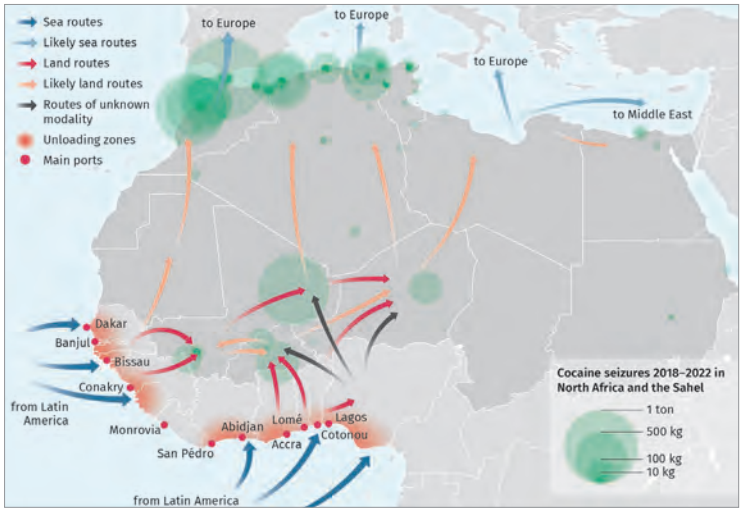


The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Reproduced from UNODC, *Global Report on Cocaine 2023: Local Dynamics, Global Challenges*.

Note: A seizure was considered to be linked to the Paraná-Paraguay waterway or the River Plate estuary if its itinerary (actual or planned) included a stretch or a port on the waterway or the estuary. Aircraft-related incidents linked to drug trafficking include episodes where the circumstances suggested that, at the moment of detection, drugs had just been, were about to be, or were being transported on an aeroplane. Not all of the aircraft-related incidents represent the physical seizure of the relevant aircraft by law enforcement.

MAP 14 Cocaine trafficking routes across West and North Africa

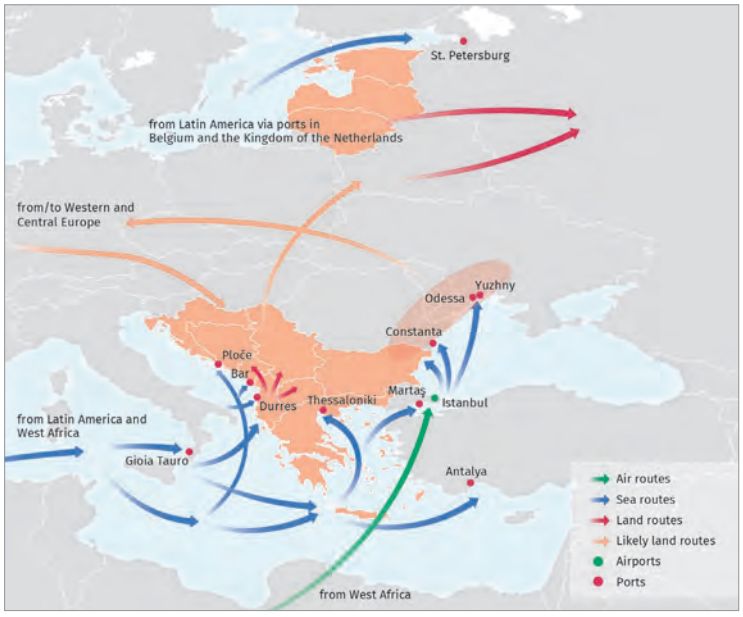


The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Source: Reproduced from UNODC, *Global Report on Cocaine 2023: Local Dynamics, Global Challenges*.

Note: Only individual seizures made in countries in the Sahel and North Africa are shown.

MAP 15 Cocaine trafficking routes involving South-Eastern and Eastern Europe



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Source: Reproduced from UNODC, *Global Report on Cocaine 2023: Local Dynamics, Global Challenges*.

In 2019, the ripple effects of the increases in cocaine supply became visible on the western coast of Africa and nearby islands, with notable individual seizures being made in Cabo Verde (9.5 tons in February and 2.3 tons in August 2019), Guinea-Bissau (789 kg in March and 1.8 tons in September 2019) and Senegal (five seizures ranging between 43 kg and 798 kg and collectively amounting to 1.9 tons).[219] In contrast, seizures in the entire subregion of West and Central Africa had amounted to less than 1 ton annually in the period 2015–2018 and 4.6 tons at the previous peak in 2007.

Seizure data suggest that in 2021, the cocaine flows into West and Central Africa further expanded via countries in the Gulf of Guinea, such as Benin, Côte d'Ivoire, Nigeria and Togo. This shift may have been facilitated by an increasing pattern of sailing vessels departing from Brazil.[220] In any case, cocaine reaches the two arrival zones (the west coast and the Gulf of Guinea) in contaminated cargo, in particular containerized shipments, as well as on dedicated Atlantic crossings on sailing, fishing and merchant vessels (and combinations thereof). From these arrival zones, some cocaine may continue northward along the coast of West and North Africa. Some also continues overland, across the Sahel towards the Mediterranean coast, and from there likely towards Europe or possibly the Middle East.[221]

Expansion of trafficking routes via South and South-Eastern Europe

Around the mid-2010s, maritime trafficking routes also began to increasingly reach countries in South and South-Eastern Europe. Some of the earliest observations of this development were made by Italian authorities, which, on the basis of data up to 2016, drew a possible link between increasing seizures of incoming cocaine on the north-eastern land borders of Italy and the activities of Balkan criminal groups facilitating maritime cocaine flows into ports in South-Eastern Europe and subsequently along the well-established Balkan route, known mainly for trafficking in heroin.[222]

According to Italian authorities, since 2020 Italian ports, mainly the southern port of Gioia Tauro, have been increasingly used as trans-shipment points for cocaine being trafficked eastward to ports on the Aegean Sea and the Black Sea. At these ports, large

shipments of cocaine from South America are received by Balkan criminal groups, who ensure its wholesale distribution and transportation to markets and stockpiling areas in Greece, Bulgaria, Romania and (prior to the armed conflict) Ukraine.[223] Significant developments have also been observed in Türkiye, where seizures almost quadrupled between 2014 and 2017 (from 393 kg to 1,485 kg) and Romania, where the number of cocaine seizures – likely reflecting the domestic retail market – began to increase in 2015, with a similar increase in Bulgaria beginning two years later.[224]

2021, a record year for cocaine supply after the outbreak of the COVID-19 pandemic

In 2021, coca bush cultivation, cocaine production and cocaine seizures all reached record highs. Coca bush cultivation and cocaine seizures increased very sharply. As the expansion of coca bush cultivation in Colombia involved the cultivation of new fields of younger, and hence less productive, plants, cocaine production increased less sharply than seizures and cultivation. Nevertheless, 2021 saw the seventh consecutive year-on-year increase, with estimated production in 2021 standing at more than 2.5 times the level observed in 2014. Moreover, as coca bushes mature, productivity per unit area is likely to recover in the coming years.

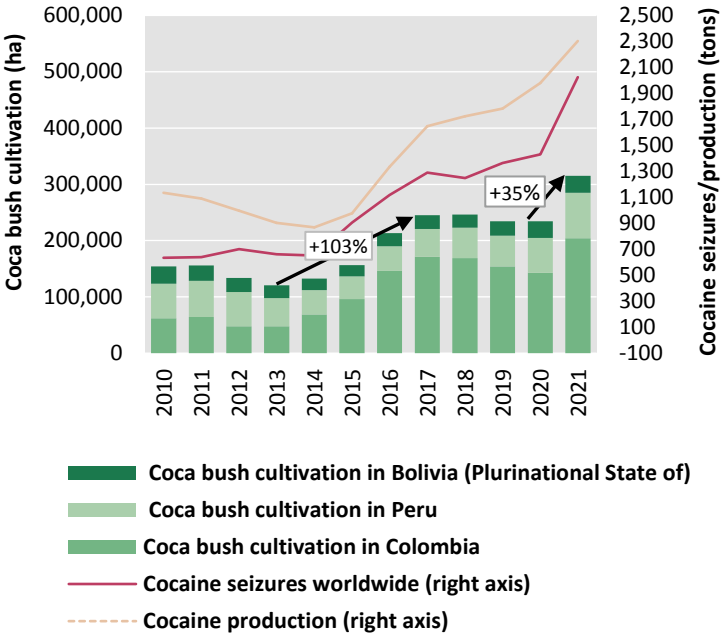
In 2021, record quantities of cocaine were seized in numerous countries, including countries in South America and countries representing or close to the main destination markets. In some subregions, in particular Western and Central Europe and West and Central Africa, the very high seizure levels in 2021 can be seen as a continuation of an already existing expansion, which in some cases was slowed down by the onset of the COVID-19 pandemic and resumed in its aftermath.

In Asia, Hong Kong, China, has shown some of the clearest signs of an increase in cocaine trafficking in recent years, and 2021 was no exception. Seizures increased gradually but steadily from 2016 to 2019, declined in 2020 and then rose to a record 2.9 tons in 2021.[225]

Seizure data also suggest that the Mediterranean routes to South-Eastern Europe and the eastern Mediterranean coast also continued to gain importance as entry channels for cocaine shipments. However, in this case, the impact of the COVID-19 pandemic (if any) was less clear. For example, cocaine seizures in Türkiye increased at progressively faster rates in 2019 (by 10 per cent), 2020 (by 20 per cent) and 2021 (by 45 per cent).

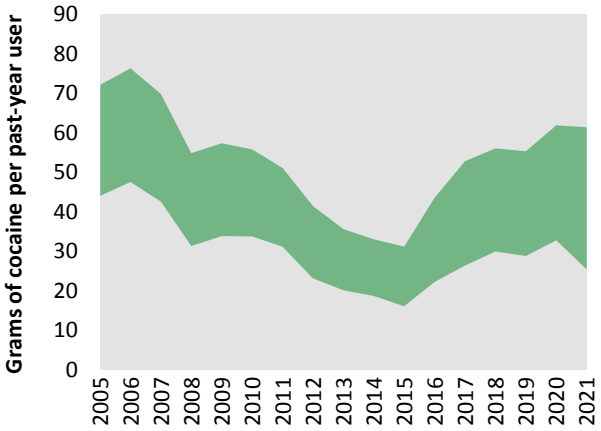
In other cases, the increases of 2021 appear to represent a turning point. For example, in the United States, seizures rose by 66 per cent to a record 252 tons in 2021, having previously declined for three consecutive years. Annual seizures in South Africa, which were always below 1 ton in the period 1990–2020, reached 5.3 tons in 2021. In the United Arab Emirates, seizure quantities remained modest in 2021 (625 kg), but were almost three times higher than the previous record (218 kg in 2015). In India, annual seizures had remained below 115 kg for 14 consecutive years (2007–2020), but reached 364 kg in 2021.

FIG. 40 Global cultivation of coca bush, cocaine seizures and cocaine production, 2010–2021



Sources: UNODC calculations based on UNODC data and data from the respective Governments, and coca bush cultivation surveys carried out in Bolivia (Plurinational State of), Colombia and Peru in 2021 and previous years; and UNODC, responses to the annual report questionnaire.

FIG. 41 **Estimated supply of cocaine available for consumption (net of seizures, purity-adjusted) per past-year cocaine user worldwide (range), 2005–2021**



Sources: Production: UNODC calculations based on UNODC data and data from the respective Governments, and coca bush cultivation surveys carried out in Bolivia (Plurinational State of), Colombia and Peru in 2021 and previous years; seizures and purities: UNODC, responses to the annual report questionnaire.

Note: Although the available supply is expressed per past-year user, the quantities actually consumed by individual users vary widely, and supply may not always be consumed in its entirety. Moreover, the numbers of past-year users are mainly based on household surveys, which may not capture all users; however, in principle this applies consistently across countries and across time. In view of this, these values are best understood as benchmark ratios rather than typical quantities consumed by users.

The balance of supply, demand and interdiction

The current situation with regard to the global cocaine market is the result of developments at both source and destination, driven by a combination of demand-side and supply-side factors. Although supply-side factors tend to be more visible and to exhibit more sudden changes, it should be borne in mind that the population of cocaine users has been growing gradually but steadily, driven by the increase in the global population and compounded by increasing prevalence of use (estimated at 0.32 per cent of the general population aged 15–64 in 2004, 0.36 per cent in 2010 and 0.42 per cent in 2021). Moreover, in the early 2010s, cocaine availability in Western and Central Europe was still short of levels in North America, and the subregion afforded space for growth and strong incentives for traffickers. Therefore, while cocaine supply declined between 2006 and 2014, the developments during the 2010s provided opportunities for supply to readjust to demand.

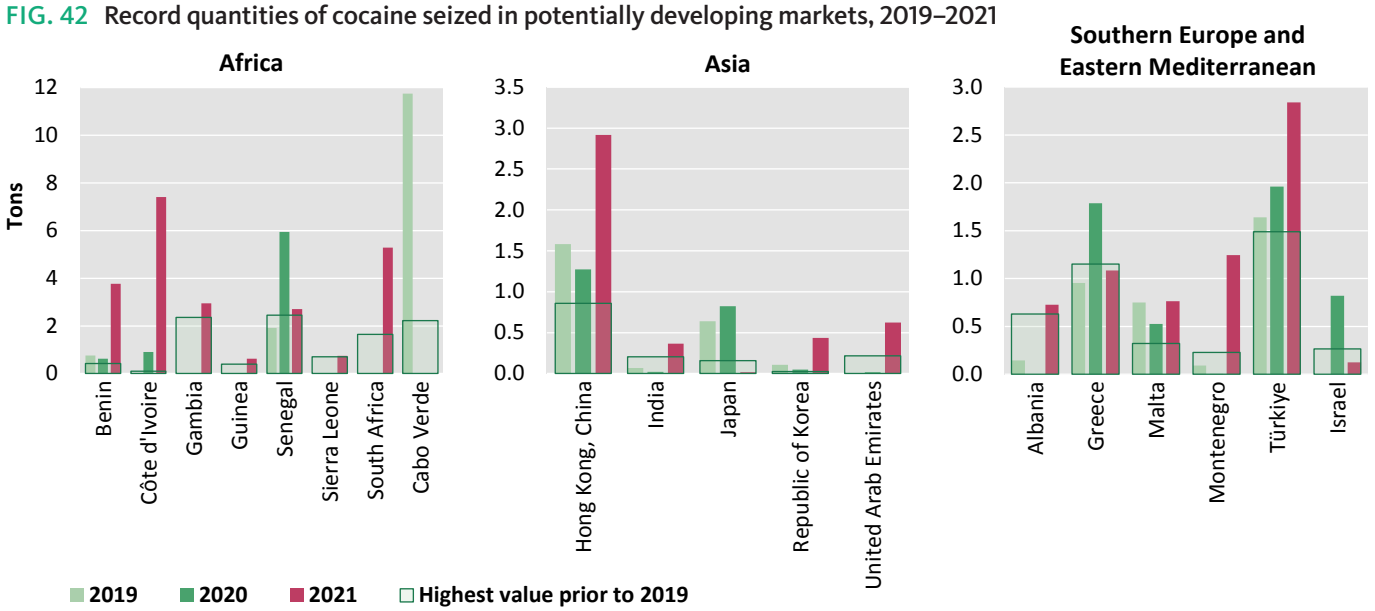
Cocaine seizures have grown significantly, outpacing the growth in production and, therefore, somewhat limiting the net supply available for consumption. Factoring in both the mitigating factor of seizures on supply and the increasing demand suggests that, despite the very sharp increases in cocaine supply, cocaine is currently not as abundant, on a per capita basis, as it may initially appear; indeed, it seems that 2006 and 2015 were years when extremes in availability were reached, while the ongoing high levels have been triggered by the low point of 2015 but have not quite reached the peak levels of 2006.

Prolonged surge in cocaine supply felt across the globe, beyond traditional markets

The world is currently experiencing a prolonged surge in both cocaine supply and demand. While, during the early years of their expansion, the major cocaine markets consolidated, recalibrated and further integrated, including through improvements in supply chains and the development of new routes, the prolonged surge is now being felt across the globe and is likely to spur the development of new markets beyond the traditional confines of the Americas, Western and Central Europe and Oceania. Moreover, although the global cocaine market continues to be concentrated in the Americas and in Western and Central Europe (with very high prevalence also in Australia), in relative terms it appears that the fastest growth is occurring in developing markets in Africa, Asia and South-Eastern Europe.

There are also signs of geographical diversification in the cocaine production process. Responses to the annual report questionnaire provide evidence in 2021 of the small-scale, likely experimental cultivation of coca bush beyond the main production countries of Colombia, Peru and the Plurinational State of Bolivia, in Guatemala, Honduras, Mexico and Ecuador.[226] Laboratories producing intermediate cocaine products (coca paste or cocaine base) were found in Honduras (13), Guatemala (3) and Mexico (1). It appears that limited quantities of cocaine are converted from base

FIG. 42 Record quantities of cocaine seized in potentially developing markets, 2019–2021



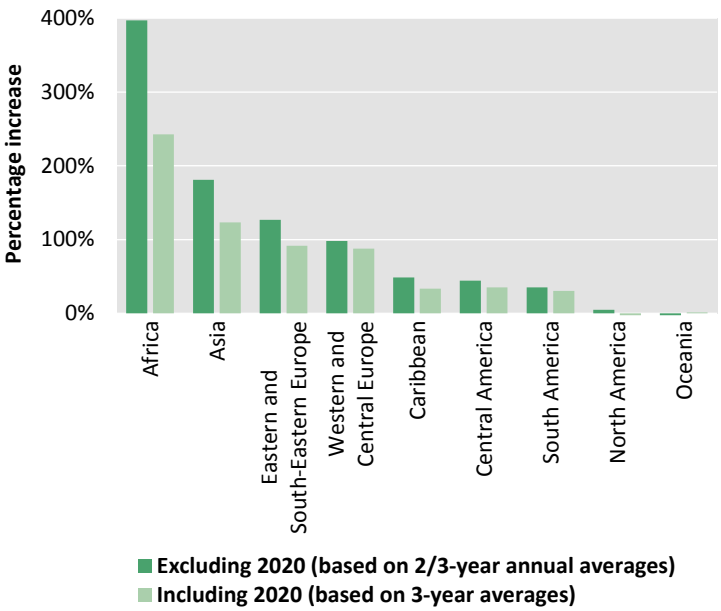
Sources: UNODC, responses to the annual report questionnaire; and UNODC, Drugs Monitoring Platform.

Note: Due to incomplete reporting in Africa, totals of individual seizures recorded in the UNODC Drugs Monitoring Platform for that region were considered in cases where they exceeded the available aggregate annual value.

form to salt (hydrochloride) form for export to destination markets in Ecuador (four cocaine hydrochloride laboratories reported in 2021), Paraguay (six laboratories reported) and Venezuela (60 laboratories reported). In Europe, the refinement of cocaine into hydrochloride form continues to be detected alongside extraction from carrier materials, notably in the Kingdom of the Netherlands, which in 2021 detected seven large-scale clandestine laboratories producing cocaine in base form (which requires further processing in order to be marketed as cocaine hydrochloride) and 14 medium-scale laboratories producing cocaine in hydrochloride form.

In Western and Central Europe, the available evidence suggests that the conversion of cocaine from base form to cocaine hydrochloride has typically occurred in the context of carrier materials impregnated with cocaine, and subsequently retrieved (initially in base form) using sophisticated techniques in "secondary extraction" laboratories. One clear sign of changing dynamics emerged in April 2023, when a law enforcement operation in Spain led to the dismantling of a large-scale laboratory processing coca paste into

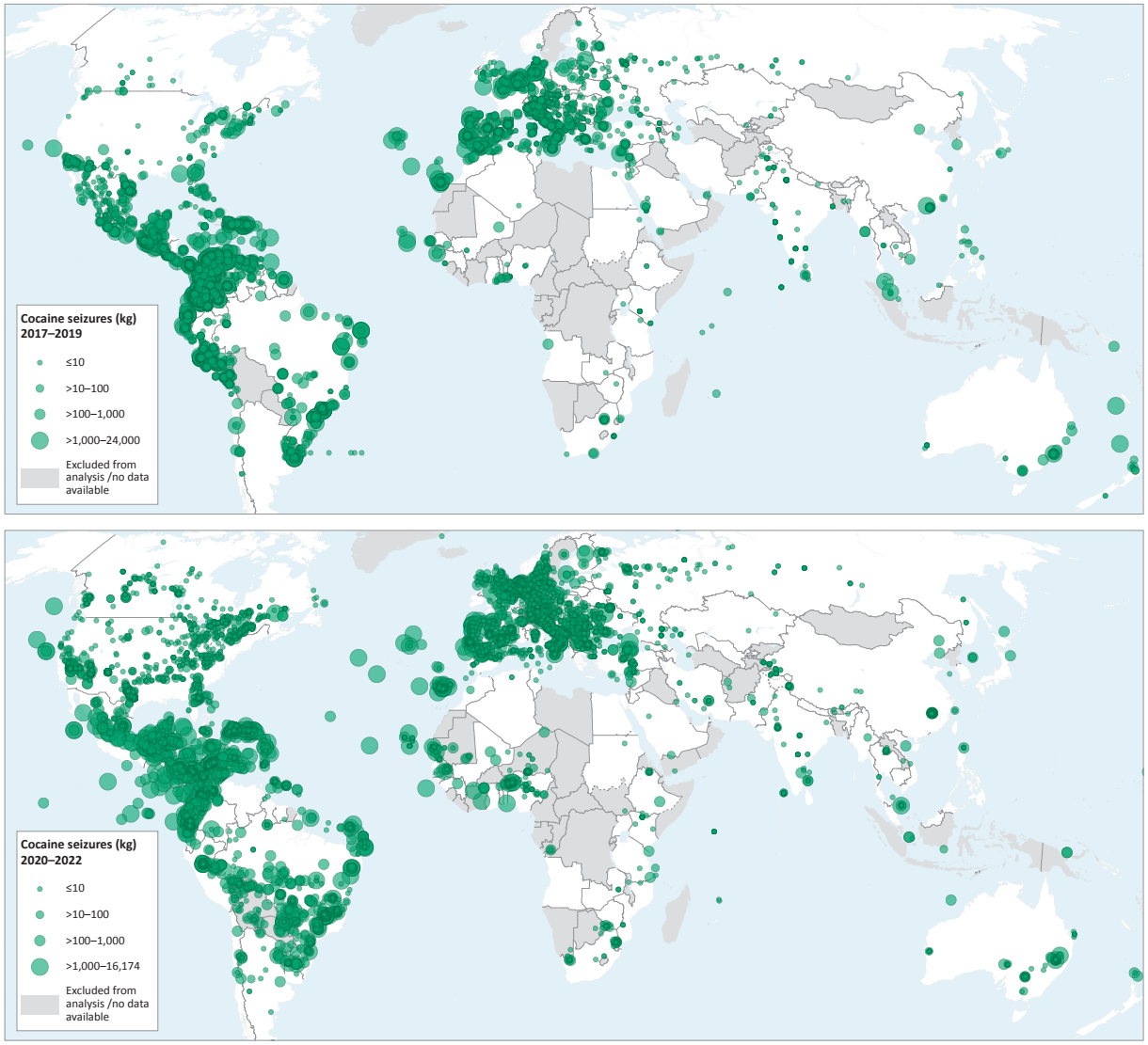
FIG. 43 Global cultivation of coca bush, cocaine seizures and cocaine production, 2010–2021



Source: UNODC, responses to the annual report questionnaire.

Note: The calculation excluding 2020 is based on the average of 2019 and 2021 in comparison with the average of 2016, 2017 and 2018.

MAP 16 Significant individual cocaine seizures at the global level, 2017–2019 and 2020–2022



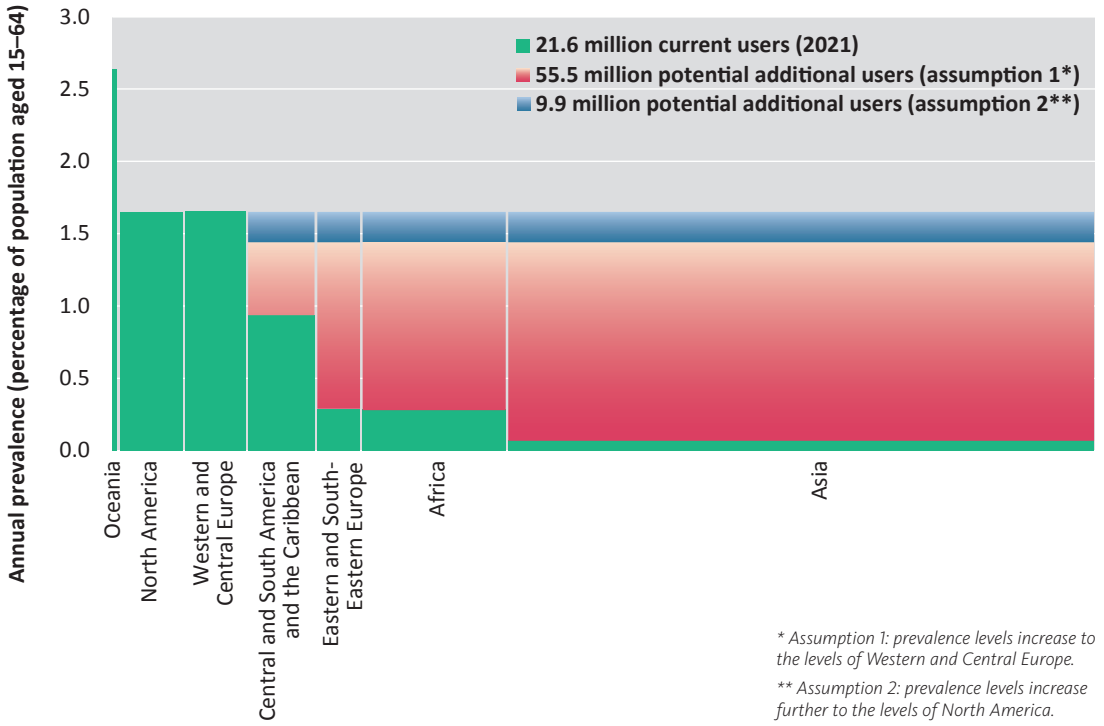
The boundaries and names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Source: UNODC, Drugs Monitoring Platform.

cocaine hydrochloride. The case involved the seizure of a large quantity (1.3 tons) of coca paste, which had been trafficked inside metal machinery,[227] suggesting that the last stage of conversion (from base to hydrochloride) was carried out on Spanish soil as a strategic choice by traffickers, rather than as a consequence of the concealment method.

The current increase in cocaine supply in Latin America, the expansion of trafficking in the drug eastward, the highly globalized and interconnected nature of society and the inherent potential for consumption in Africa and Asia, especially in countries with increasingly large affluent segments of the population, may lead to an expansion of the markets in these regions.

FIG. 44 Potential additional cocaine users if the prevalence of cocaine use in Western and Central Europe or in North America were to extend to other (sub)regions of the world



** Assumption 1: prevalence levels increase to the levels of Western and Central Europe.*

*** Assumption 2: prevalence levels increase further to the levels of North America.*

Note: The total global population aged 15–64 is 5.1 billion.

Source: UNODC estimates based on responses to the annual report questionnaire.

These markets are still limited, but they have the highest potential to grow given the size of their populations. If, hypothetically, the prevalence of cocaine use in these countries were to increase to the point of matching those of the established markets (a shift which is, in reality, highly unlikely to materialize in the short term), the population of cocaine users would increase tremendously. For example, the number of past-year cocaine users would increase by 55.5 million from the currently estimated 21.6 million if prevalence in Asia, Africa and the rest of Europe were to increase to the level of Western and Central Europe, and by an additional 9.9 million should it further increase in those (sub)regions (and in Western and Central Europe) to the level observed in North America. Asia, where cocaine use is comparatively very low, has the greatest potential for an increase in the number of cocaine users, largely due to its population size.

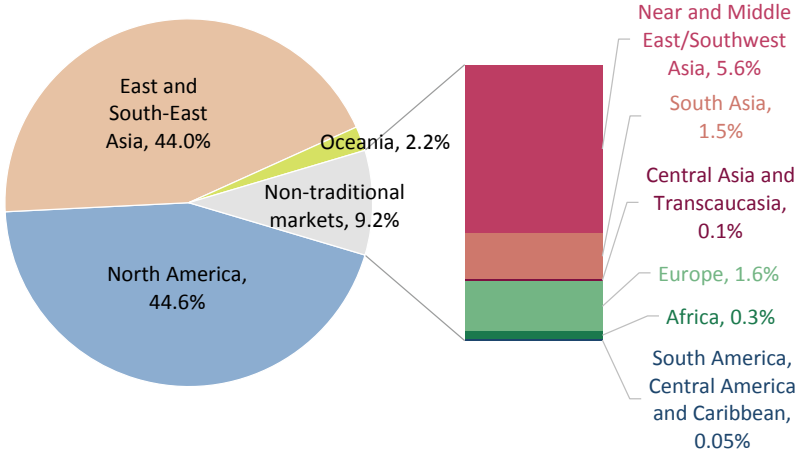
Emerging trends in methamphetamine supply: expansion to non-traditional markets

Methamphetamine use and trafficking are expanding and affecting more regions

Methamphetamine manufacture, trafficking and use appear to have increased at the global level over the past two decades,[228] not only in the traditional, long-standing markets for the drug in North America, East and South-East Asia and Oceania, but also – and even more markedly – in a number of relatively new non-traditional markets in Asia, Europe and Africa. Indeed, increases in methamphetamine use over the last decade have been reported not only by officials in traditional markets but also by officials in non-traditional markets such as the Near and Middle East/South-West Asia, South Asia, South-Eastern Europe and West and Southern Africa.

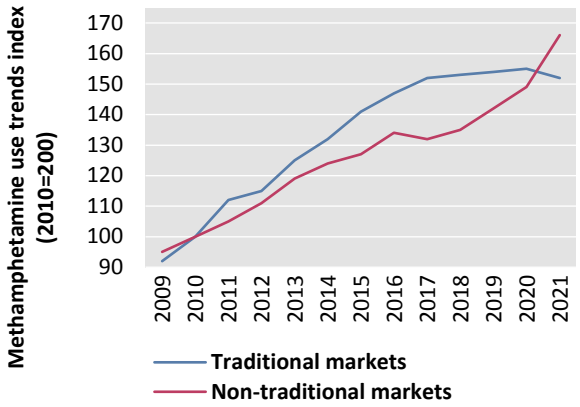
Aggregated seizures of methamphetamine in the drug's non-traditional markets accounted for 12 per cent of global methamphetamine seizures in 2021, compared with less than 0.1 per cent in 2001, and increased from 60 kg to more than 50 tons over the same period.

FIG. 45 Distribution of global quantities of methamphetamine seized, 2017–2021



Source: UNODC, responses to the annual report questionnaire.

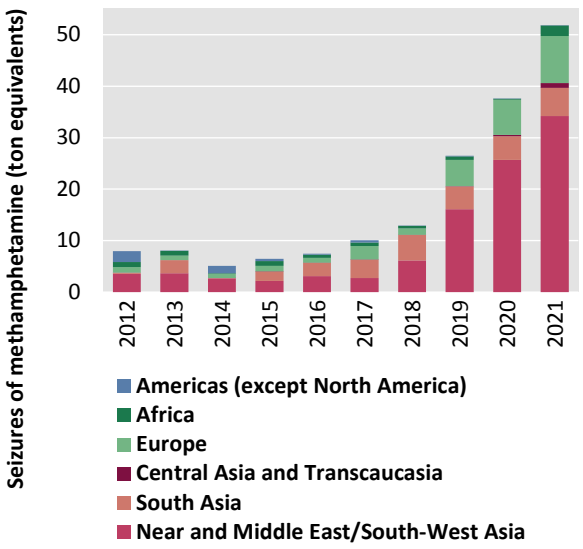
FIG. 46 Reported trends in methamphetamine use in traditional and non-traditional markets, 2009–2021



Source: UNODC, responses to the annual report questionnaire.

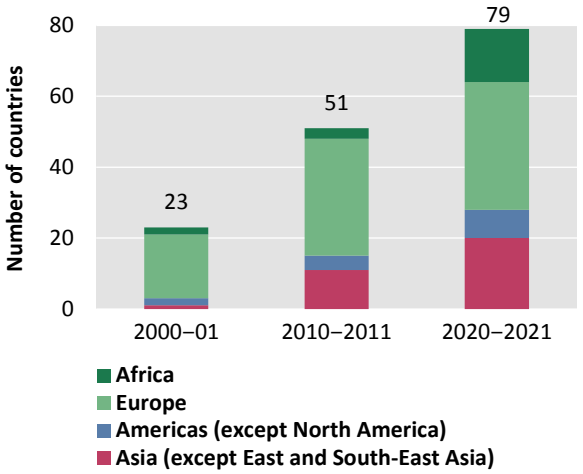
Note: Traditional markets: North America, East and South-East Asia and Oceania; non-traditional markets: Africa, Asia and Europe. The methamphetamine use trends index is based on qualitative information on trends in methamphetamine use reported by Member States. Calculations are based on the reports of 95 countries – on average, 31 countries per year over the period 2010–2021. The trend line is calculated based on the number of countries reporting increases minus the number of countries reporting decreases (2 points for a "large increase", 1 point for "some increase", 0 points for a "stable situation", -1 point for "some decrease", -2 points for a "large decrease").

FIG. 47 Quantities of methamphetamine seized in non-traditional markets, 2012–2021



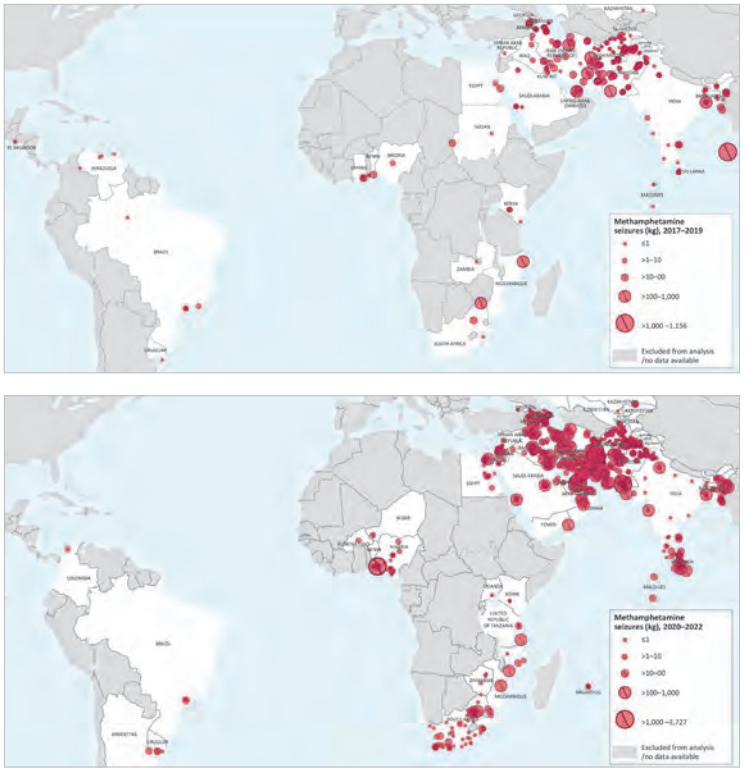
Source: UNODC, responses to the annual report questionnaire.

FIG. 48 Number of countries outside the traditional markets for methamphetamine that reported seizures of the drug, 2000–2001, 2010–2011 and 2020–2021



Source: UNODC, responses to the annual report questionnaire.

MAP 17 Significant individual methamphetamine seizures in non-traditional markets, 2017–2022



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Source: UNODC Drugs Monitoring Platform.

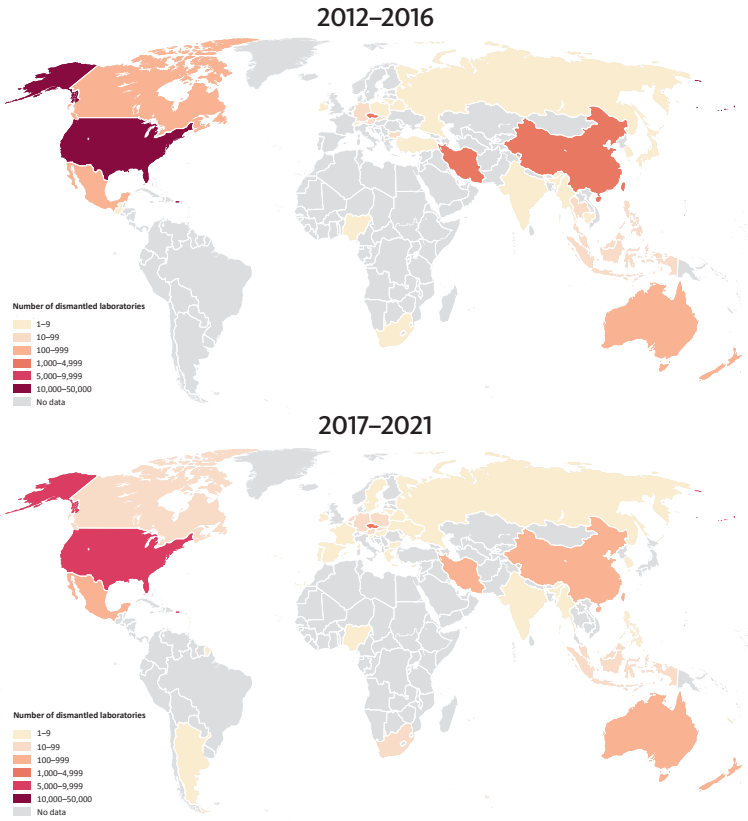
Moreover, the number of countries reporting seizures of the drug beyond its traditional markets of North America, East and South-East Asia and Oceania has almost tripled over the past two decades. Although such seizures may reflect growing concern about methamphetamine and related shifts in law enforcement priorities, they could well point to increases in the supply of and demand for the drug and are a further indication of the geographical expansion of methamphetamine trafficking.

In recent years, methamphetamine seizures and reported trafficking activities in the Americas, with the exception of North America, have remained relatively small, possibly reflecting the ease of access to a readily available and generally cheaper alternative stimulant in South America, namely, cocaine products.[229, 230] By contrast, increases in terms of methamphetamine trafficking activities have been most marked in South-West Asia, South-East, West and Central Africa and South Asia.

In addition, there are indications that the manufacture of methamphetamine is no longer restricted to the established markets, as reflected in the detection of clandestine methamphetamine laboratories in non-traditional markets such as South-West Asia, South Asia or Africa. While the number of dismantled laboratories in traditional markets has been declining, it has been increasing in a number of other countries. Caution is required as the output of several hundred small-scale laboratories may still be negligible compared with a few industrial-scale laboratories supplying most of a market.

Moreover, data also show that seizures of precursors used in the manufacture of methamphetamine are no longer limited to traditional markets. Such seizures have been reported in, inter alia, South Asia, South-West Asia and Africa (notably, West and South-East Africa) in recent years.

MAP 18 Number of dismantled methamphetamine laboratories



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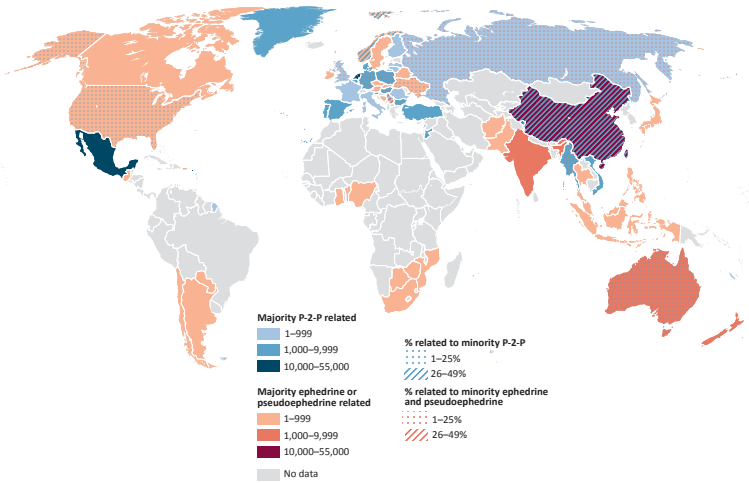
Source: UNODC, responses to the annual report questionnaire.

MAP 19 Quantities of precursor chemicals used in the manufacture of amphetamine and methamphetamine seized, 2017–2021



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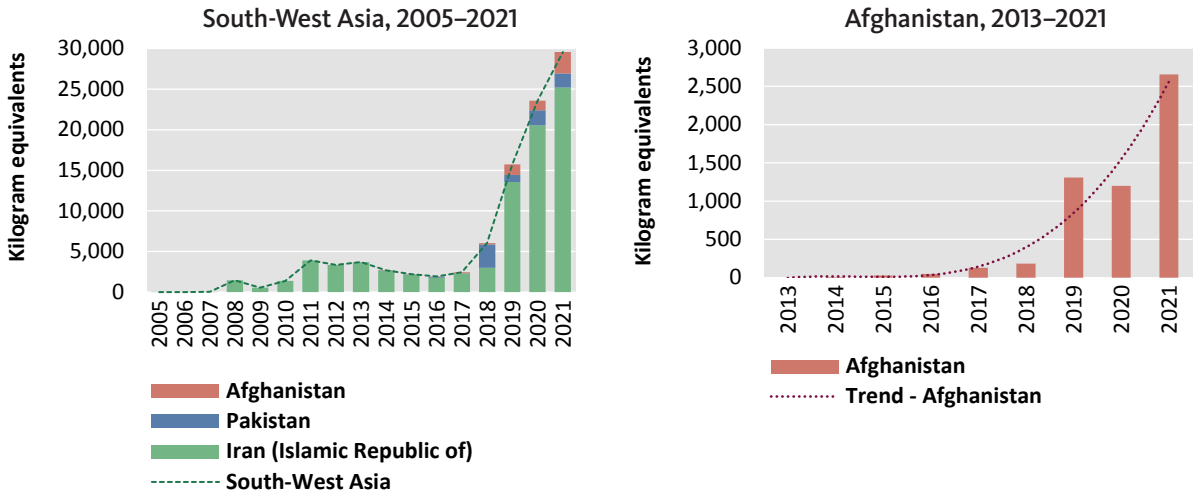
Note: Most seizures of ATS precursors (ephedrine/pseudoephedrine and P-2-P-related) can be linked to the manufacture of methamphetamine, except for in Europe, where most of the P-2-P-related precursor seizures are still linked to the manufacture of amphetamine; only Belgium and the Kingdom of the Netherlands report P-2-P-related precursors being used in clandestine industrial-scale laboratories for the manufacture of methamphetamine.

Source: UNODC calculations based on INCB, Precursors 2022, Annex III, Seizures 2017–2021 (New York, February 2023).

Methamphetamine trafficking in South-West Asia continues to increase and reach markets beyond the subregion, including South Asia

The most striking expansion of methamphetamine manufacture beyond the drug's traditional markets over the past decade seems to have taken place in South-West Asia. This began with the expansion of the clandestine manufacture of methamphetamine in the Islamic Republic of Iran in the first decade of the new millennium, until its decline after 2015. In recent years, methamphetamine manufacture has expanded in Afghanistan, where the drug is produced both from the locally grown *Ephedra* plant[231] and from pharmaceutical ephedrine extracted from over-the-counter cold medications.[232] Some seizure cases suggest that methamphetamine exports from Afghanistan have also potentially increased and now reach markets in East and South-East Asia, South Asia, Central Asia and Transcaucasia, as well as in Africa, Europe and Oceania. It is not clear, however, whether the rise to power of the Taliban in Afghanistan in August 2021 and the officially declared ban on *Ephedra* cultivation in a number of Afghan provinces in December 2021[233] and on illicit drug production, in general, in April 2022[234] have fundamentally changed methamphetamine manufacture and exports from Afghanistan.

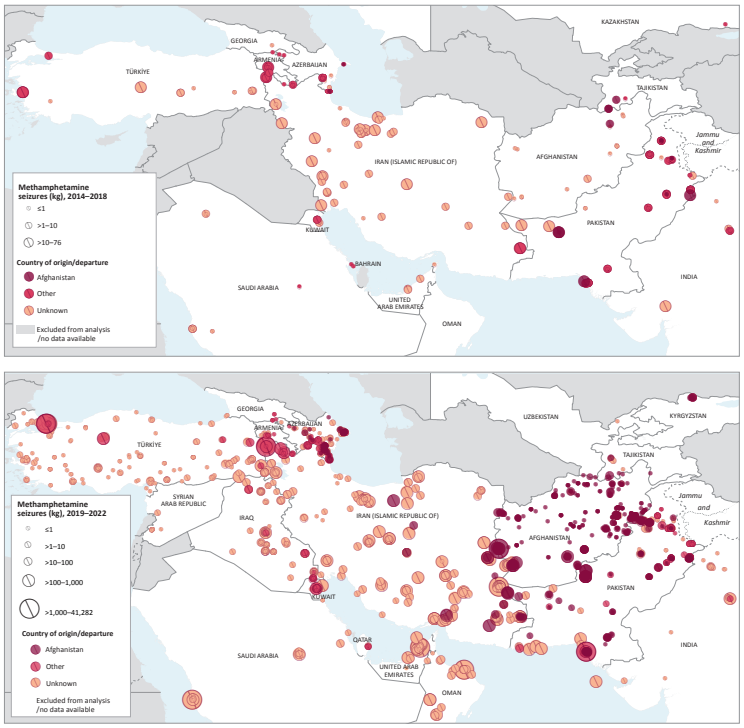
FIG. 49 Quantities of methamphetamine seized in South-West Asia



Sources: UNODC, responses to the annual report questionnaire.

Sources: UNODC, responses to the annual report questionnaire; UNODC Drugs Monitoring Platform.

MAP 20 Significant seizures of methamphetamine in South-West Asia and neighbouring subregions, by origin, 2014–2018 and 2019–2022



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Source: UNODC Drugs Monitoring Platform.

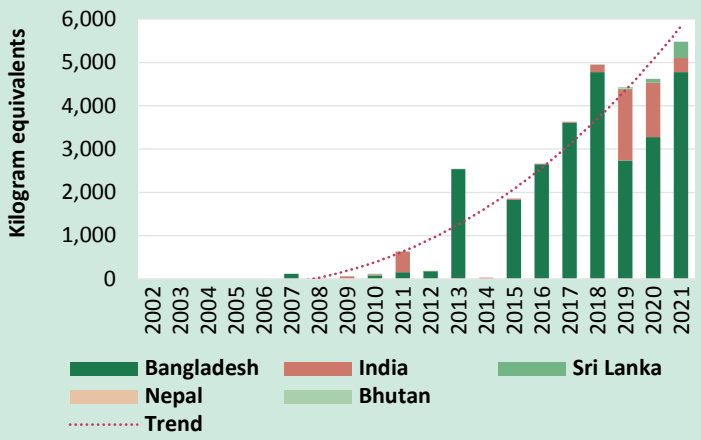
South Asia increasingly exposed to methamphetamine trafficking from the east and west

In South Asia, methamphetamine manufactured in Afghanistan reaches both India and Sri Lanka. Most users of ATS (mainly methamphetamine) in India are found in the country's western states, while the prevalence of methamphetamine use is highest in its eastern states, close to Myanmar.[a] As the mapping of individual seizures suggests, India is increasingly being squeezed between the expansion of methamphetamine trafficking from South-West Asia and from South-East Asia (mainly originating in Myanmar), which poses a high risk of significantly increasing the availability and use of the drug.

In addition, some local manufacture of methamphetamine has been reported; six clandestine laboratories have been reported dismantled in India since 2014.[a] In parallel, significant seizures of the main precursors used in the manufacture of methamphetamine, ephedrine and pseudoephedrine were reported by India in the period 2017–2021 (exceeding 3.5 tons in methamphetamine equivalents).[b]

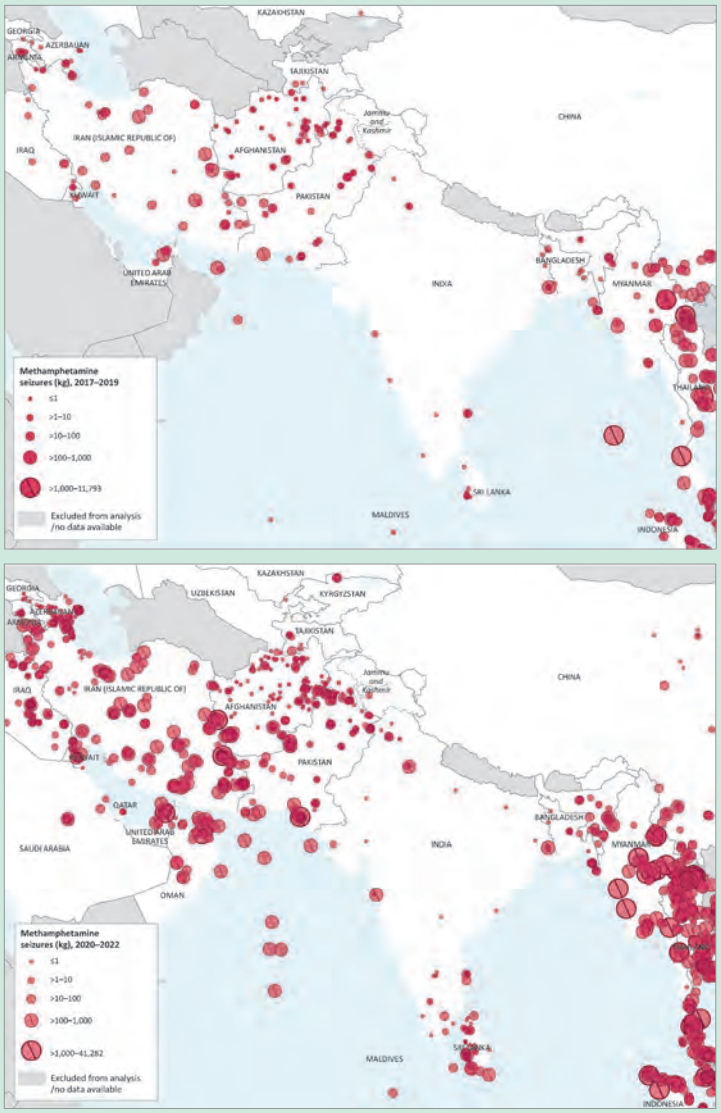
That said, seizure data suggest that the largest methamphetamine market in South Asia is Bangladesh.[c] The methamphetamine found in that country continues to originate primarily in South-East Asia, in particular Myanmar.[d]

Seizures of methamphetamine in South Asia, 2000–2021



Source: UNODC, responses to the annual report questionnaire.

Significant individual seizures of methamphetamine in South Asia and neighbouring subregions, 2017–2019 and 2020–2022



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Source: UNODC, Drugs Monitoring Platform.

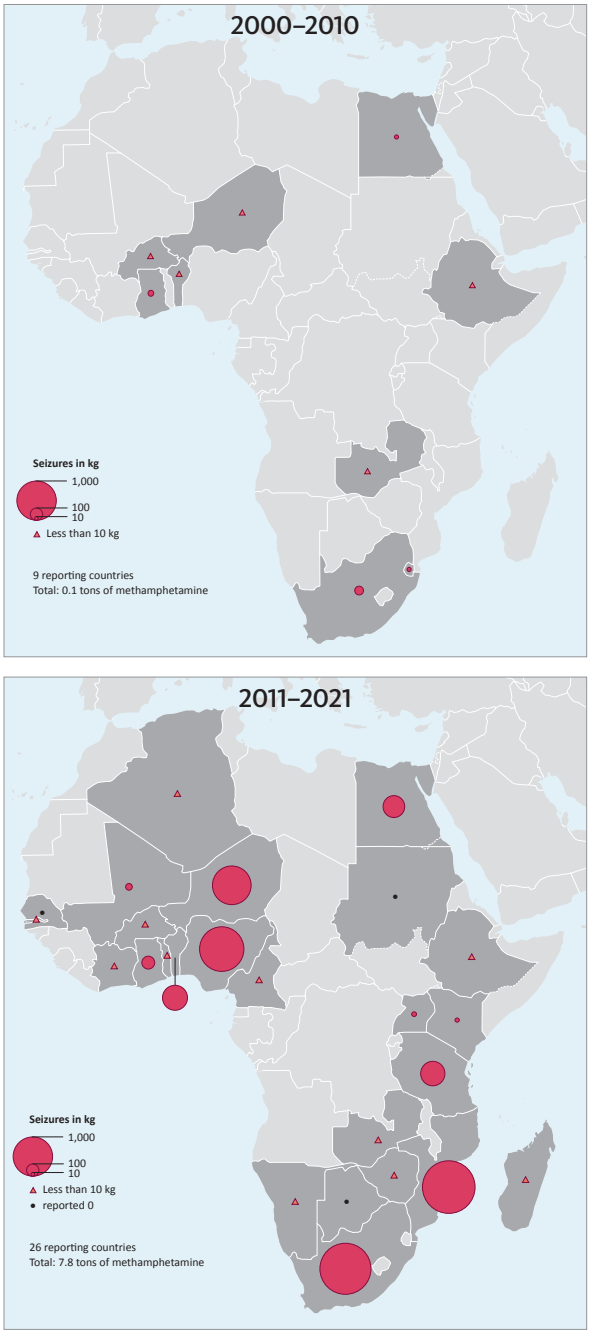
[a] Ministry of Social Justice and Empowerment, Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

[b] INCB, 2022 *Annual Report on Precursors and Chemicals Frequently Used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances. Annex III, Seizures 2017-2021* (Vienna: United Nations Publications, 2023).

[c] UNODC, responses to the annual report questionnaire.

[d] INCB, *Report of the International Narcotics Control Board for 2020* (Vienna: United Nations Publications, 2021).

MAP 21 Quantities of methamphetamine seized in Africa, 2000–2021



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Source: UNODC, responses to the annual report questionnaire.

Levels of individual drug seizures in South-West Asia (excluding Afghanistan, in the absence of reporting) were similar in 2021 and 2022; indeed, there was even an increase between 2021 and 2022 when the wider region is considered (i.e. seizures that occurred in South-West Asia, South Asia, Central Asia, Transcaucasia and the Near and Middle East and in international waters in the Indian Ocean and off the coast of the Arabian Peninsula). Meanwhile, seizures made in subregions that are further away (South-Eastern Europe and Eastern Europe) and less linked to methamphetamine supply from South-West Asia showed some declines.[235]

Methamphetamine trafficking is on the increase in Africa

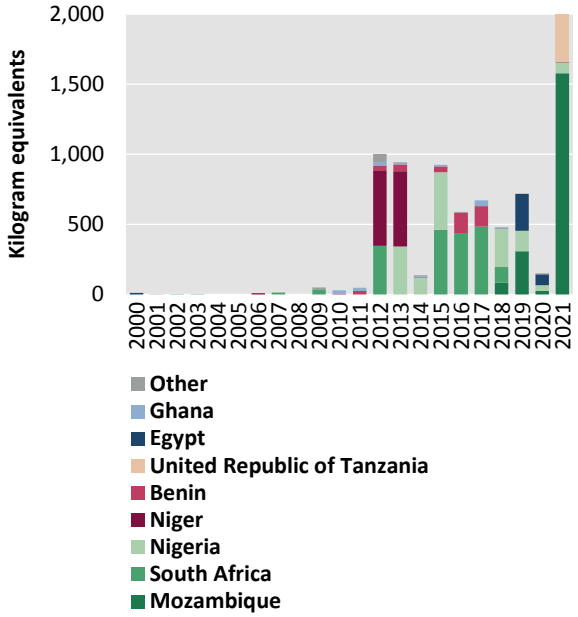
Another non-traditional market for methamphetamine undergoing an expansion is Africa, where the number of countries reporting use of the drug almost tripled, from 4 to 11, between the periods 2010–2011 and 2020–2021. Overall, 14 African countries reported the use of methamphetamine in the period 2011–2021 – almost a quarter of all 58 countries in the region.

Methamphetamine trafficking also seems to be on the increase in Africa. Seizures of the drug were reported by 26 countries in the region in the period 2011–2021 – almost triple the number in the period 2000–2010 and accounting for almost half of all the countries in Africa. The overall largest aggregated quantities of methamphetamine seized in the region over the past decade were in Mozambique and South Africa, followed by Nigeria.

Although methamphetamine remains an ATS of only secondary importance in Africa, given that most African countries suffer primarily from a large number of falsified pharmaceutical stimulants used for non-medical purposes being peddled on their streets,[236, 237] several pockets have emerged in recent years where the use of and trafficking in methamphetamine have been gaining in significance. These pockets are located, for example, in Nigeria and some of its neighbouring countries, as well as in South Africa, Mozambique, the United Republic of Tanzania, Kenya and Egypt.[238]

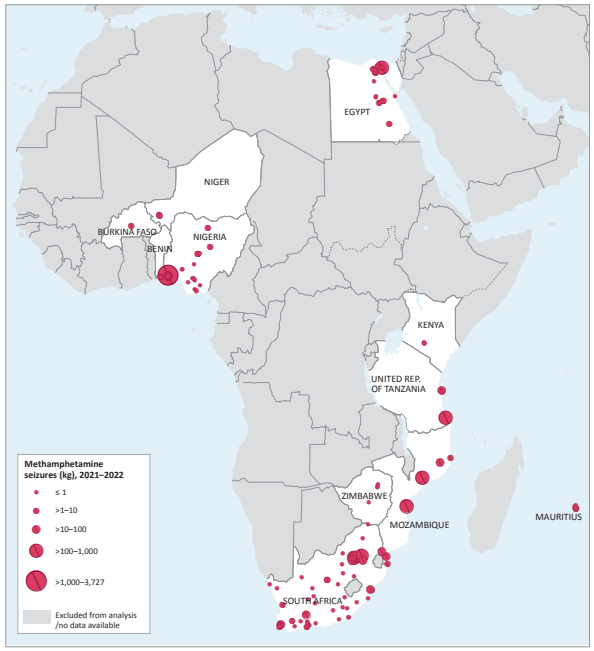
Methamphetamine markets in Africa are mainly supplied with methamphetamine produced in South-West

FIG. 50 Quantities of methamphetamine seized in Africa, 2000–2021



Source: UNODC, responses to the annual report questionnaire.

MAP 22 Significant individual methamphetamine seizures in Africa, 2021–2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Source: UNODC, Drugs Monitoring Platform.

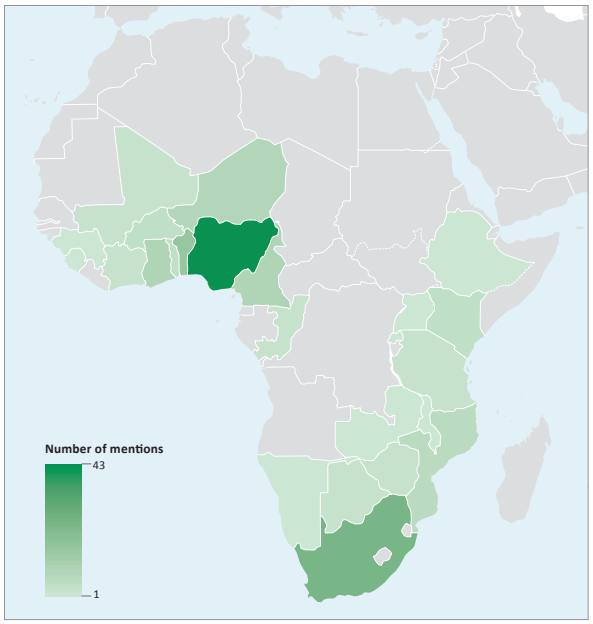
Asia (with shipments to Mozambique, South Africa, Kenya and the Sudan having been reported) and East and South-East Asia (with shipments to South Africa and Benin having been reported), but the clandestine manufacture of the drug seems to be on the increase in the region, where the total number of officially dismantled methamphetamine laboratories rose from 10 in the period 2012–2016 to 18 in the period 2017–2021.[239, 240]

Locally produced methamphetamine supplies some of the domestic markets in Africa, although some of it is also destined for overseas markets, in particular in East and South-East Asia (Malaysia, Indonesia, Brunei Darussalam, Hong Kong, China, the Republic of Korea and Japan), and in Western and Central Europe (most notably Belgium, France, Spain and Italy).

A total of 28 clandestine methamphetamine laboratories were officially reported to have been dismantled in Africa in the period 2012–2021, 15 of them in South Africa and 13 in Nigeria, but there are indications that clandestine methamphetamine manufacture may also be taking place in other countries in the region. The Democratic Republic of the Congo, Kenya, Mozambique, South Africa and the United Republic of Tanzania, as well as Nigeria, Benin and other countries in West Africa, were identified by other countries in Africa, Asia and Europe as countries of origin of the methamphetamine seized on their territory in the period 2010–2019, although the possibility cannot be ruled out that some of these countries were only transit or departure countries.

In any case, trafficking in methamphetamine to, through and out of Africa already seems to be widespread. Overall, 26 countries in Africa were identified as countries of origin, departure, transit or destination for methamphetamine over the last decade (2012–2021), with the most frequently mentioned countries being Nigeria and South Africa, followed by Benin, Ghana, Cameroon, the Niger, Mozambique and Kenya.

MAP 23 African countries most frequently reported as countries of origin, departure, transit or destination for methamphetamine, 2012–2021



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Source: UNODC, responses to the annual report questionnaire.

Moreover, ephedrine and ephedrine preparations, typically used in the clandestine manufacture of methamphetamine, have been seized both in West and Central Africa (Nigeria, Ghana and Benin) and in Southern Africa (South Africa and Mozambique) in recent years (2017–2021).[241]

It may be also noteworthy that Nigeria, Egypt, South Africa and Ghana were among the 10 largest importers of ephedrine worldwide (in terms of volume notified through the INCB Pre-Export Notification Online (PEN Online) system) between November 2021 and November 2022, while Egypt was among the 10 largest importers of pseudoephedrine notified through the PEN Online system.[242] Furthermore, the export of a major shipment of 2.5 tons of ephedrine destined for Uganda, far more than the annual legitimate requirement for the country, was stopped by the authorities of India in the same period.[243]

Consumption of and trafficking in methamphetamine in Europe: recent surge in South-Eastern Europe

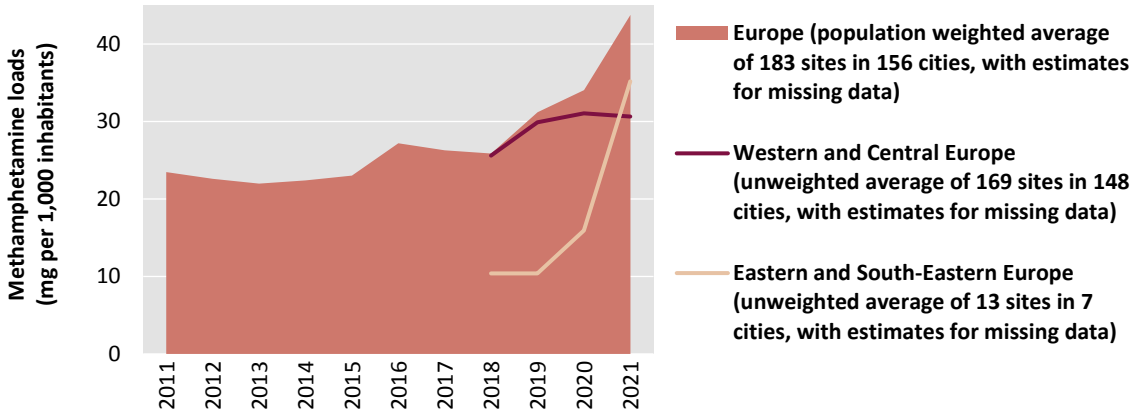
The methamphetamine use market in Europe continues to be smaller than that of amphetamine. However, seizures of methamphetamine and analysis of wastewater in selected cities, located mainly in Western and Central Europe and, to a lesser extent, in Eastern and South-Eastern Europe, indicate an overall increase in methamphetamine consumption and trafficking in the continent over the past decade.

In 2021, the number of cities in Western and Central Europe showing a decline in methamphetamine consumption (49) slightly outnumbered those showing an increase (43), while in Eastern and South-Eastern Europe, more cities reported an increase (11) than a decline (3). Those trends suggest that the increase after 2019 was mainly driven by countries and cities in South-Eastern Europe.

At the same time, trafficking in methamphetamine has expanded geographically in Europe, with seizures being reported by 36 countries in 2020–2021, exactly double the number reported in 2000–2001. In addition, methamphetamine manufacture in Europe has extended from pockets in central Europe, most notably Czechia, from where it has spread to neighbouring countries, including Slovakia, Poland, Germany, the Kingdom of the Netherlands, Belgium, Austria and other countries across Europe.

More than 2,700 methamphetamine laboratories were dismantled in 23 European countries in the period 2011–2021. Czechia reports the largest number every year, accounting for 86 per cent of all methamphetamine laboratories dismantled in Europe from 2011 to 2021. Primarily consisting of small laboratories ("kitchen labs"), the number of laboratories dismantled annually in Czechia decreased by more than 50 per cent, from 338 in 2011 to 188 in 2021. The next largest numbers of methamphetamine laboratories were dismantled in the Kingdom of the Netherlands (15) and Poland (14) in 2021. In 2021, however, most of the industrial-scale laboratories in Europe were dismantled in the Kingdom of the Netherlands (9), whereas none were reportedly dismantled in Czechia.

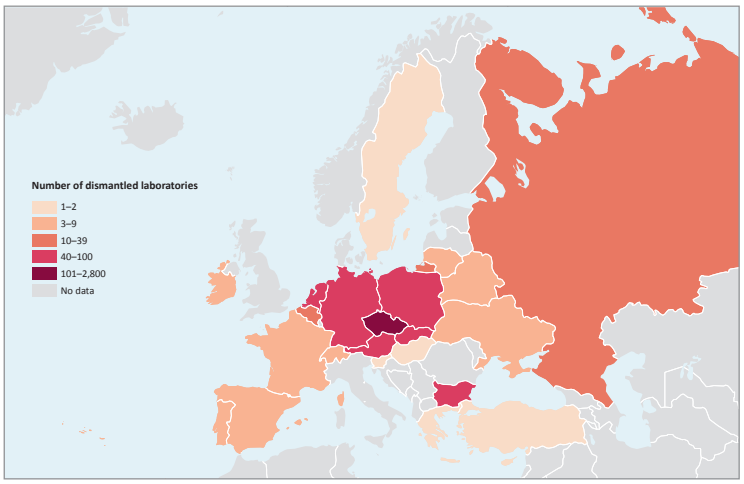
FIG. 51 Quantities of methamphetamine metabolites found in wastewater, 156 cities in Europe, 2011–2021



Source: UNODC calculations based on wastewater data provided by Sewage Analysis CORe group Europe.

Note: Of the seven cities in Eastern and South-Eastern Europe, six were located in South-Eastern Europe.

MAP 24 Number of methamphetamine laboratories dismantled in Europe (logarithmic scale), 2011–2021



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Note: The laboratories dismantled may be of varying size, indicating varying manufacture capacity.

Source: UNODC, responses to the annual report questionnaire.

The manufacture of methamphetamine appears to have increased considerably in the Kingdom of the Netherlands and Belgium in recent years.[244] It is largely carried out using precursors and pre-precursors of P-2-P, as is the case in Mexico, rather than ephedrine and pseudoephedrine, the traditional precursors used in the manufacture of the drug. The methamphetamine originating in Belgium and the Kingdom of the Netherlands is not only destined for markets in Europe but also trafficked to other regions,[245] including Australia and New Zealand, East and South-East Asia, West and Central Africa and, in recent years, South America, Central America and the Caribbean, although some may be intended for onward trafficking. Over the period 2012–2021, a total of 13 countries outside the European Union, including 10 over the period 2017–2021, cited Belgium or the Kingdom of the Netherlands as source or transit countries for methamphetamine found in their territories, while the authorities of Belgium and the Kingdom of the Netherlands identified another seven countries outside the European Union as intended destination countries over the last decade.

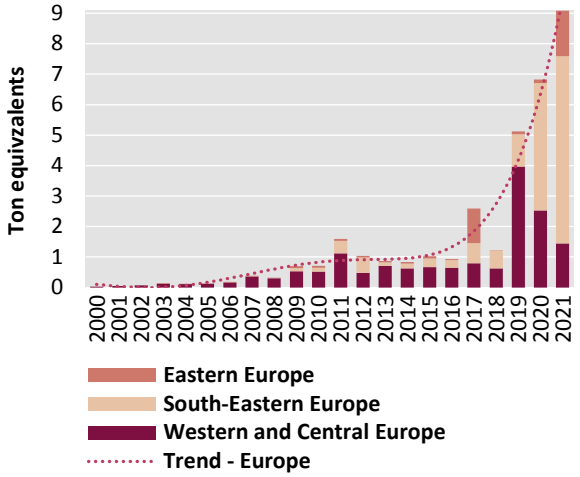
Nonetheless, seizures suggest that overall trafficking in methamphetamine in Western and Central Europe has declined since 2019, when seizures peaked in the subregion.

The dynamics of trafficking in methamphetamine within Europe are changing. Interceptions of the drug have risen markedly since 2019, mainly as a result of large increases in quantities seized in South-Eastern Europe, in particular Türkiye. This may be linked to the ongoing smuggling of methamphetamine into the country from (or via) the neighbouring Islamic Republic of Iran[246] (possibly an indication of trafficking in methamphetamine manufactured in Afghanistan);[247]

while the drug may be passing through, destined for markets in East and South-East Asia,[248] Central Asia, Europe and North Africa.[249] Some of it may also end up on the domestic market in Türkiye; wastewater data indicate an increase in consumption of the drug in some of the country's cities.[250]

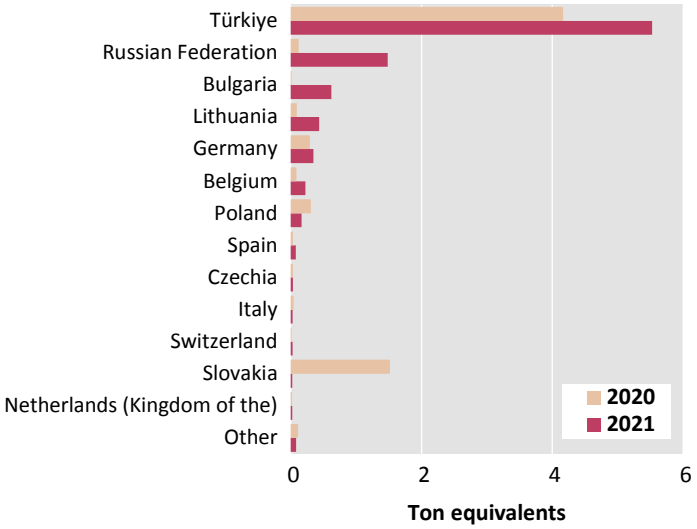
Significant seizures also suggest an increase in methamphetamine trafficking in Eastern Europe, most notably in the Russian Federation, in and around St. Petersburg and Moscow, from the period 2017–2019 to 2020–2022.[251]

FIG. 52 Quantities of methamphetamine seized in Europe, 2000–2021



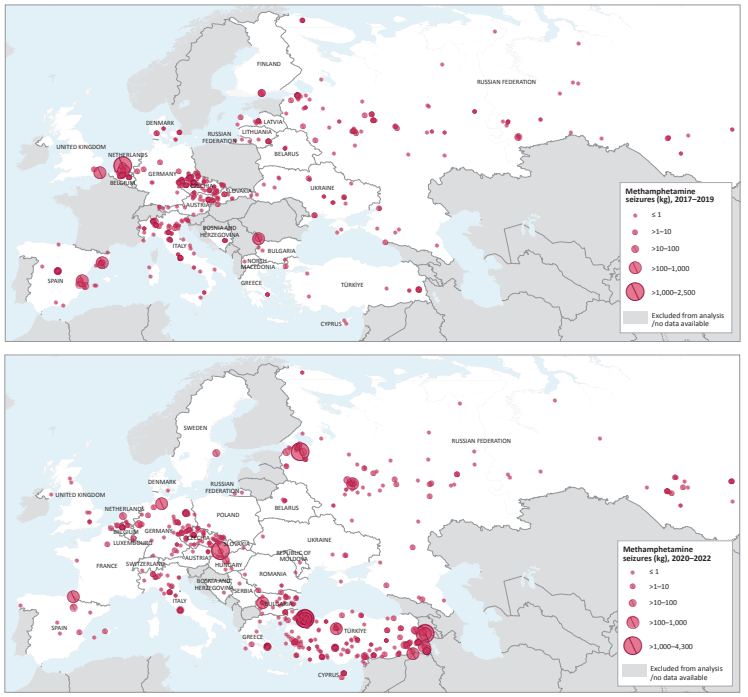
Source: UNODC, responses to the annual report questionnaire.

FIG. 53 Quantity of methamphetamine seized in Europe, 2020 and 2021



Source: UNODC, responses to the annual report questionnaire.

MAP 25 Significant individual methamphetamine seizures in Europe, 2017–2022



The boundaries and names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations.

Note: The laboratories dismantled may be of varying size, indicating varying manufacture capacity.

Source: UNODC, Drugs Monitoring Platform.

South Asia: a major opiate market that appears to be expanding

South Asia, located in between the world's two largest opiate production areas of South-West Asia and South-East Asia, is the largest consumer market for opiates worldwide . The proportion of the global total of opiate users who reside in South Asia was 20 per cent in 2002 and increased to 39 per cent in 2021, or 12 million people – a significantly larger number than in the Near and Middle East and South-West Asia combined, which accounted for 19 per cent of the global total, or in Europe, which accounted for 10 per cent.[252] At 1.1 per cent, the prevalence of opiate use in South Asia was almost twice the estimated global average (0.6 per cent) in 2021.[253]

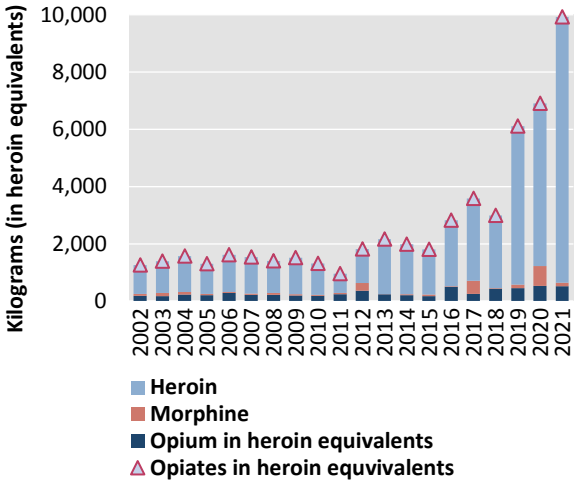
Majority of opiates found in South Asia originate in South-West Asia

The largest opiate market in South Asia is India, which is projected to become the world's most populous country in 2023.[254] With close to an estimated 11 million opiate users in 2021, India accounted for nearly 90 per cent of the estimated number of opiate users in South Asia, or 34 per cent of the global total, which is nearly double the country's share of the global population (18 per cent). India also accounts for a major share of the heroin seized in South Asia – two thirds in the period 2017–2021, followed by Sri Lanka (23 per cent) and Bangladesh (7 per cent) – and has seen an increase in seizures of heroin in the past decade, as has South Asia overall.[255]

Opium is produced licitly for the pharmaceutical industry in India; production has declined over the past two decades and has stabilized at between 200 and 300 tons annually since 2018.[256] Some diversion of opium from licit sources may occur, but is likely limited. Indeed, the overall average quantity of opium per hectare supplied to the authorities by licensed opium farmers has actually increased, from an average of 47 kg per ha in 1994/95 to 64 kg per ha in 2020/21.[257] In parallel, the Indian authorities report that, unlike in the past, most of the opium seized in India nowadays is no longer from licit sources, which also points towards a reduction in the diversion of licit opium.[258]

Opium was,[259] and continues to be, illicitly cultivated in India,[260] primarily in the country's north-eastern and

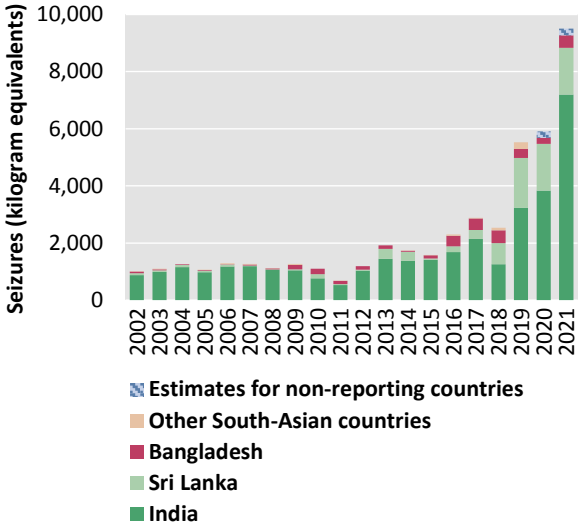
FIG. 54 Opiates seized in South Asia, by drug, 2002–2021



Source: UNODC, responses to the annual report questionnaire.

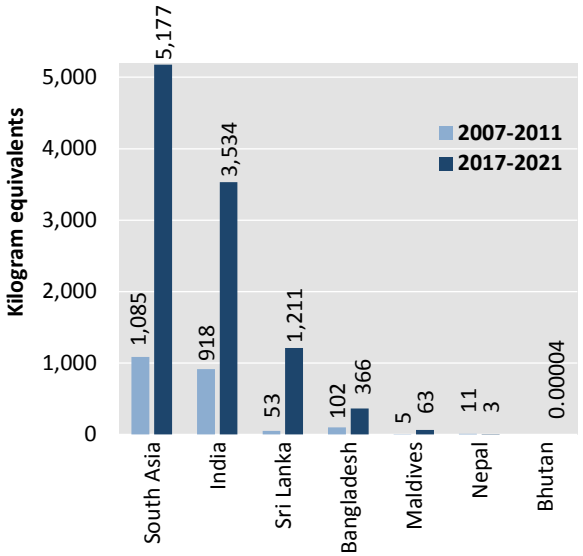
Note: It is assumed that an average of 10 kg of opium are needed to produce 1 kg of heroin or 1 kg of morphine.

FIG. 55 Seizures of heroin in South Asia, by country, 2002–2021



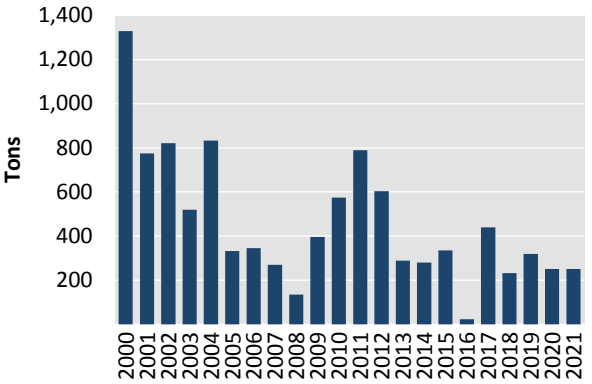
Source: UNODC, responses to the annual report questionnaire.

FIG. 56 Average annual seizures of heroin in South Asia, 2007–2011 and 2017–2021



Source: UNODC, responses to the annual report questionnaire.

FIG. 57 Licit opium production in India, 2000–2021



Source: INCB, Narcotic Drugs 2021 (Vienna 2022, and previous years).

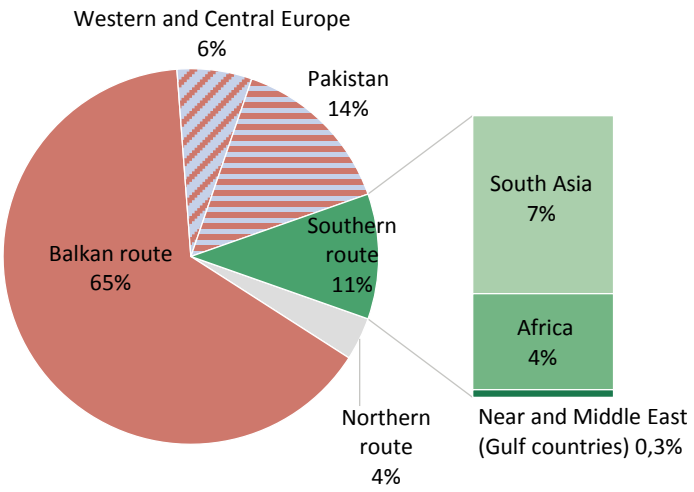
north-western states.[261] In the period 2020/2021, roughly 4,400 ha of illicitly cultivated opium poppy was eradicated,[262] which is almost the same area as the total area under licit opium poppy cultivation in India (4,941 ha in 2020 and 5,406 ha in 2021).[263]

Irrespective of opium production in India, most of the heroin found in South Asia in recent years appears to have originated primarily in South-West Asia, having been manufactured from opium produced in Afghanistan, the world's largest producer of the substance. Following two decades of increase, Afghanistan accounted for 86 per cent of global illicit opium production in 2021. Traffickers from Myanmar, which accounted for some 6 per cent of global illicit opium production in 2021, regularly supply some of the north-eastern states of India with heroin.[264]

The bulk of Afghan opiates continues to be trafficked to neighbouring countries and along the Balkan route to markets in Western and Central Europe. Recently, however, seizure data have suggested that trafficking in Afghan opiates has increased markedly along the southern route towards South Asia and Africa, to the extent that the total quantities of Afghanistan-related heroin and morphine seized along the southern route are now larger than those seized along the northern route, which mainly supplies markets in the Russian Federation, via Central Asia.

South Asia accounted for the majority of heroin and morphine seized on the southern route in most years over the last two decades and in each year since 2017. In 2021, about one third of the heroin and morphine seized on the southern route was seized in Africa, while two thirds were seized in South Asia. Although most of the heroin shipped to Africa has been for domestic consumption or re-export to Europe, some of it is now also heading to South Asia, thus reversing the traditional trafficking flows that saw, inter alia, shipments of heroin being transported from South-West Asia to Africa, via India.[265] Major African transit countries identified in relation to heroin trafficking to India have been South Africa, Uganda and Kenya, with trafficking mostly carried out by human carriers as well as in courier parcels. In several cases, this has involved the participation of Nigerian traffickers, who accounted for the majority of African traffickers arrested for drug trafficking in India in 2021, ahead of traffickers from Uganda and the United Republic of Tanzania.[266] Although it has increased in recent years, notably during the COVID-19 pandemic,[267] such trafficking via

FIG. 58 Distribution of Afghanistan-related heroin and morphine seizures in 2021



Source: UNODC calculations based on UNODC, responses to annual report questionnaire.

Africa still accounted for less than 5 per cent of all heroin seized in India in 2021.

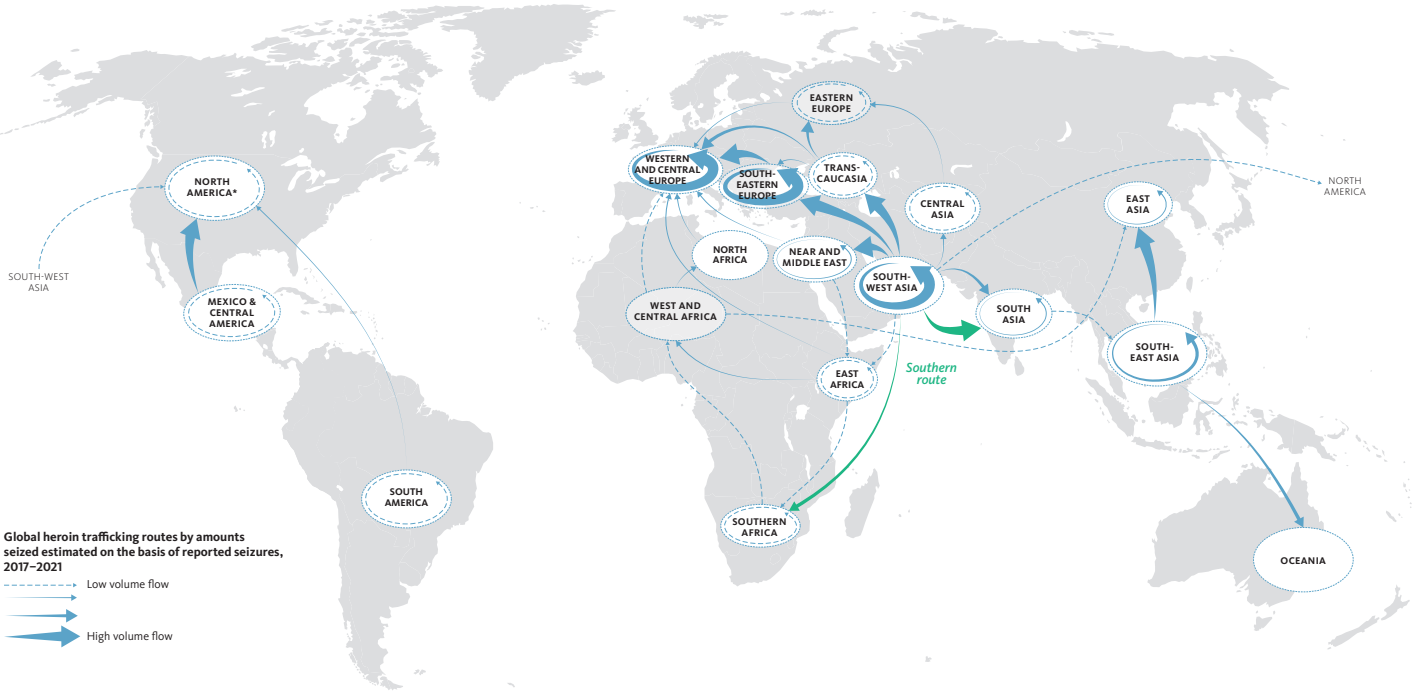
The bulk of the heroin found in South Asia continues to be shipped more directly from South-West Asia to South Asia. Official reports suggest that more than half of the heroin found in India in 2017 entered the country from Pakistan and Afghanistan (53 per cent), and just 0.4 per cent came from Myanmar (the origin of the remainder was unknown). According to the Indian authorities, the main trafficking route for heroin has traditionally been across the India-Pakistan border, notably through the State of Punjab and the union territory of Jammu and Kashmir, from where the heroin is then trafficked to other states across the country.[268] It seems, however, that this route has changed recently; in 2021, the Indian authorities identified the Islamic Republic of Iran as the primary country of departure for heroin shipments. The vast majority of that heroin entered India by sea, a mode of trafficking that has strongly increased in recent years.[269, 270]

The single largest interception of heroin by India (of close to 3 tons) was reported in September 2021, when that heroin was seized in two shipping containers at the seaport of Mundra in the State of Gujarat, the country's largest container hub.[271] The heroin originated in Kandahar, Afghanistan, and was routed through the port of Bandar Abbas (Islamic Republic of Iran) to the port of Mundra.[272] To a lesser extent, Pakistan and Afghanistan were still identified by the Indian authorities as major departure countries for heroin shipments, while neither Myanmar nor India itself were among the most significant ones in 2021.

Sri Lanka reported that most of the heroin arriving on its territory in 2019 and 2020 had transited through the Islamic Republic of Iran (68 per cent in 2019), and that a much smaller quantity had transited through Pakistan (11 per cent in 2019). The situation is less clear in Bangladesh, which reported that a small proportion of the heroin found on its market in 2019 had originated in Myanmar (5 per cent), while the vast majority was reported to have originated in India (95 per cent), although much of it might only have transited through India.

In line with opium production patterns in Asia, individual drug seizures show that most opium continues to be seized in South-West Asia and, to a lesser extent, in South-East Asia, while seizures in South Asia remain rather limited and are mostly restricted to India. Individual heroin seizures also show the dominance of South-West Asia, and to a lesser extent that of

MAP 26 Trafficking in heroin and morphine



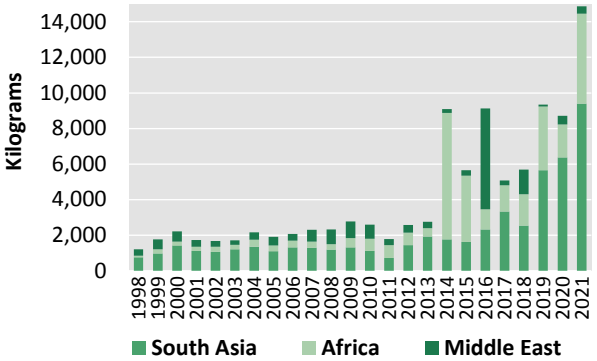
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Sources: UNODC.

Note: The size of the route is based on the total amount seized on that route, according to the information on trafficking routes provided by Member States in the annual report questionnaire, individual drug seizures and other official documents, over the 2017–2021 period. The routes are determined on the basis of reported country of departure/transit and destination in these sources. As such, they need to be considered as broadly indicative of existing trafficking routes while several secondary routes may not be reflected. Route arrows represent the direction of trafficking: origins of the arrows indicate either the area of departure or the one of last provenance, end points of arrows indicate either the area of consumption or the one of next destination of trafficking. Therefore, the trafficking origin may not reflect the country in which the substance was produced. Please see the Methodology section of this document.

** North America excluding Mexico.*

FIG. 59 Seizures of heroin and morphine along the southern route, 1998–2021



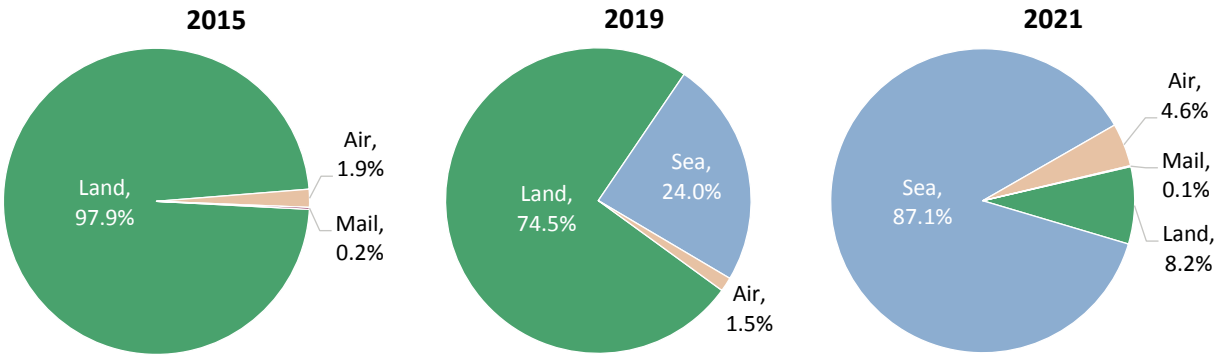
Source: UNODC, responses to annual report questionnaire.

South-East Asia. In this case, however, a clear increase in heroin seizures along the coast of north-western India and around Sri Lanka can be identified, reflecting the growing significance of maritime trafficking in heroin in South Asia in recent years.[273]

Supply, demand and demographic factors may explain the expansion of the opiate market in South Asia

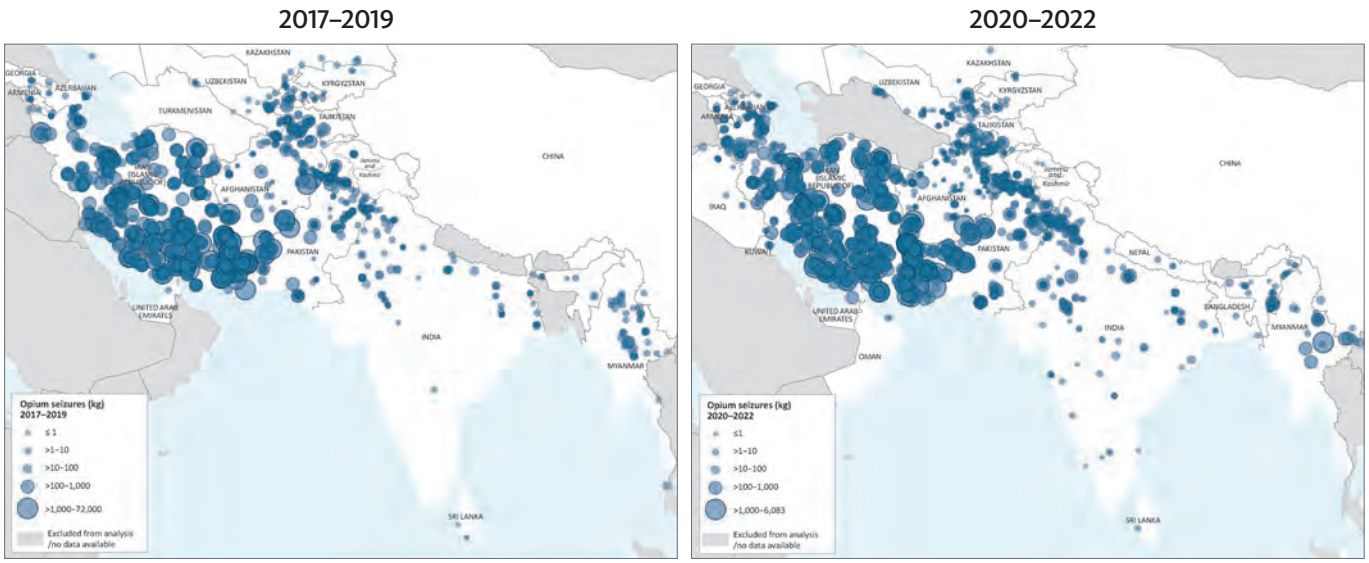
The expansion of opiate trafficking in South Asia may be the result of a combination of supply, demand and demographic factors. The sharp increase in opium production in Afghanistan over the past two decades may have led to an increase in the availability of opiates on

FIG. 60 Inbound trafficking in heroin as reported by the Indian authorities, 2015–2021



Source: UNODC, responses to annual report questionnaire.

MAP 27 Significant individual opium seizures in South Asia and neighbouring subregions



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

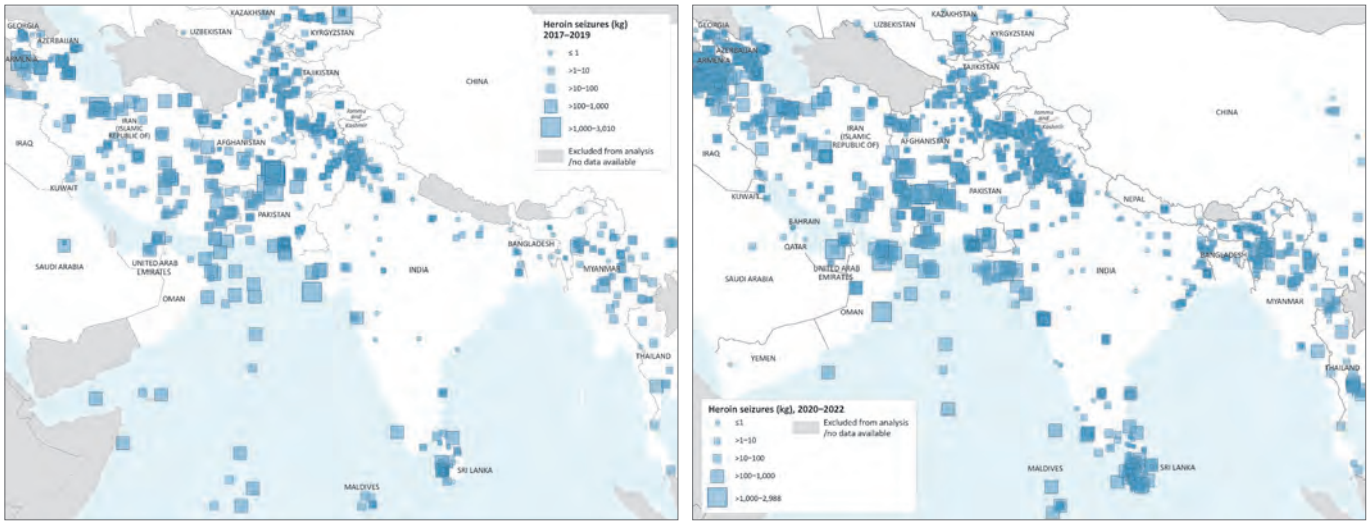
Source: UNODC, Drugs Monitoring Platform.

the market, while the expansion of the opiate supply towards South-Asia, in particular India, may have created an increase in demand.

The best estimates of the number of opiate users in South Asia show a clear increase over the past two decades. This is partly because of better data, partly because of population growth in the subregion and partly because of an actual increase in the prevalence of opiate use. In the absence of comparable survey data, qualitative information provided by Member States and subnational studies in the subregion, drug treatment data and seizure data all suggest an actual increase in opiate use in South Asia over the past two decades. The latest survey on substance use in India,

MAP 28 Significant individual heroin seizures in South Asia and neighbouring subregions

2017–2019 2020–2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Source: UNODC, Drugs Monitoring Platform.

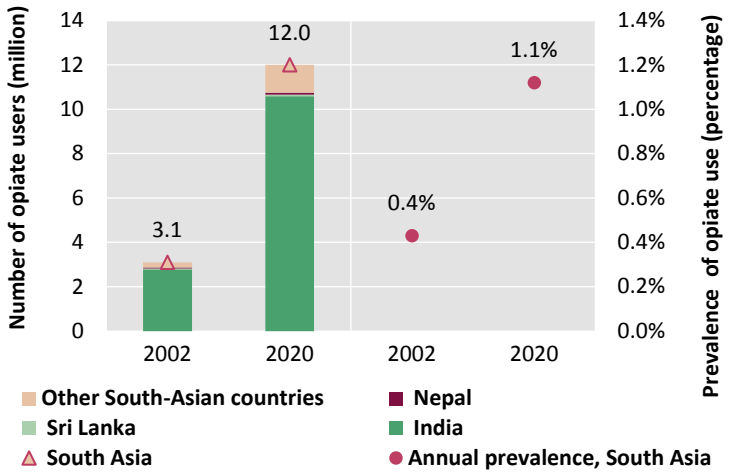
carried out in 2018, attributed the higher estimates to both an increase in the use of opioids in the country and to improvements in the methodology for estimating drug use.[274]

Factors affecting drug use in South Asia are, in general, not that different from those reported in other regions, and include curiosity, peer pressure, pain reduction, anxiety and work efficiency.[275] Having said that, demographic dynamics may be specifically affecting South Asia, not least the increasing rate of urbanization. In India, for example, the use of opium is still primarily a rural phenomenon,[276] while the use of heroin and non-medical use of pharmaceutical opioids is more of an urban phenomenon.[277] The urban population of India has grown substantially over the past three decades, its share of the country's total population having increased from roughly a quarter to more than a third by 2021.[278] This phenomenon may have contributed to the overall increase in the use of heroin and non-medical use of pharmaceutical opioids in the country.

At 2.1 per cent, India had the highest prevalence of opioid use in South Asia in 2018.[279] Opioid use in the country is still mainly a male phenomenon; more than 95 per cent of all opioid users in India are men, and the prevalence of use among men is 4 per cent, compared with 0.2 per cent among women.[280] Opiate use, especially the use of heroin, is of particular concern in Punjab, a state that has been strongly affected by the inflow of Afghan heroin through Pakistan.[281]

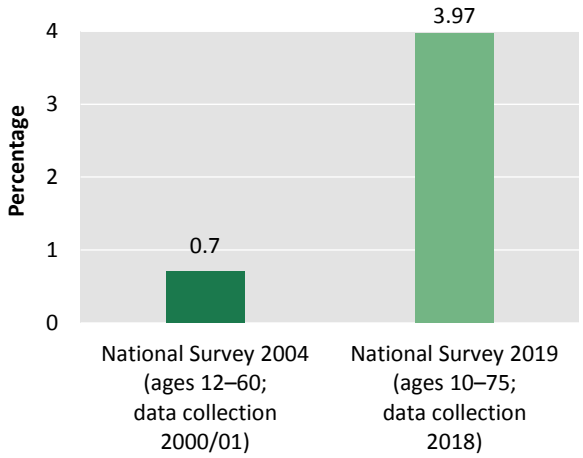
Detailed analysis of opioid use in India reveals that rates vary widely within the country. Among the population aged 10–75, overall rates of opioid use range between 0.2 and 25.2 per cent, and rates of opioid use disorders between 0.1 and 6.9 per cent. The highest prevalence of people with opioid use disorders is found in the eastern parts of the country, while the largest numbers of people with opioid use disorders are found in north-western India (Uttar Pradesh, Punjab and Haryana) as well as in some of the central-western states (Maharashtra and Madhya Pradesh). Traditionally, the prevalence of opiate use was high in the country's north-eastern and north-western states;[282] however, the high level now also found in Maharashtra seems to be linked to the increasing quantities of opiates being trafficked to India from South-West Asia by sea.

FIG. 61 Prevalence of opiate use in South Asia, 2002–2020



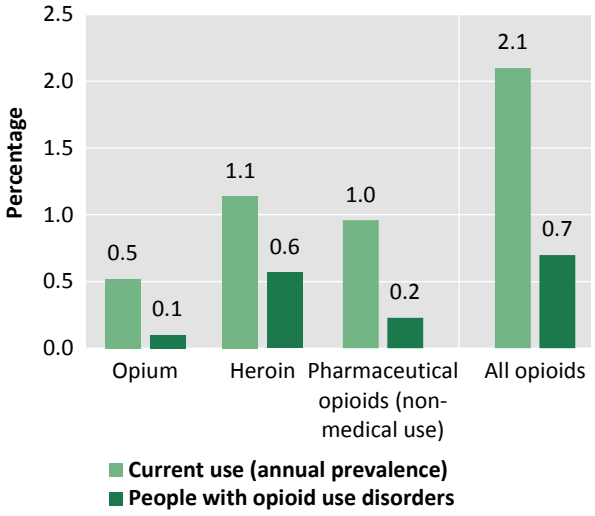
Source: UNODC calculation for the World Drug Report, based on responses to the annual report questionnaire.

FIG. 62 Prevalence of opioid use among men in India, 2000/01 and 2018



Source: Ministry of Social Justice and Empowerment, Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

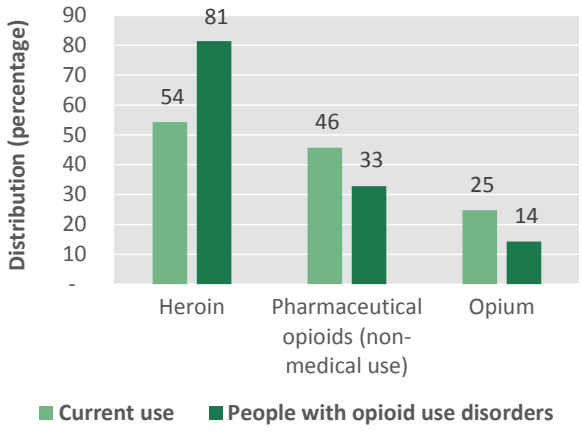
FIG. 63 Annual prevalence of opioid use and prevalence of opioid use disorders among people aged 10–75 in India, 2018



Source: Ministry of Social Justice and Empowerment, Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

Note: The survey defines people with opioid use disorders as problem opioid users.

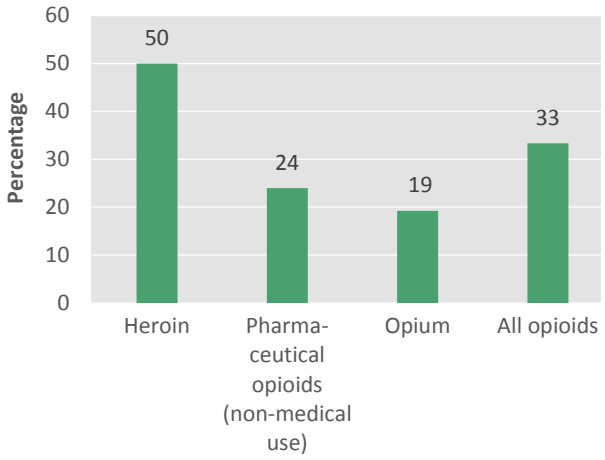
FIG. 64 Type of opioid used by people who used an opioid in the last year (current use) and people with opioid use disorders in India, 2018



Source: Ministry of Social Justice and Empowerment, Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

Note: A person may use more than one type of opioid. The survey defines people with opioid use disorders as problem opioid users.

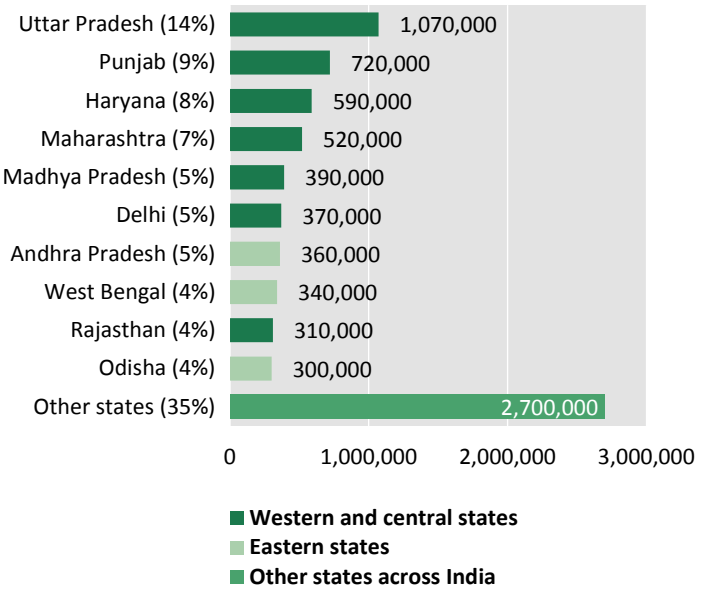
FIG. 65 Proportion of people with opioid use disorders among opioid users in India, 2018



Source: Ministry of Social Justice and Empowerment, Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

Note: The survey defines people with opioid use disorders as problem opioid users.

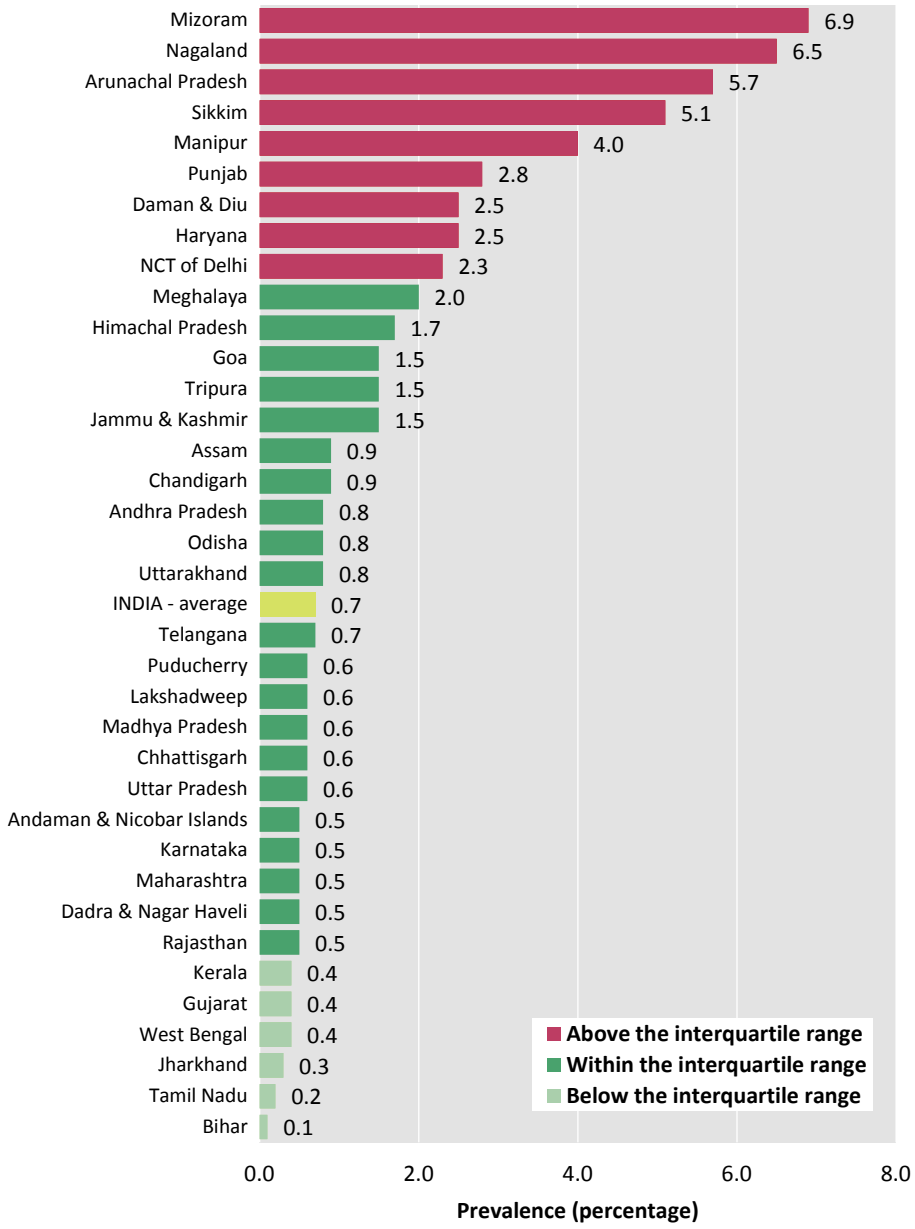
FIG. 66 Number of people in India with opioid use disorders (people who need help for opioid-related problems), by state, 2018



Source: Ministry of Social Justice and Empowerment Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

Note: The overall number of problem opioid users in India is 7.7 million. The top 10 states account for 65 per cent of all problem opioid users in India..

FIG. 67 Prevalence of opioid use disorders (people aged 10–75 who need help for opioid-related problems), by state of India, 2018 (expressed as a percentage of the population aged 10–75)



Source: Ministry of Social Justice and Empowerment, Government of India, Magnitude of Substance Use in India 2019 (New Delhi, February 2019).

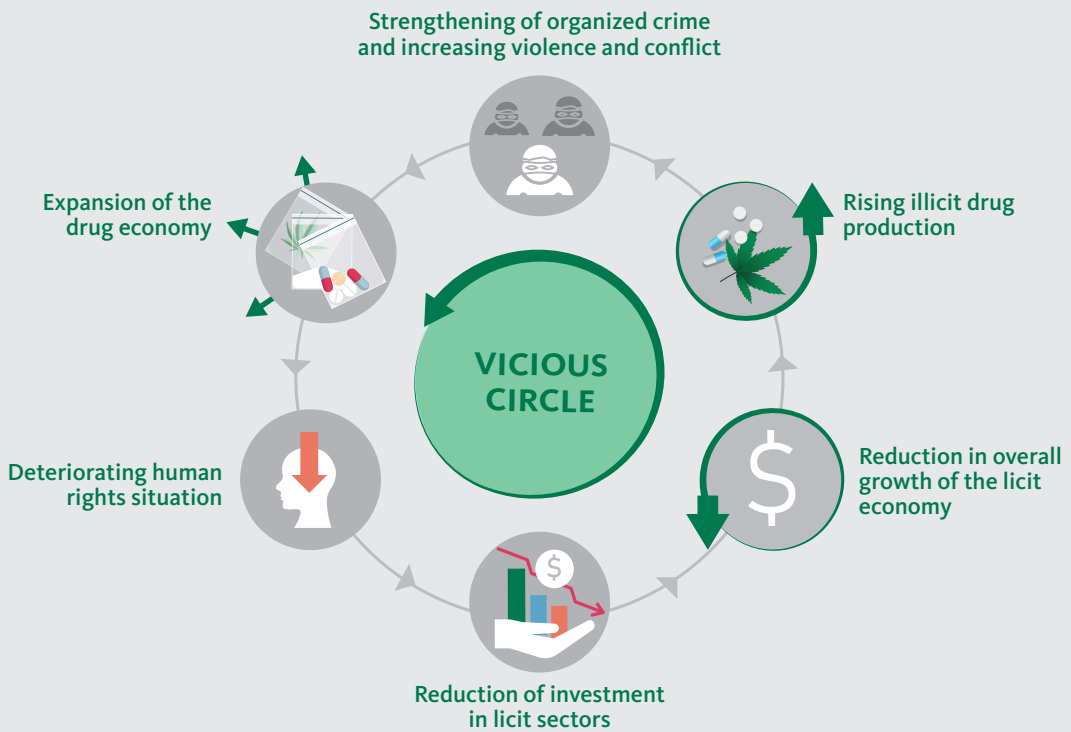
Conflicts and drug supply: Ukraine, Yemen and the Sahel

As noted in the *World Drug Report 2022*, "illicit drug economies can flourish in situations of conflict and weak rule of law, and can, in turn, prolong or fuel conflict". The relationship between drugs and conflict has been evidenced by the direct involvement of parties to a conflict in the drug economy or in its "taxation". When conflicts have erupted in areas with sizeable drug production or trafficking activities, the parties have exploited them. There are also cases where conflicts have provided a fertile environment for the substantial manufacture of synthetic drugs, particularly when the conflict has developed close to a large consumer market for the drugs.[283, 284] In some conflict areas, the drug economy and instability are linked through a vicious cycle in which weak rule of law facilitates the expansion of the drug economy, which can, in turn, provide financial resources for maintaining or expanding the conflict.

Sometimes, however, conflict and instability can disrupt drug production and trafficking, as was seen during the civil war in the former Yugoslavia in the 1990s, when trafficking routes shifted from the western Balkan route to the eastern Balkan route (through Bulgaria, Romania and Hungary).[285, 286, 287, 288]

That said, there have been a number of conflicts during which the drug economy has flourished; some were described in the *World Drug Report 2017* and the *World Drug Report 2022*, which dealt with the links between drugs and instability in a number of geographical areas, including Afghanistan, Myanmar, Colombia, Peru, Central America, Mexico, the Syrian Arab Republic, Ukraine and the Sahel. Moreover, a recent rapid assessment by UNODC details the drug trafficking flows – primarily of cocaine and cannabis – transiting Haiti and helping

THE VICIOUS CIRCLE OF CONFLICT AND THE DRUG ECONOMY



to fuel spiralling gang violence and a profound security crisis.[289]

In addition to providing an update on the ongoing armed conflict in Ukraine and the drug situation in the Sahel, the present section examines one conflict area not analysed previously: Yemen.

The links between drugs and instability in Haiti and the Sahel are examples of drug markets that fuel and have been fuelled by the violence and the governance vacuum that characterize conflict situations. In Ukraine, the armed conflict seems to have disrupted existing and emerging trafficking routes for heroin and cocaine, although there are signs that it could trigger a further expansion of the manufacture of and trafficking in synthetic drugs that had emerged in the country shortly before the conflict. In the case of Yemen, the information is too patchy to draw any conclusions; however, sporadic seizure data suggest that some drugs may transit through Yemen. Nevertheless, the links between the conflict and these drug dynamics are still unclear.

DATA LIMITATIONS IN CONFLICT SETTINGS

Data on drug markets in conflict situations are typically very weak, and existing information is based mostly on seizures, which may reflect interdiction capacity more than actual drug supply. Analysing seizures in countries in the same region as the conflict, particularly countries that neighbour the conflict area, can help to overcome this limitation partially, since significant changes observed across all relevant countries are likely to indicate actual changes in the market.

Ukraine: displacement of plant-based drug trafficking routes and the threat of synthetic drugs

The ongoing armed conflict in Ukraine has had an impact on drug trafficking. Seizures of heroin and cocaine in 2021 indicated that those substances were increasingly being trafficked through Ukraine before the onset of the conflict, albeit at a relatively low level. However, the armed conflict seems to have disrupted this drug trafficking route. The quantity of heroin seized in Ukraine decreased substantially, by more than 90 per cent from 2021 to 2022, as did the identification of Ukraine by other States as a destination, transit or departure country for heroin; similar declines were also reported in the case of cocaine.

The situation appears to be different in respect of the synthetic drug market, which does not seem to have been disrupted by the armed conflict. Prior to 2022, the internal market for synthetic drugs was expanding, as shown by the sharp increase in seizures of synthetic cathinones and amphetamine in 2021, and by the increase in the use of synthetic drugs.[290, 291, 292] During the armed conflict, the quantities of a number of synthetic cathinones seized have increased sharply in Ukraine, most notably *alpha*-PVP (rising sixty-sevenfold from 2021 to 2022), mephedrone (rising sevenfold) and synthetic cannabinoids (rising fourfold).[293] Seizures in countries neighbouring Ukraine also suggest that the market for synthetic drugs is expanding regionally, providing fertile ground for the possible expansion of the manufacture of and trafficking in these drugs in Ukraine.

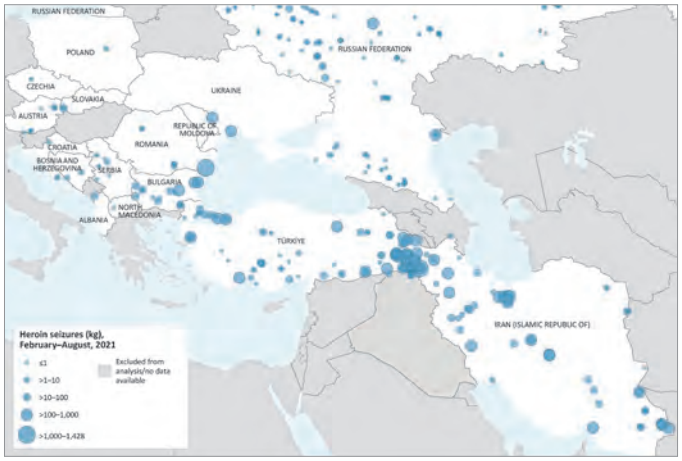
If the armed conflict creates prolonged governance gaps in certain areas, the internal and regional demand for synthetic drugs[294] could facilitate the development of manufacturing sites, as seen in other conflict areas.[295] Even prior to the ongoing conflict, the number of dismantled clandestine laboratories was growing in Ukraine. In fact, in both 2020 and 2021, most of the amphetamine laboratories dismantled in Europe were in Ukraine (67 and 69, respectively, up from five in 2019), in addition to a smaller number of laboratories manufacturing methamphetamine (five dismantled in 2021, up from three in 2020 and one in 2019) and mephedrone (two dismantled in 2020).

Yemen, a country long blighted by civil war and exposed to trafficking in multiple drugs

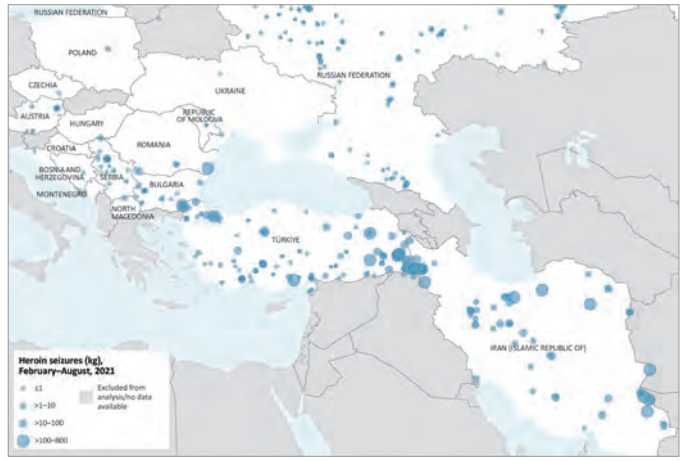
Although levels of violence did not change much in the period 2020—2022 and actually declined in 2022 owing to a temporary truce mediated by the United

MAP 29 Significant individual seizures of heroin in Ukraine and countries in its vicinity, 2021–2022

February 2021–August 2021



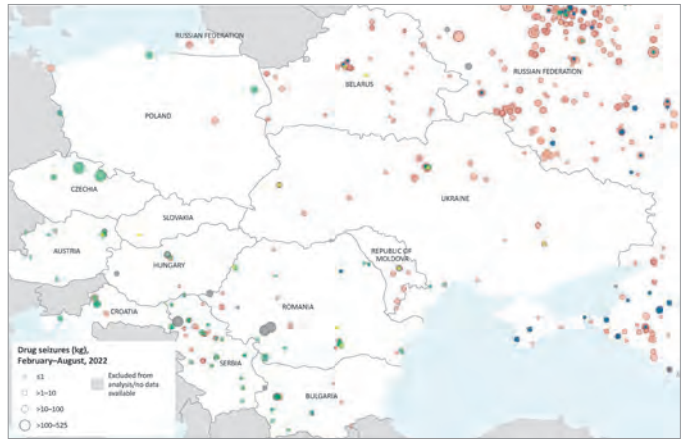
February 2022–August 2022



MAP 30 Significant individual seizures of drugs other than heroin in Ukraine and its vicinity, 2021–2022

February 2021–August 2021

February 2022–August 2022



Cocaine-type · Opioids excluding opiates · Synthetic drugs and New Psychoactive Substances · Hallucinogens · Other drugs/substances

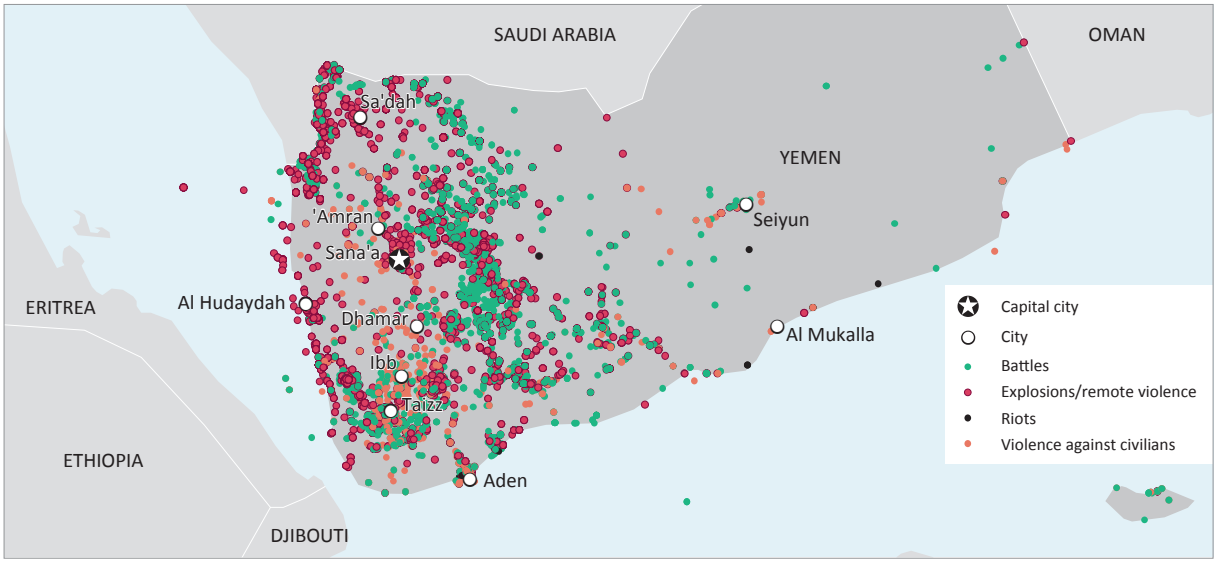
The boundaries and names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations.

Source: UNODC, Drugs Monitoring Platform.

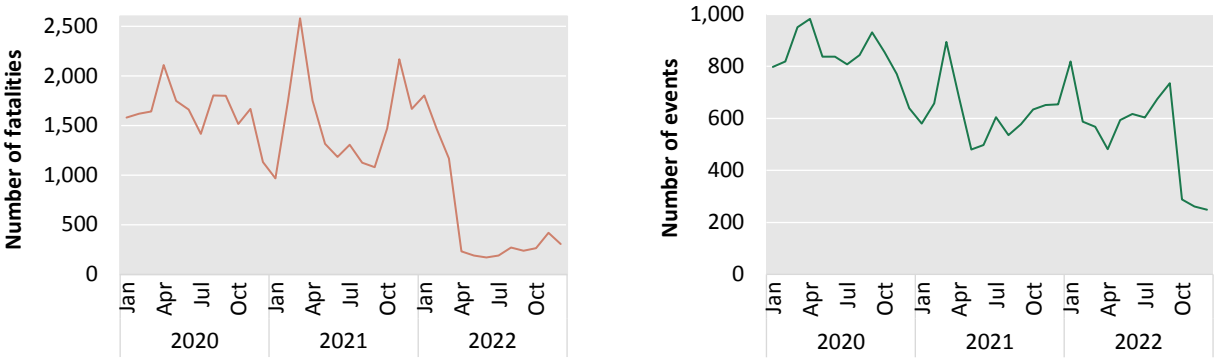
Nations,[296] Yemen is among the countries that suffered the largest number of incidents of political violence worldwide in 2022. A broader index of "conflict severity", based on four indicators (fatality rate, violence targeting civilians, subnational spread of conflict and fragmentation of violent non-State groups), shows Yemen to be one of eight countries worldwide suffering from "extreme conflict severity", a position Yemen shares in the Near and Middle East only with the Syrian Arab Republic.[297]

The cultivation and consumption of khat have been widespread in Yemen for centuries. Khat is not under international control, although a number of countries (excluding Yemen) have placed it under national control.[298] About 50 per cent of men (42.7—57.1 per cent) and 1.3 per cent of women (0.5—2.6 per cent) are estimated to be current users of khat in Yemen.[299] Moreover, according to media sources, the authorities estimate that 15 to 20 per cent of children under the age of 12 chew the drug.[300] The media has reported

FIG. 68 Development and concentration of political violence in Yemen, 2020–2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations

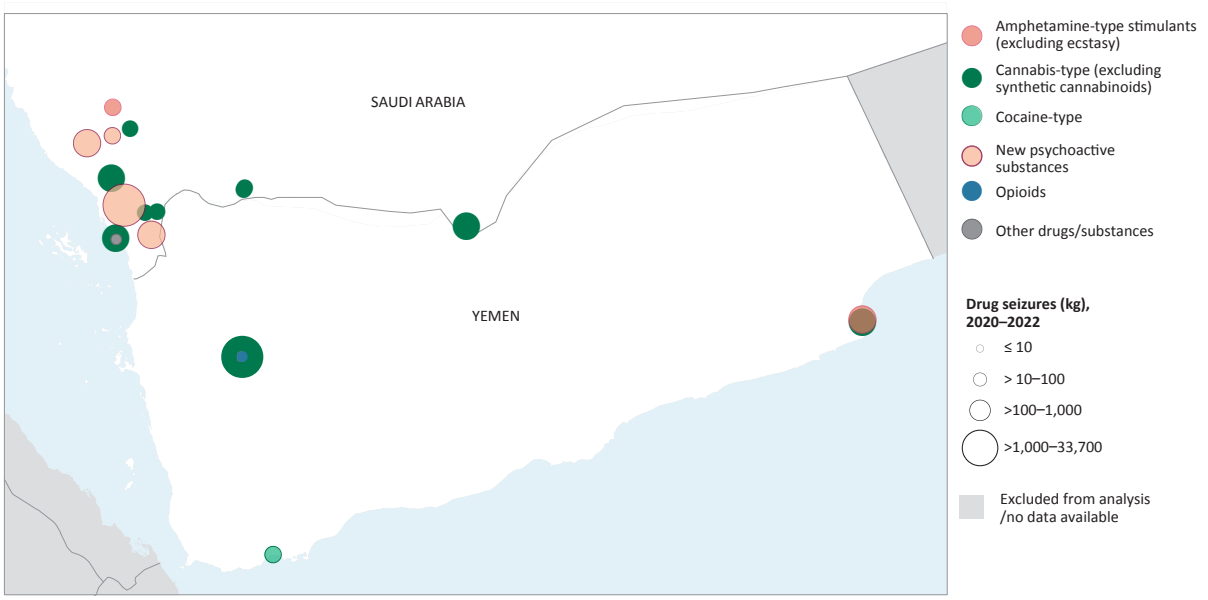


Source: Armed Conflict Location & Event Data Project (ACLED); www.acleddata.com, data from 01/01/2020 to 31/12/2022; OpenStreetMap contributors

that the current civil war has increased the use of khat,[301] most notably among child soldiers, who chew the drug in order to remain alert on the battlefield.[302, 303] Violence in Yemen in recent years[304] appears to have erupted in areas where the large-scale cultivation and consumption of khat have been reported.[305] Yemeni farmers seem to cultivate khat primarily for domestic consumption,[306] although some of it is also smuggled to Saudi Arabia, particularly to its south-western provinces bordering Yemen.[307, 308] In the past, some khat was also smuggled by air to countries in North America,[309, 310] Europe,[311, 312] South Asia (India) and East and South-East Asia (China, Malaysia, Thailand and the Republic of Korea);[313] however, no such shipments have been reported since 2014,[314, 315] i.e. after the outbreak of civil war in the country.[316]

Beyond the well-documented cultivation and use of khat, the limited information available suggests that Yemen is affected by trafficking in a wide range of drugs.[317, 318] Seizure cases reported in recent years indicate ongoing trafficking in cannabis and sporadic

MAP 31 Significant individual seizures of drugs in Yemen, 2020–2022



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations

Source: UNODC, Drugs Monitoring Platform.

trafficking in methamphetamine, "captagon", heroin, cocaine and mephedrone as follows:

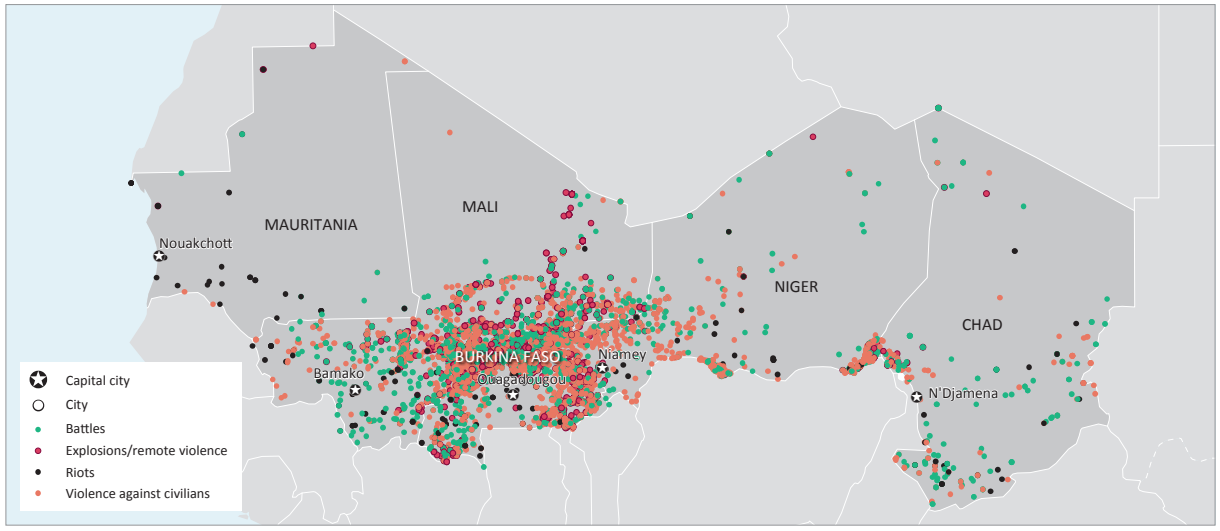
- Cannabis resin originating in Afghanistan and departing from Pakistan[319]
- Methamphetamine likely originating in Afghanistan[320] and departing from South-West Asia, notably the Islamic Republic of Iran[321] and Pakistan[322]
- "Captagon" originating in the Levant[323] and departing from Jordan[324]
- Heroin originating in Afghanistan and departing from Pakistan or the Islamic Republic of Iran[325]
- Cocaine departing from Brazil[326]
- Mephedrone departing from the Russian Federation[327]

Although seizure data provide some information on the routes along which drugs are transported to reach Yemen, they do not clarify the extent to which such shipments are destined for the local market or for onward trafficking to neighbouring countries (e.g. Saudi Arabia) or overseas markets (including Europe).[328] Such drug trafficking is not a new phenomenon: in the period 2007—2012, significant quantities of cannabis resin (26 tons in 2008) and "captagon" (2.3 tons in 2008) and smaller quantities of heroin (189 kg in 2007) and cocaine (16 kg in 2012) were seized in Yemen.[329]

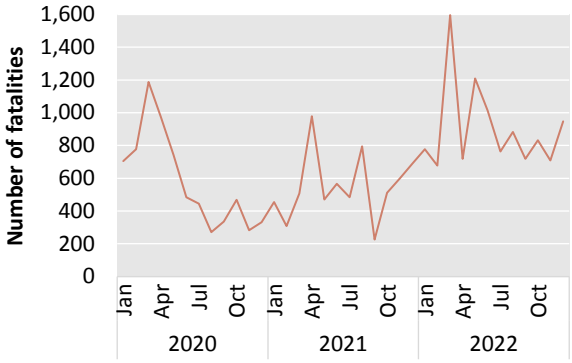
Drug trafficking in the Sahel at the intersection between criminal groups and non-State armed groups

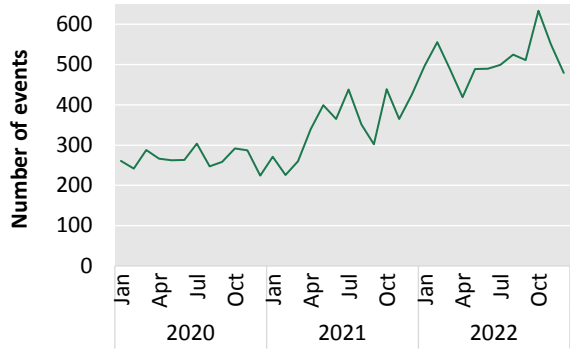
In recent years, the Sahel countries of Mauritania, Mali, Burkina Faso, the Niger and Chad have suffered not only from drought and poverty affecting large swathes of their populations, but also from political violence and related conflicts, as well as from drug trafficking, which contributes to fuelling the various conflicts in the region. The monitoring of fatalities and violent incidents shows that there was an upward trend in both over the period 2020–2022, from an estimated 7,000 fatalities in 2020 to more than 10,000 in 2022 and from around 2,300 violent incidents to 3,600 over the same period. Although violence is widespread in the Sahel, the only country in the region identified as

FIG. 69 Development and concentration of political violence in five Sahel countries (Mauritania, Mali, Burkina Faso, the Niger and Chad), 2020–2022



The boundaries and names shown and the designations used on this map do not imply ocial endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.



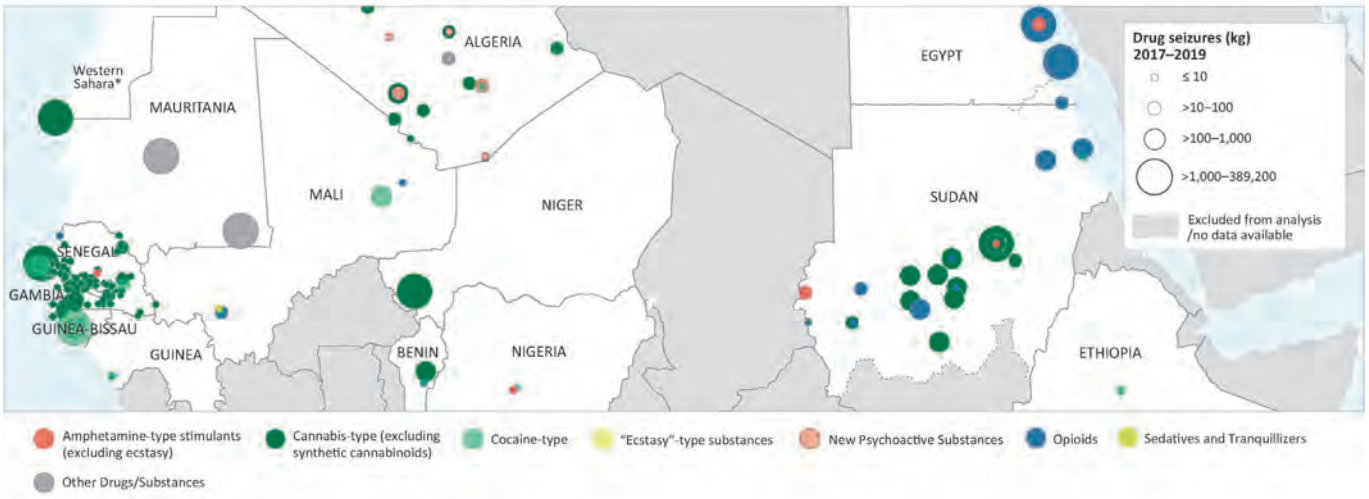


Source: Armed Conflict Location & Event Data Project (ACLED); www.acleddata.com, data from 01/01/2020 to 31/12/2022.

having "extreme severity of conflict" was Mali in 2022.[330] Various non-State armed groups have been active in the Sahel for some time, including jihadist groups asserting allegiance to Al-Qaida and Da'esh; these actors utilize the diverse range of income sources usually available to insurgents, including, to at least some degree, the illicit drug trade.[331, 332]

In most countries in the Sahel, drug trafficking is organized by criminal groups that are profit-oriented. At the same time, drug trafficking may also finance various insurgency groups operating in these countries, through the payment of "taxes" and other "duties" in exchange for "protection" or safe passage through rebel-controlled areas. The Panel of Experts established pursuant to resolution 2374 (2017) on Mali has underlined how armed groups with a variety of allegiances have been involved in providing transportation for drug shipments,[333] illustrating that illicit markets offer potential financial resources to those who are economically reliant on continuing warfare; drugs were shown to be trafficked through northern Mali on their way to Libya, providing financing to non-State armed groups. The conflict between non-State armed groups

MAP 32 Significant individual drug seizures in the Sahel and its vicinity, 2018–2022



The boundaries and names shown and the designations used on this map do not imply ocial endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

**Non-Self-Governing territory.*

Source: UNODC, Drugs Monitoring Platform.

operating drug convoys and other competing groups has led to frequent clashes, resulting in numerous deaths and injuries among the different groups.[334]

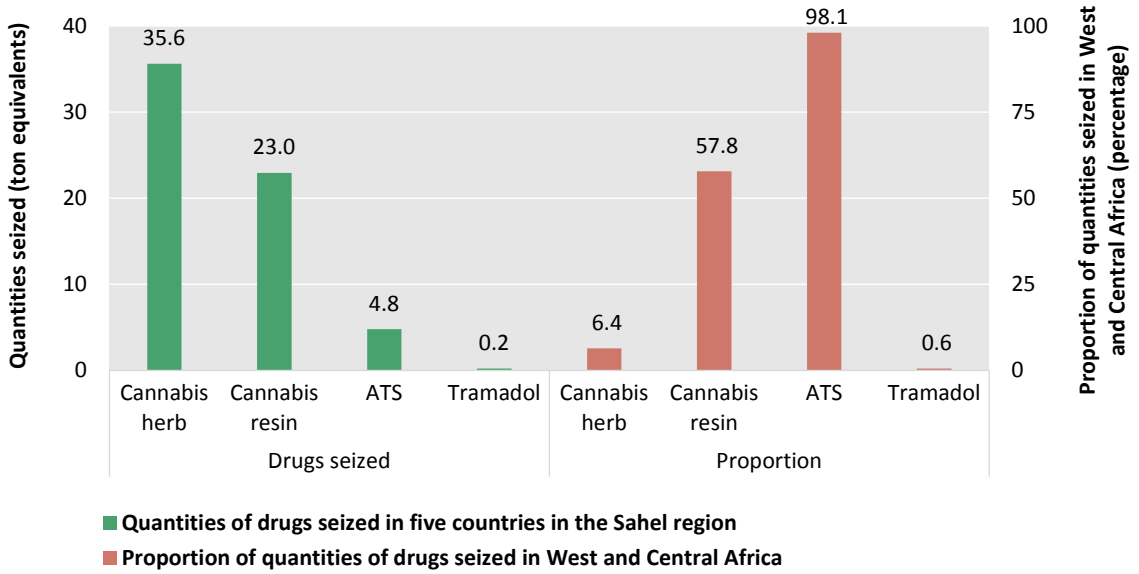
Although there have been a number of media reports about the connections between terrorist groups and drug trafficking in Africa, very few case studies seem to reveal real evidence of the direct involvement of such groups in drug trafficking.[335] Nevertheless, a few well-documented cases do exist, often linked to Mali. For example, in March 2019 a shipment of 789 kg of cocaine concealed in a truck loaded with frozen fish was seized in Guinea-Bissau;[336] the shipment belonged to a Malian who, according to the Panel of Experts on Mali, [337] was associated with the network of a United Nations-sanctioned supporter of the terrorist group Al Mourabitoun.[338]

However, given the weak institutional infrastructure, including that of law enforcement, in many countries in the Sahel, individual drug seizures tend to be a poor indicator of underlying drug trafficking activities. The overall picture is also influenced by the reporting or non-reporting of such seizures by individual countries in specific years, rendering attempts to identify underlying drug trafficking trends on the basis of seizures difficult. Individual drug seizures in the last five years point to the wide availability of cannabis (herb and, to a lesser extent, resin) across the Sahel and to trafficking in other drugs, most notably tramadol for non-medical use, within the region. Cocaine, typically smuggled from South America to ports in West Africa, also finds its way to the Sahel, where it is trafficked northward to North Africa, with its final destinations likely to be in Western Europe and the Middle East.[339] Trafficking in amphetamine, in contrast, seems to be more of a local issue.[340]

In terms of drug seizures made in the Sahel countries of Mauritania, Mali, Burkina Faso, the Niger and Chad, what is most striking is the increase in the quantity of cocaine seized, from on average of 13 kg per year in the period 2015–2020 to larger amounts in recent years, including a few seizure cases totaling around 860 kg in 2022 with the bulk reported by Niger, Burkina Faso and Mali. These seizures are probably only the tip of the iceberg of far larger undetected trafficking flows across the region.

Cannabis herb is the most seized drug in the five countries in the Sahel region analysed in this section. Of the record 36 tons reported as having been seized

FIG. 70 Drug seizures in five Sahel countries (Mauritania, Mali, Burkina Faso, the Niger and Chad) and the proportion they represent of overall quantities of drugs seized in West and Central Africa, 2021



Source: UNODC, responses to the annual report questionnaire.

in 2021 (up from an average of 4 tons per year in the period 2015–2020), the largest quantities were intercepted in Mali (18 tons), Burkina Faso (12 tons) and the Niger (5 tons); much of this cannabis herb seems to have been intended for local consumption. The next most seized drug is cannabis resin, with 23 tons seized in 2021 – far more than in previous years. Over 70 per cent of the cannabis resin seized was reported by the Niger (17 tons), followed by Mali (6 tons). The origin of the cannabis resin trafficked along routes in the Sahel is typically Morocco, and its final destinations are frequently other countries in North Africa, and sometimes countries in the Middle East and Europe.[341] In several instances, large shipments of cannabis resin transiting from Morocco to Libya have resulted in deadly clashes between groups in the region, potentially constituting ceasefire violations.[342]

Seizures of ATS (5 tons in 2021) in the five countries seem to be geographically concentrated in Burkina Faso, which accounted for 94 per cent of the quantity seized in 2021, followed by the Niger (3 per cent) and Mali (3 per cent). ATS seized in the period 2017–2021 were mainly *médicaments de la rue*, i.e. smuggled substances and/or falsified medicines with some stimulant properties,[343] which seem to be mostly used in the domestic market.[344] Amphetamine accounted for 15 per cent of ATS seized in that period and methamphetamine for 11 per cent.[345]

Although the non-medical use of tramadol is widespread in West and Central Africa, seizures of the substance in the five countries remain small. At 195 kg in 2021, the total quantity seized was the equivalent of less than 1 per cent of all tramadol seized in the subregion. This was a larger amount than in 2019 and 2020, but smaller than the average amount in the period 2015–2020 (389 kg) and far smaller than the peak reported in 2014 (2.6 tons). The largest quantities of tramadol seized in the period 2015–2021 were reported by the Niger (89 per cent of the total seized in the five countries), followed, at far lower levels, by Chad (10 per cent) and Mali (1 per cent). However, in contrast to trafficking in other drugs, there appears to be little evidence of the involvement of armed groups in trafficking in tramadol, or in trafficking in medical products more generally, in Sahel countries.[346]

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GLOSSARY

amphetamine-type stimulants — a group of substances composed of synthetic stimulants controlled under the Convention on Psychotropic Substances of 1971, which includes amphetamine, methamphetamine, methcathinone and the "ecstasy"-group substances (3,4-methylenedioxymethamphetamine (MDMA) and its analogues).

amphetamines — a group of amphetamine-type stimulants that includes amphetamine and methamphetamine.

annual prevalence — the total number of people of a given age range who have used a given drug at least once in the past year, divided by the number of people of the given age range, and expressed as a percentage.

coca paste (or coca base) — an extract of the leaves of the coca bush. Purification of coca paste yields cocaine (base and hydrochloride).

"crack" cocaine — cocaine base obtained from cocaine hydrochloride through conversion processes to make it suitable for smoking.

cocaine salt — cocaine hydrochloride.

drug use — use of controlled psychoactive substances for non-medical and non-scientific purposes, unless otherwise specified.

fentanyls — fentanyl and its analogues.

new psychoactive substances — substances of abuse, either in a pure form or a preparation, that are not controlled under the Single Convention on Narcotic Drugs of 1961 or the 1971 Convention, but that may pose a public health threat. In this context, the term "new" does not necessarily refer to new inventions but to substances that have recently become available.

opiates — a subset of opioids comprising the various products derived from the opium poppy plant, including opium, morphine and heroin.

opioids — a generic term that refers both to opiates and their synthetic analogues (mainly prescription or pharmaceutical opioids) and compounds synthesized in the body.

problem drug users — people who engage in the high-risk consumption of drugs. For example, people who inject drugs, people who use drugs on a daily basis and/or people diagnosed with drug use disorders (harmful use or drug dependence), based on clinical criteria as contained in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition) of the American Psychiatric Association, or the *International Classification of Diseases and Related Health Problems* (tenth revision) of WHO.

people who suffer from drug use disorders/people with drug use disorders — a subset of people who use drugs. Harmful use of substances and dependence are features of drug use disorders. People with drug use disorders need treatment, health and social care and rehabilitation.

harmful use of substances — defined in the *International Statistical Classification of Diseases and Related Health Problems* (tenth revision) as a pattern of use that causes damage to physical or mental health.

dependence — defined in the *International Statistical Classification of Diseases and Related Health Problems* (tenth revision) as a cluster of physiological, behavioural and cognitive phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state.

substance or drug use disorders — referred to in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition) as patterns of symptoms resulting from the repeated use of a substance despite experiencing problems or impairment in daily life as a result of using substances. Depending on the number of symptoms identified, substance use disorder may be mild, moderate or severe.

prevention of drug use and treatment of drug use disorders — the aim of "prevention of drug use" is to prevent or delay the initiation of drug use, as well as the transition to drug use disorders. Once a person develops a drug use disorder, treatment, care and rehabilitation are needed.

REGIONAL GROUPINGS

The *World Drug Report* uses a number of regional and subregional designations. These are not official designations, and are defined as follows:

AFRICA

- East Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania and Mayotte
- North Africa: Algeria, Egypt, Libya, Morocco, Sudan and Tunisia
- Southern Africa: Angola, Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe and Reunion
- West and Central Africa: Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo and Saint Helena

AMERICAS

- Caribbean: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Anguilla, Aruba, Bonaire, Netherlands (Kingdom of the)[1], British Virgin Islands, Cayman Islands, Curaçao, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saba, Netherlands (Kingdom of the), Sint Eustatius, Netherlands (Kingdom of the), Sint Maarten, Turks and Caicos Islands and United States Virgin Islands
- Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama
- North America: Canada, Mexico, United States of America, Bermuda, Greenland and Saint-Pierre and Miquelon
- South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of) and Falkland Islands (Malvinas)

ASIA

- Central Asia and Transcaucasia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan
- East and South-East Asia: Brunei Darussalam, Cambodia, China, Democratic People's Republic of Korea, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Timor-Leste, Viet Nam, Hong Kong, China, Macao, China, and Taiwan Province of China
- South-West Asia: Afghanistan, Iran (Islamic Republic of) and Pakistan
- Near and Middle East: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen and State of Palestine
- South Asia: Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka

EUROPE

- Eastern Europe: Belarus, Republic of Moldova, Russian Federation and Ukraine
- South-Eastern Europe: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro,

1 Since 3 March 2023, "Netherlands (Kingdom of the)" has replaced "Netherlands (the)" as the short name used in the United Nations.

North Macedonia, Romania, Serbia, Türkiye and Kosovo[2]

- Western and Central Europe: Andorra, Austria, Belgium, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands (Kingdom of the), Norway, Poland, Portugal, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, Faroe Islands, Gibraltar and Holy See

OCEANIA

- Australia and New Zealand: Australia and New Zealand
- Polynesia: Cook Islands, Niue, Samoa, Tonga, Tuvalu, French Polynesia, Tokelau and Wallis and Futuna Islands
- Melanesia: Fiji, Papua New Guinea, Solomon Islands, Vanuatu and New Caledonia
- Micronesia: Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, Palau, Guam and Northern Mariana Islands

2 References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

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UNODC Research

For the first time since its conception, this year the *World Drug Report* presents the latest global, regional and subregional estimates of and trends in drug demand and supply in a user-friendly, interactive online format. The new online segment is designed to both enhance and simplify access to the wealth of information provided in the report by presenting the data in the form of succinct key findings supported by interactive graphs, infographics and maps.

While Booklet 1 takes the form of an executive summary based on analysis of the key findings of the online segment and the thematic booklet 2, the Special points of interest offer a framework for the main takeaways and the conclusions and policy implications that can be drawn from them. In addition to providing an in-depth analysis of key developments and emerging trends in selected drug markets, including in countries currently experiencing conflict, booklet 2 focuses on contemporary issues related to drugs. The booklet opens with a look at the challenges posed to law enforcement by synthetic drugs, both in terms of their increasing potency, adaptability and ease of manufacture and their shorter supply chains, reduced risk and lower production costs compared with drugs of natural origin. Other law enforcement challenges are considered in the context of the increasing use of social media for buying and selling drugs online. Booklet 2 also examines approaches to regulating the medical cannabis market in different countries and assesses recent developments surrounding the therapeutic, spiritual and non-medical use of substances known as "psychedelics". The remainder of the booklet focuses on issues related to drugs in specific contexts, including the Amazon Basin, where the convergence of drug crime and crimes that affect the environment poses a threat to natural and human ecosystems. The risk factors for and vulnerability to substance use disorders among forcibly displaced populations are also discussed in the booklet, and the interim outcomes of innovations and modifications of services for people who use drugs during the COVID-19 pandemic are summarized.

The *World Drug Report 2023* is aimed not only at fostering greater international cooperation to counter the impact of the world drug problem on health, governance and security, but also at assisting Member States in anticipating and addressing threats posed by drug markets and mitigating their consequences.

The *World Drug Report 2023* is published on the UNODC website:
https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2023.html

The online segment is published on the UNODC website:
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