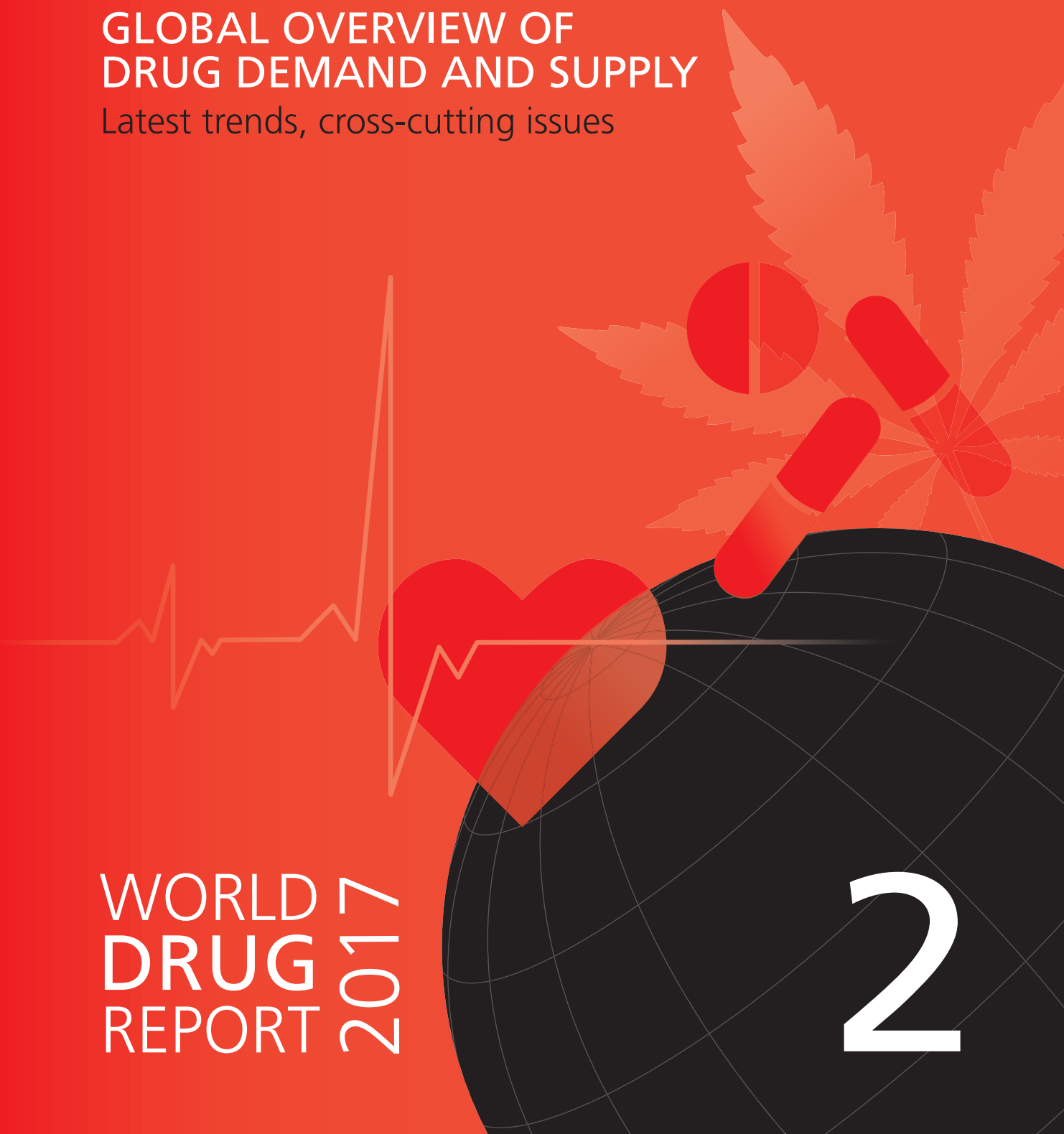
UNODC
United Nations Office on Drugs and Crime

UNODC Research

GLOBAL OVERVIEW OF DRUG DEMAND AND SUPPLY

Latest trends, cross-cutting issues



WORLD DRUG REPORT 2017

2

This booklet constitutes the second part of the *World Drug Report 2017.*

© United Nations, May 2017. All rights reserved worldwide.
ISBN: 978-92-1-148293-5
eISBN: 978-92-1-060625-7
United Nations publication, Sales No. E.17.XI.8

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. The United Nations Office on Drugs and Crime (UNODC) would appreciate receiving a copy of any publication that uses this publication as a source.

Suggested citation:
United Nations Office on Drugs and Crime, *World Drug Report 2017* (ISBN: 978-92-1-148291-1, eISBN: 978-92-1-060623-3, United Nations publication, Sales No. E.17.XI.6).

No use of this publication may be made for resale or any other commercial purpose whatsoever without prior permission in writing from UNODC. Applications for such permission, with a statement of purpose and intent of the reproduction, should be addressed to the Research and Trend Analysis Branch of UNODC.

DISCLAIMER

The content of this publication does not necessarily reflect the views or policies of UNODC or contributory organizations, nor does it imply any endorsement.

Comments on the report are welcome and can be sent to:

Division for Policy Analysis and Public Affairs
United Nations Office on Drugs and Crime
PO Box 500
1400 Vienna
Austria
Tel: (+43) 1 26060 0
Fax: (+43) 1 26060 5827

E-mail: wdr@unodc.org
Website: www.unodc.org/wdr2017



PREFACE

I am proud to say that this year we are marking 20 years of the *World Drug Report*.

Over the past two decades, the United Nations Office on Drugs and Crime (UNODC) has been at the forefront of global research into complex areas of drug use and supply, supporting international cooperation and informing policy choices with the latest estimates, information on trends and analysis.

This year we are launching a new format, with the report available as five separate booklets: the executive summary, together with the report's conclusions and policy implications; a global overview of drug use and supply; a market analysis of plant-based drugs; a market analysis of synthetic drugs; and a thematic booklet on the links between drugs and organized crime, illicit financial flows, corruption and terrorism. We have done this in response to readers' needs and to improve user-friendliness, while maintaining the rigorous standards expected from the Office's flagship publication.

The 2017 report comes at a time when the international community has acted decisively to achieve consensus on a way forward for joint action.

The outcome document unanimously adopted at last year's special session of the General Assembly on the world drug problem contains more than 100 concrete recommendations for implementing balanced, comprehensive and integrated approaches to effectively addressing and countering the world drug problem.

Moreover, at its sixtieth session, in March 2017, the Commission on Narcotic Drugs adopted resolution 60/1, reinforcing commitment to implementing the outcome document and charting a course to the 2019 target date of the 2009 Political Declaration and Plan of Action on the world drug problem, as well as strengthening action towards the Plan of Action's agreed goals and targets.

As the *World Drug Report 2017* clearly shows, there is much work to be done to confront the many harms inflicted by drugs, to health, development, peace and security, in all regions of the world.

Globally, there are an estimated minimum of 190,000 — in most cases avoidable — premature deaths from drugs, the majority attributable to the use of opioids.

The terrible impact of drug use on health can also be seen in related cases of HIV, hepatitis and tuberculosis.

Much more needs to be done to ensure affordable access to effective scientific evidence-based prevention, treatment and care for the people who desperately need them, including those in prison settings. As just one example, this year's report highlights the need to accelerate accessibility to the treatment of hepatitis C, a disease whose negative health impact on people who use drugs is far greater than that of HIV/AIDS.

Recent attention has focused on the threats posed by methamphetamine and new psychoactive substances (NPS). However, as the report shows, the manufacture of both cocaine and opioids is increasing. These drugs remain serious concerns, and the opioid crisis shows little sign of stopping.

The *World Drug Report 2017* further looks at the links with other forms of organized crime, illicit financial flows, corruption and terrorism. It draws on the best available evidence and, most of all, highlights the fact that much more research needs to be carried out in these areas.

Corruption is the great enabler of organized crime, and opportunities for corruption exist at every stage of the drug supply chain. However, too little is known about how different types of corruption interact with drug markets.

The outcome document of the special session of the General Assembly on the world drug problem and

Security Council resolutions express concern about terrorist groups profiting from drug trafficking, among other forms of transnational organized crime.

It is well established that there are terrorists and non-State armed groups profiting from the drug trade — by some estimates, up to 85 per cent of opium poppy cultivation in Afghanistan is in territory under influence of the Taliban.

However, evidence on the organized crime-terrorism nexus remains patchy at best. Moreover, these links are not static. Relations between organized crime and terrorists groups are always evolving, much like drug markets themselves.

As we have seen with the NPS market, drug use, supply, trafficking routes and the substances themselves continue to shift and diversify at alarming speed.

Drugs continue to represent a major source of revenue for organized crime networks, but business models are changing, with criminals exploiting new technologies, such as the darknet, that are altering the nature of the illicit drug trade and the types of players involved, with looser, horizontal networks and smaller groups becoming more significant. New ways of delivering drugs further point to the need to involve other sectors such as postal services in the fight against drug trafficking.

Clearly, countries must be able to act and react to an ever-changing and formidable array of threats and problems. UNODC is fully engaged in strengthening responses, working closely with our United Nations partners and in line with the international drug control conventions, human rights instruments and the 2030 Agenda for Sustainable Development, which are themselves complementary and mutually reinforcing.

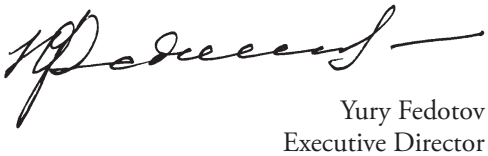
As the special session of the General Assembly and the recent session of the Commission on Narcotic Drugs have shown, the international community is equipped to respond swiftly and decisively to global drug-related challenges.

For example, in March, the Commission scheduled two precursors and an analogue to the scheduled drug fentanyl. This important step will make it harder for criminals to illicitly manufacture fentanyl and its analogues and, I hope, can help to stem the tragic increase in opioid overdoses in recent years.

However, there remains an enormous need for capacity-building and technical assistance, and funding continues to fall far short of political commitment. Further resources are urgently needed to help all Member States implement the recommendations contained in the outcome document of the special session of the General Assembly and achieve related targets under the Sustainable Development Goals.

The many evolving drug challenges also highlight the importance of prevention — science- and rights-based drug use prevention — but also prevention of crime, corruption, terrorism and violent extremism, in line with commitments under the conventions and United Nations standards and norms.

Finally, I ask all Governments to help us improve the evidence base for these reports. Areas such as the links between drugs, terrorism and insurgency clearly touch upon sensitive intelligence, and there are legitimate concerns about compromising sources, collection and operations. But if we want to effectively address drug challenges we need to strengthen international cooperation and information-sharing to the extent possible, to close the gaps and ensure that joint action is targeted, effective and timely.



Yury Fedotov
Executive Director
United Nations Office on Drugs and Crime

CONTENTS

BOOKLET 1 EXECUTIVE SUMMARY — CONCLUSIONS AND POLICY IMPLICATIONS

BOOKLET 2 GLOBAL OVERVIEW OF DRUG DEMAND AND SUPPLY
Latest trends, cross-cutting issues

PREFACE 3
EXPLANATORY NOTES 7
KEY FINDINGS 9
INTRODUCTION 11
A. EXTENT OF DRUG USE 13
- A quarter of a billion people use drugs globally 13
- Problem drug use as reflected in the demand for drug treatment 15

B. HEALTH IMPACT OF DRUG USE 19
- Almost 12 million people worldwide injected drugs in 2015 19
- HIV and hepatitis markedly impact on people who inject drugs 19
- Drug use and tuberculosis 21
- At least 190,000 mostly preventable drug-related deaths in 2015 26

C. PHARMACEUTICAL OPIOIDS 29
- Access to pain medication: key issues and considerations 30
- Misuse of prescription opioids 31
- Use of prescription opioids and heroin in the United States 32
- Misuse of tramadol in Africa and Asia 38

D. EXTENT OF DRUG SUPPLY 39
- Cultivation and production 39
- After cannabis, cocaine accounts for the largest quantities seized 40
- Drug trafficking over the darknet continues to increase at a fast pace 42

ANNEX 47
- Annual prevalence of drug use 47
- Number and prevalence of people who inject drugs and those living with HIV 49
- Opium/Heroin 50
- Coca/Cocaine 58
- Cannabis 60

GLOSSARY 65
REGIONAL GROUPINGS 66

BOOKLET 3 MARKET ANALYSIS OF PLANT-BASED DRUGS
Opiates, cocaine, cannabis

BOOKLET 4 MARKET ANALYSIS OF SYNTHETIC DRUGS
Amphetamine-type stimulants, new psychoactive substances

BOOKLET 5 THE DRUG PROBLEM AND ORGANIZED CRIME, ILLICIT FINANCIAL FLOWS, CORRUPTION AND TERRORISM

Acknowledgements

The *World Drug Report 2017* was prepared by the Research and Trend Analysis Branch, Division for Policy Analysis and Public Affairs, United Nations Office on Drugs and Crime, under the supervision of Jean-Luc Lemahieu, Director of the Division, and Angela Me, Chief of the Research and Trend Analysis Branch.

General coordination and content overview
Chloé Carpentier
Angela Me

Analysis and drafting
Philip Davis
Kamran Niaz
Thomas Pietschmann

Data management and estimates production
Enrico Bisogno
Jesus Maria Garcia Calleja (WHO)
Riku Lehtovuori
Andrea Oterova
Umidjon Rakhmonberdiev
Ali Saadeddin
Keith Sabin (UNAIDS)
Antoine Vella

Editing
Jonathan Gibbons

Graphic design and production
Anja Korenblik
Suzanne Kunnen
Kristina Kuttnig

Coordination
Francesca Massanello

Data Support
Diana Camerini
Raffaella Conconi
Sarika Dewan

Administrative support
Anja Held
Iulia Lazar

Review and comments
The *World Drug Report 2017* benefited from the expertise and invaluable contributions of UNODC colleagues in the Drug Prevention and Health Branch of the Division for Operations; the Corruption and Economic Crime Branch, the Organized Crime and Illicit Trafficking Branch and the Terrorism Prevention Branch of the Division for Treaty Affairs; and the Research and Trend Analysis Branch of the Division for Policy Analysis and Public Affairs.

The Research and Trend Analysis Branch acknowledges the invaluable contributions and advice provided by the *World Drug Report* Scientific Advisory Committee:

Jonathan Caulkins
Paul Griffiths
Marya Hynes
Vicknasingam B. Kasinather
Letizia Paoli
Charles Parry
Peter Reuter
Francisco Thoumi
Alison Ritter
Brice De Ruyver

UNODC gratefully acknowledges the contribution of Masoud Dara and Annabel Baddeley of the World Health Organization to the section on tuberculosis.

The research and preparation of the joint UNODC/UNAIDS/WHO/World Bank estimates of the number of people who inject drugs were partly funded by the HIV/AIDS Section of the Drug Prevention and Health Branch of the Division for Operations of UNODC.



EXPLANATORY NOTES

The boundaries and names shown and the designations used on maps do not imply official endorsement or acceptance by the United Nations. A 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. Disputed boundaries (China/India) are represented by crosshatch owing to the difficulty of showing sufficient detail.

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.

All references to Kosovo in the *World Drug Report*, if any, should be understood to be in compliance with Security Council resolution 1244 (1999).

Since there is some scientific and legal ambiguity about the distinctions between "drug use", "drug misuse" and "drug abuse", the neutral terms "drug use" and "drug consumption" are used in the *World Drug Report.*

All uses of the word "drug" in the *World Drug Report* refer to substances under the control of the international drug control conventions.

All analysis contained in the *World Drug Report* is based on the official data submitted by Member States to the United Nations Office on Drugs and Crime through the annual report questionnaire unless indicated otherwise.

The data on population used in the *World Drug Report* are taken from: United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2015 Revision.*

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

References to tons are to metric tons, unless otherwise stated. R stands for the correlation coefficient, used as measure of the strength of a statistical relationship between two or more variables, ranging from 0 to 1 in case of a positive correlation or from 0 to -1 in case of a negative correlation.

KEY FINDINGS

Harm caused by drug use remains considerable

An estimated quarter of a billion people, or around 5 per cent of the global adult population, used drugs at least once in 2015. Even more worrisome is the fact that about 29.5 million of those drug users, or 0.6 per cent of the global adult population, suffer from drug use disorders.

The magnitude of the harm caused by drug use is underlined by the estimated 28 million years of "healthy" life (disability-adjusted life years (DALYs)) lost worldwide in 2015 as a result of premature death and disability caused by drug use. Of those years lost, 17 million were attributable solely to drug use disorders across all drug types. DALYs attributable to morbidity and mortality resulting from all causes of drug use have increased overall in the past decade.

Yet, with fewer than one in six persons with drug use disorders provided with treatment each year, the availability of and access to science-based services for the treatment of drug use disorders and related conditions remain limited.

Opioids, the most harmful drug type

Opioids, including heroin, remain the most harmful drug type in health terms. A significant proportion of the large number of premature deaths among people who use drugs is attributable to opioids. In addition, opioid use disorders account for the heaviest burden of disease attributable to drug use disorders: in 2015, almost 12 million DALYs, or 70 per cent of the global burden of disease attributable to drug use disorders, were attributable to opioids.

Hepatitis C causing greatest harm among people who use drugs

People who inject drugs (PWID) face some of the most severe health consequences associated with drug use. Almost 12 million people worldwide inject drugs, of whom one in eight (1.6 million) are living with HIV and more than half (6.1 million) are living with hepatitis C.

The number of deaths attributable to hepatitis C among people who use drugs is greater than from other causes of death related to drug use. Overall, more DALYs are lost as a result of hepatitis C than of HIV infection among people who use drugs. Most of those DALYs are the result of premature death, while the remainder are the result of years lived with disability.

People who use drugs particularly vulnerable to tuberculosis

Based on the limited data available from studies in Europe, Asia and the Americas, the prevalence of tuberculosis among PWID is estimated at approximately 8 per cent, which compares with less than 0.2 per cent in the general population.

People who use drugs may have a particular need for interventions that prevent and treat tuberculosis. They may be disproportionately affected by the risk factors for the disease. Infection with HIV is one of the main reasons for the high prevalence of tuberculosis among PWID and tuberculosis is one of the leading causes of mortality among people who use drugs and are living with HIV.

Treatment of tuberculosis is particularly complex for people who use drugs as they may be living with multiple, co-existing infectious diseases and psychiatric and medical co-morbidities in addition to drug dependency. Furthermore, many barriers to the prevention and treatment of tuberculosis are more difficult to surmount for people who use drugs than for the general population.

Prison a high-risk environment for the spread of infectious diseases

Drug use, including the use of heroin and injecting drug use, are commonplace in many prisons. One out of three prisoners has used an illicit substance at some time while incarcerated, with 16 per cent reporting current (past-month) use. Cannabis is by far the most commonly used drug in prison, while heroin ranks second. Approximately 10 per cent of prisoners report using heroin at some time while incarcerated, one third of whom report current (past-month) use within prison.

Unsafe injecting practices help to spread HIV among PWID in prison populations and ultimately to the

wider community. People who use drugs who are incarcerated are also placed at greater risk of tuberculosis.

Higher rate of increase in the burden of disease from drug use disorders among women than among men

At least twice as many men than women suffer from drug use disorders. However, once women have initiated substance use, in particular, use of alcohol, cannabis, opioids and cocaine, they tend to increase their rate of consumption more rapidly than men.

In the past decade, the negative health impact of drug use has increased more rapidly among women than among men. The rate of increase in the number of DALYs attributed to drug use disorders in 2015, particularly opioid and cocaine use disorders, was greater among women (25 per cent and 40 per cent, respectively) than among men (17 per cent and 26 per cent, respectively).

Evidence shows that making pharmaceutical opioids available to the population who need them most often does not lead to their misuse or addiction

Despite the fact that pharmaceutical opioids for pain management and treatment of opioids use disorders are included in the list of essential medicines by WHO, there remain significant gaps and barriers in the access to and availability of pain medications in most parts of the world.

Fear of addiction to pharmaceutical opioids contributes to the complex dynamics influencing access to and availability of controlled medicines. However, a structured review of the literature found that 3 per cent of chronic non-cancer pain patients regularly taking opioids developed opioid use disorders.

Opioid market in a constant state of change

The opioid market is becoming more diversified: this is illustrated by the example of the United States, where the opioid market comprises a combination of internationally controlled substances, particularly heroin, and prescription medicines that are either diverted from the legal market or produced as counterfeit medicines on a large scale. These counterfeit medicines are made to look like pharmaceutical products while actually containing fentanyl and fentanyl analogues, as well as non-opioid substances such as derivatives of benzodiazepine and methylphenidate.

Expansion of the cocaine market

Data on drug production, trafficking and use point to an overall expansion of the market for cocaine worldwide. Following a long-term decline, coca bush cultivation increased by 30 per cent during the period 2013-2015, mainly as a result of increased cultivation in Colombia. Total global manufacture of pure cocaine hydrochloride reached 1,125 tons in 2015.

The quantities of cocaine seized are also on the increase, reaching a record level of 864 tons in 2015.

Opium production on the increase

In 2016, global opium production (6,380 tons) increased by one third compared with the previous year. Although there was also an increase in the size of the area under opium poppy cultivation, the major increase in opium production was primarily the result of an improvement in opium poppy yields in Afghanistan compared with the previous year.

Global seizures relatively stable

The largest quantities of drugs seized were of cannabis, followed by coca/cocaine related substances and opioids.

The sharpest increases in quantities seized over the period 2010-2015 were reported for synthetic NPS, which increased fourfold, and of ATS, which doubled. Sharp increases, in particular during 2015, were also reported for cocaine, in line with reports of rising levels of cocaine manufacture.

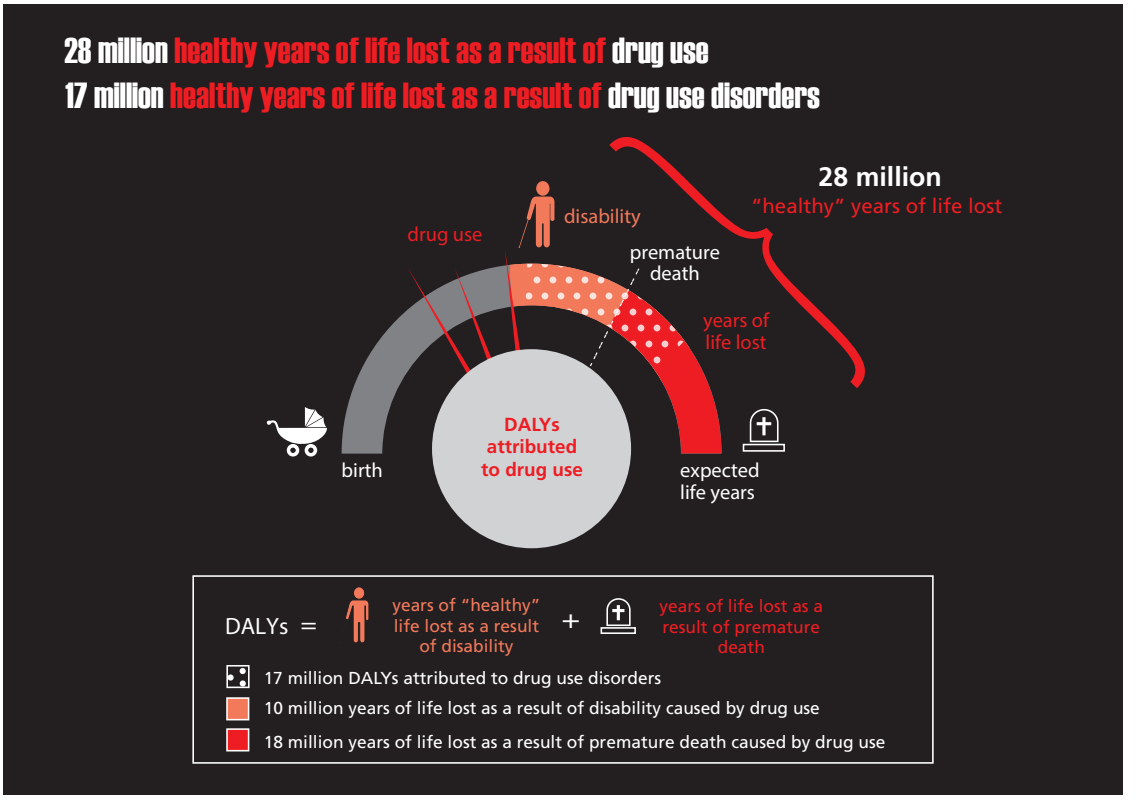
Trafficking through the darknet: relatively small but growing fast

The darknet allows users to buy drugs with a cryptocurrency, such as bitcoin, and have their purchases delivered to them in a concealed manner. Typical buyers are recreational users of cannabis, “ecstasy”, cocaine, hallucinogens and NPS. They are less likely to order heroin or methamphetamine. Although the darknet accounts for only a small percentage of drug sales, the market has been growing by around 50 per cent per year in recent years.

INTRODUCTION

Although presented as a stand-alone publication, this booklet constitutes the second chapter of the *World Drug Report 2017*. It provides a global overview of the latest estimates of and trends in drug use and drug supply, as well as of several cross-cutting issues related to the world drug problem. Such issues include the health impact of drug use, including trends among people with drug use disorders, problem drug use as reflected in treatment demand and estimates of the number of people who inject drugs (PWID) and of those living with HIV and hepatitis.

The present booklet also examines the global extent of drug-related deaths, particularly of fatal overdoses, with recent trends in some countries being presented as illustrative. A review of tuberculosis among people who use drugs, both in the general population and in prisons, as well as challenges in the treatment of tuberculosis among those groups, is featured for the first time in the *World Drug Report*. An analysis of the dynamics of and trends in the misuse of prescription opioids is also included, as is a brief discussion of the issues related to making opioid painkillers available and accessible to the population in need of them. Finally, the booklet contains a global overview of the latest estimates of and trends in cultivation, production and trafficking of illicit drugs, including on the Internet, using the darknet.



A. EXTENT OF DRUG USE

A quarter of a billion people use drugs globally

It is estimated that a quarter of a billion people, or about 5 per cent of the adult population aged 15-64 years, used drugs at least once in 2015 (range: 158 million to 351 million),[1] meaning that the extent of drug use among the world population has remained stable over the past five years. Globally, over 11 per cent of people who use drugs, or around 29.5 million people (range: 15.3 million to 43.1 million), are estimated to suffer from drug use disorders.This means that their drug use is harmfull to the point that they may experience drug dependence and require treatment. Moreover, the Global Burden of Disease Study 2015 estimated that around 17 million "healthy" years of life lost (disability-adjusted life years or DALYs)[2, 3] were attributable to drug use disorders in that year.

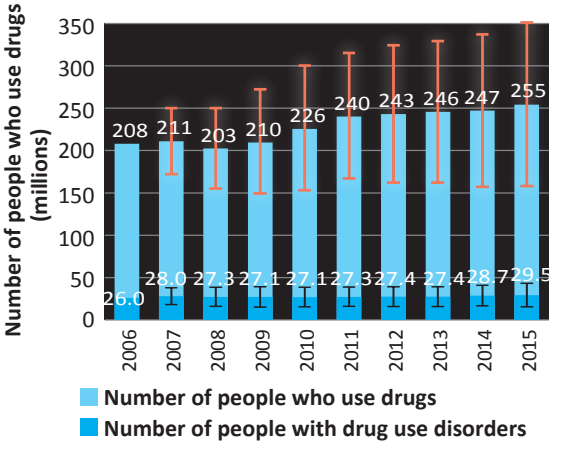
Opioids are the substances that cause the highest negative health impact, but cannabis remains the world's most widely used drug, with an annual prevalence of 3.8 per cent of the adult population, or an estimated 183 million people (range 128 million to 238 million), having used cannabis in the past year. Cannabis use has increased in parts of North and South America, while its use is declining or stabilizing in parts of Europe, albeit from or at high levels. Amphetamines remain the second most commonly used drug worldwide, with an estimated 35 million past-year users (range 13 million to 58 million), and the use of amphetamines, particularly methamphetamine, is perceived to be increasing in many subregions, including North America, Oceania and most parts of Asia.

1 These estimates are based on updates by some 25 countries in which new data were available, and reflect the best data currently available on the global extent of drug use.

2 As defined by the Word Health Organization (WHO), one DALY is one lost year of "healthy" life. "Healthy" years of life lost is the combination of life lost as a result of premature death and life lost as a result of disability (any short-term or long-term health loss).

3 Global Burden of Disease Study 2015 DALYs and HALE Collaborators, "Global, regional, and national disability-adjusted life years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015", The Lancet, vol. 388, No. 10053 (2016), pp. 1603-1658.

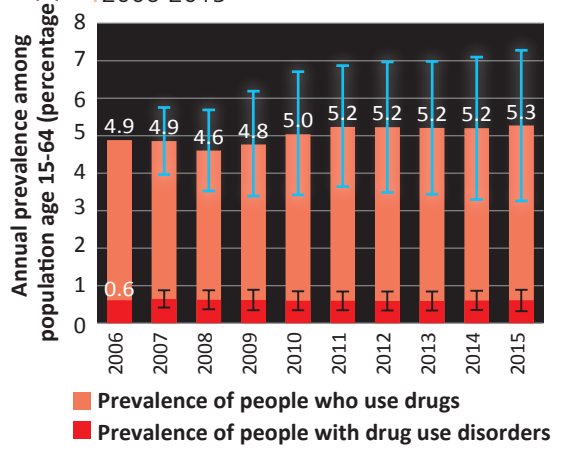
FIG. 1 Global trends in estimated number of drug users, 2006-2015



Source: UNODC, responses to annual report questionnaire.

Note: Estimates are for adults (aged 15-64) who used drugs in the past year.

FIG. 2 Global trends in the estimated prevalence of drug use and prevalence of people with drug use problems, 2006-2015



Source: UNODC, responses to the annual report questionnaire.

Note: Estimated percentage of adults (aged 15-64) who used drugs in the past year.

The number of past-year users of opiates and persons who misuse prescription opioids is estimated at about 35.1 million people (range 28.3 million to 42.7 million), of whom some 17.7 million are estimated to have used opiates (heroin and opium). The misuse of pharmaceutical opioids remains of concern in many countries, particularly the United States of America, where, coupled with an increase in heroin and fentanyl use, it has resulted in a

Drugs and infectious diseases that produce the highest negative health impact of drug use

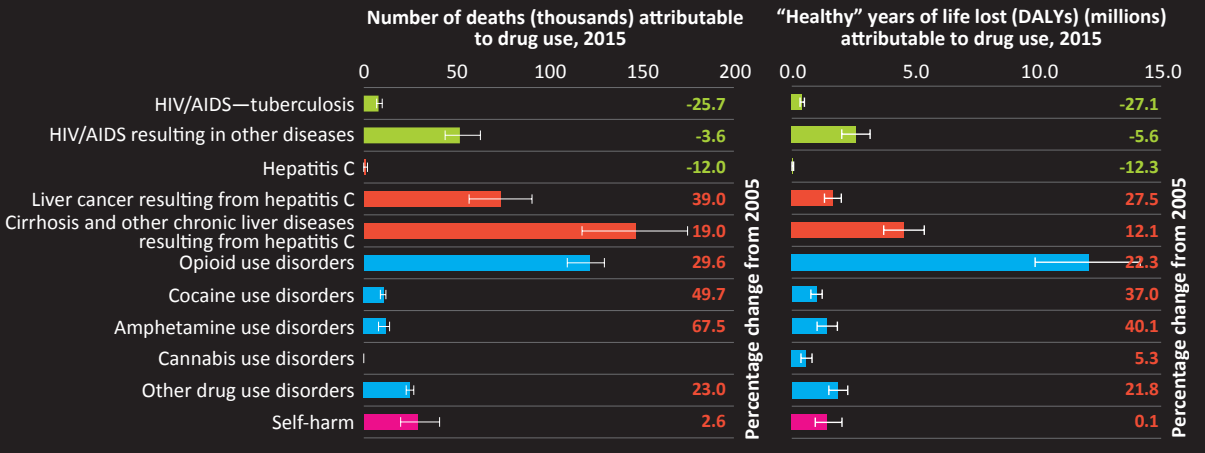
The Global Burden of Disease Study 2015 examined the connection between the use of drugs[a] and the development of poor health.[b] The most negative health consequences of drug use are associated with untreated hepatitis C (which can lead to liver cirrhosis and cancer) and opioid use disorders.

The burden of disease is greater for health consequences related to hepatitis C than to HIV infection: considerably more deaths (222,000 from hepatitis C; 60,000 from HIV) and DALYs (6.3 million from hepatitis C; 3.0 million from HIV) are attributable to hepatitis C than to HIV. Most of those DALYs are the result of premature death, while the remainder are the result of years lived with disability.

Opioids remain major drugs in terms of health consequences, with nearly 12 million of the total 17 million DALYs attributed to drug use disorders in 2015 being attributed to opioid use disorders.[c] Opioids also account for the majority of drug-related deaths in many subregions. The overall burden of disease from all causes of drug use increased in the period 2005-2015, with DALYs increasing from 24 million to 28 million, whereas the burden of disease attributed to drug use disorders alone increased from 14 million to 17 million DALYs over the same period. The largest increase in DALYs was attributed to opioid use disorders, but large increases were also attributed to disorders resulting from use of amphetamines and use of cocaine.

The fact that opioids, including heroin, account for most of the negative health consequences of drug use is also reflected in data provided by hospital emergency departments. In Europe, opioids and heroin are most frequently associated with acute toxicity presentations, with heroin involved in almost one out of four cases. Cocaine and cannabis are also prominent (each accounting for 16 per cent of presentations), with new NPS, mostly synthetic cathinones, and mephedrone in particular, accounting for 11 per cent. Polydrug use presentations are also common in Europe, being involved in 38 per cent of cases.[d]

Number of deaths and "healthy" years of life lost (DALYs) attributable to drug use, 2015



Source: "Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015".

Notes: Error bars represent uncertainty intervals. Numbers given in charts are percentage changes from 2005.

[a] In the Global Burden of Disease Study, drug use as a risk factor is defined as the extent of the population who are dependent on opioids, cannabis, cocaine or amphetamines and the population who have ever injected drugs (i.e., extent of exposure to drug use as a risk factor).

[b] Global Burden of Disease Study 2015 Risk Factors Collaborators, "Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015", *The Lancet*, vol. 388 (2016), pp. 1659-1724.

[c] Global Burden of Disease Study 2015 DALYs and HALE Collaborators, "Global, regional, and national disability-adjusted life years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015", *The Lancet*, vol. 388, No. 10053 (2016), pp. 1603-1658.

[d] European Monitoring Centre for Drugs and Drug Addiction, *Hospital Emergency Presentations and Acute Drug Toxicity in Europe: Update from the Euro-DEN Plus Research Group and the EMCDDA* (Luxembourg, Publications Office of the European Union, 2016).

combined and interrelated epidemic and an increase in morbidity and mortality related to opioids.[4] There are also indications of a recent increase in heroin use in parts of Western and Central Europe, suggesting that the long-term downward trend in parts of that subregion may be coming to an end.

With a high prevalence of cocaine use in North America (1.8 per cent, Western and Central Europe (1.1 per cent) and Oceania (1.5 per cent, primarily Australia and New Zealand), it is estimated that there are nearly 17 million past-year users of cocaine worldwide. Although cocaine use is decreasing or stabilizing in parts of Europe, wastewater analysis suggests an increase in consumption of the drug in the past five years (see booklet 3, chapter B). There are also indications of an increase in parts of North America. Some 21.6 million people are estimated to be past-year users of "ecstasy", the use of which remains high in Oceania (primarily Australia and New Zealand), Europe and North America. "Ecstasy" use had been declining in Western and Central Europe, but since 2013, data from many European countries, particularly in Western and Central Europe, show an increase in its use.

Many drug users, both occasional and regular, tend to be polydrug users. In order to enhance the overall psychoactive experience of the drugs taken, they use more than one substance concurrently or sequentially to experience a cumulative or synergistic effect, making the entire drug-use scenario rather complicated. In many subregions, for example, an increasingly complex relationship between the use of heroin and synthetic opioids is being observed, in which the illicit manufacture of opioids and the availability of many "research opioids", such as AH-7921, U-47700, AH-21, MT-45 and many analogues of fentanyl, are posing serious public health concerns. Moreover, the emergence of synthetic stimulants and new psychoactive substances (NPS) and their use in lieu of, or in combination with, conventional drugs, are presenting additional challenges to health professionals responding to drug use-related emergencies and treating people with drug use disorders.

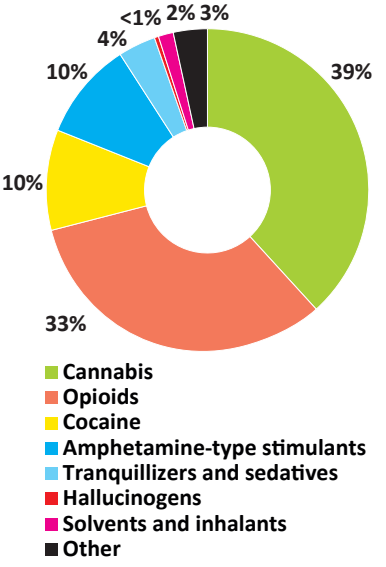
4 Wilson M. Compton, Christopher M. Jones and Grant T. Baldwin, "Relationship between nonmedical prescription-opioid use and heroin use", *New England Journal of Medicine*, vol. 374, No. 2 (2016), pp. 154-163.

Problem drug use as reflected in the demand for drug treatment

Information on people in treatment for disorders related to the use of different drugs can be taken as a proxy to understand the nature and extent of problem drug use. However, this is only a latent indicator of trends in the use of drugs, owing to the time lag between the period when people start using drugs, when they develop drug use disorders and when they seek treatment for drug use.

For people with drug use disorders, the availability and access to treatment services, particularly of science-based services, remains limited at the global level, with one out of six people with drug-use disorders being provided with treatment each year. On average, among those treated, the proportion of people with cannabis and opioid use disorders remains larger than the proportion of people with disorders related to the use of other substances. It is important to understand, however, that there is great variability in the definition and practice of what constitutes treatment of cannabis use disorders. At present, such treatment consists of behavioural or psychosocial interventions that may vary from a

FIG. 3 Proportion of people in treatment for different drugs, global averages



Source: UNODC, responses to annual report questionnaire.

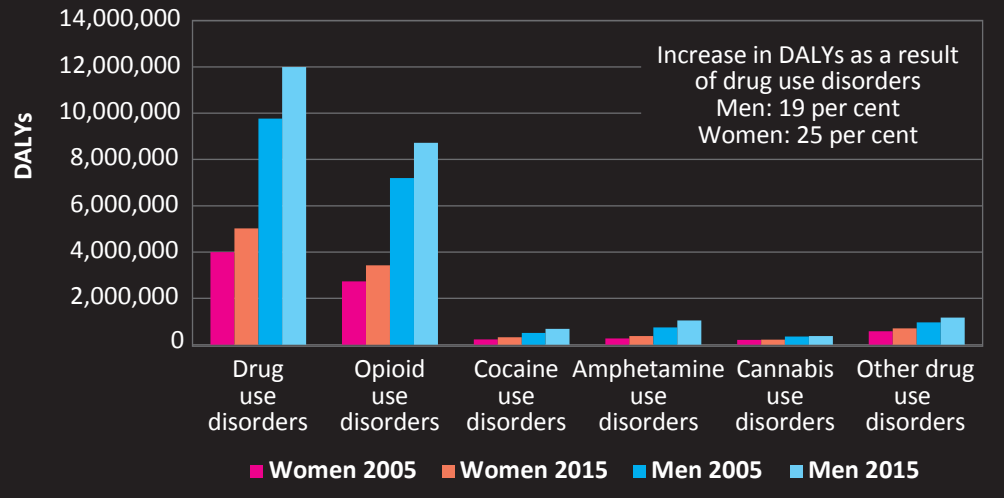
Note: Unweighted average of people in treatment for different drugs in different regions.

Gender and drug use

Compared with drug use among men, overall drug use remains low among women. At the global level, men are three times more likely than women to use cannabis, cocaine or amphetamines. By contrast, women are more likely than men to misuse prescription drugs, particularly prescription opioids and tranquillizers.[a, b] This mainly reflects differences in opportunities to use drugs owing to the influence of social or cultural environments, rather than intrinsic gender vulnerability.[c] Women typically begin using substances later in life than men, but once they have initiated substance use, women tend to increase their rate of consumption of alcohol, cannabis, opioids and cocaine more rapidly than men and may progress more quickly than men to the development of drug use disorders.

According to the Global Burden of Disease Study, men suffer at least twice as much as women from drug use disorders and therefore from the consequences of drug use, as expressed in DALYs. Between 2005 and 2015, DALYs attributed to drug use disorders increased by 24 per cent,[d] which is attributed to an increase in exposure to risk, i.e. an increase in the prevalence of drug use disorders, coupled with an increase in the population. The relative increase in the prevalence of drug use disorders (exposure to risk factors) was higher among women than among men in this period.[e] Similarly, the per cent increase in DALYs caused by drug use disorders, particularly opioid and cocaine use disorders, was greater among women (25 per cent and 40 per cent, respectively) than among men (17 per cent and 26 per cent, respectively).

"Healthy" years of life lost (DALYs) attributable to drug use disorders among men and women, 2005 and 2015



Source: Global Burden of Disease Data, Institute for Health Metrics and Evaluation.

a *World Drug Report 2015* (United Nations publication, Sales No. E.15.XI.6).

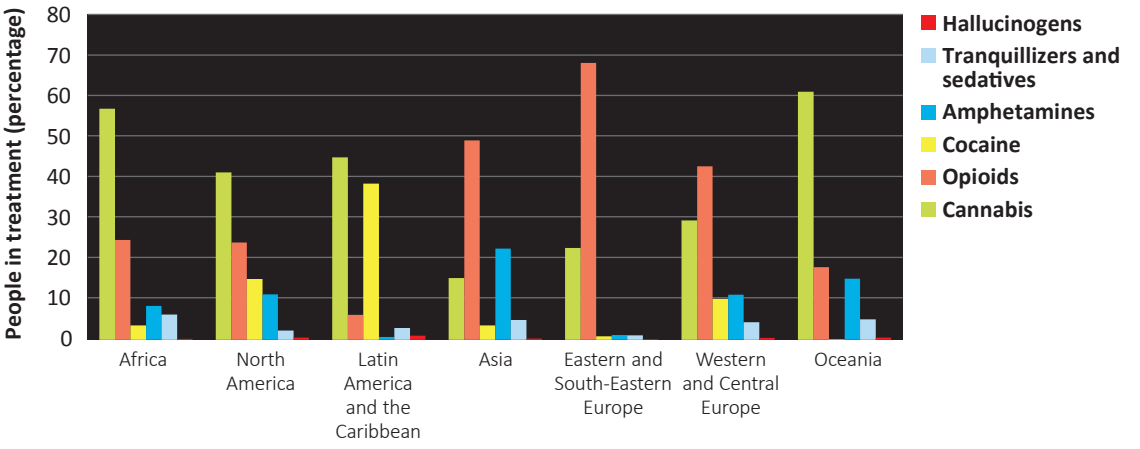
b Christine E. Grella, "From generic to gender-responsive treatment: changes in social policies, treatment services, and outcomes of women in substance abuse treatment", *Journal of Psychoactive Drugs*, vol. 40, SARC Suppl. No. 5 (2008), pp. 327-343.

c Michelle L. Van Etten and James C. Anthony, "Male-female differences in transitions from first drug opportunity to first use: searching for subgroup variation by age, race, region, and urban status", *Journal of Women Health and Gender Based Medicine*, vol. 10, No. 8 (2001), pp. 797-804.

d Global Burden of Disease Study 2015 DALYs and HALE Collaborators, "Global, regional, and national disability-adjusted life years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015", *The Lancet*, vol. 388, No. 10053 (2016), pp. 1603-1658.

e Global Burden of Disease Study 2015 Risk Factors Collaborators, "Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015", *The Lancet*, vol. 388 (2016), pp. 1659-1724.

FIG. 4 | Primary drug of concern among people in drug treatment, by region, 2015



Source: UNODC, responses to annual report questionnaire.

one-time online contact, or a brief intervention in an outpatient setting, to a more comprehensive treatment plan involving the treatment of other co-morbidities in an outpatient or inpatient setting.[5, 6, 7, 8]

Opioids remain of major concern in South-West and Central Asia and in Eastern and South-Eastern Europe. In South-Eastern Europe, nearly three out of every five people in drug treatment are in treatment for opioid use disorders. Treatment for cocaine use remains prominent in North America, Latin America and the Caribbean and, to a lesser extent, in Western and Central Europe, while amphetamines remain a problem primarily in East and South-East Asia and to some extent in North America. The number of people in treatment for disorders resulting from use of amphetamines has been increasing in Asia, although half of people in treatment are still receiving treatment for opioid use disorders. Cannabis is the main drug for which drug use treatment is sought in Africa, but many countries, most notably Mozambique, Nigeria, South Africa and the United Republic of Tanzania, have reported an increasing number of people entering treatment for opioid use disorders.

Information on the number of people in treatment for drug use disorders for the first time shows an increasing trend in opioid use, including heroin, in North and South America, as well as in Eastern and South-Eastern Europe, where nearly a third of people in treatment for opioid use disorders were first-time entrants into treatment. Accounting for more than half of those treated, the proportion of people seeking treatment for cannabis use disorders for the first time remains high at the global level.

Although, overall, nearly one out of three people in treatment for the use of tranquillizers and sedatives is a woman, women account for only one out of five people in treatment for drug use disorders. Younger people are seeking treatment for disorders related to the use of cannabis and amphetamines (with an average age of 24 and 25, respectively) more than for other substances, reflecting increasing use of cannabis and amphetamines. Meanwhile, people in treatment for opioid- or cocaine-related disorders are typically in their 30s and, in many subregions, reflect an ageing cohort of users in treatment. It should be borne in mind, however, that between 40

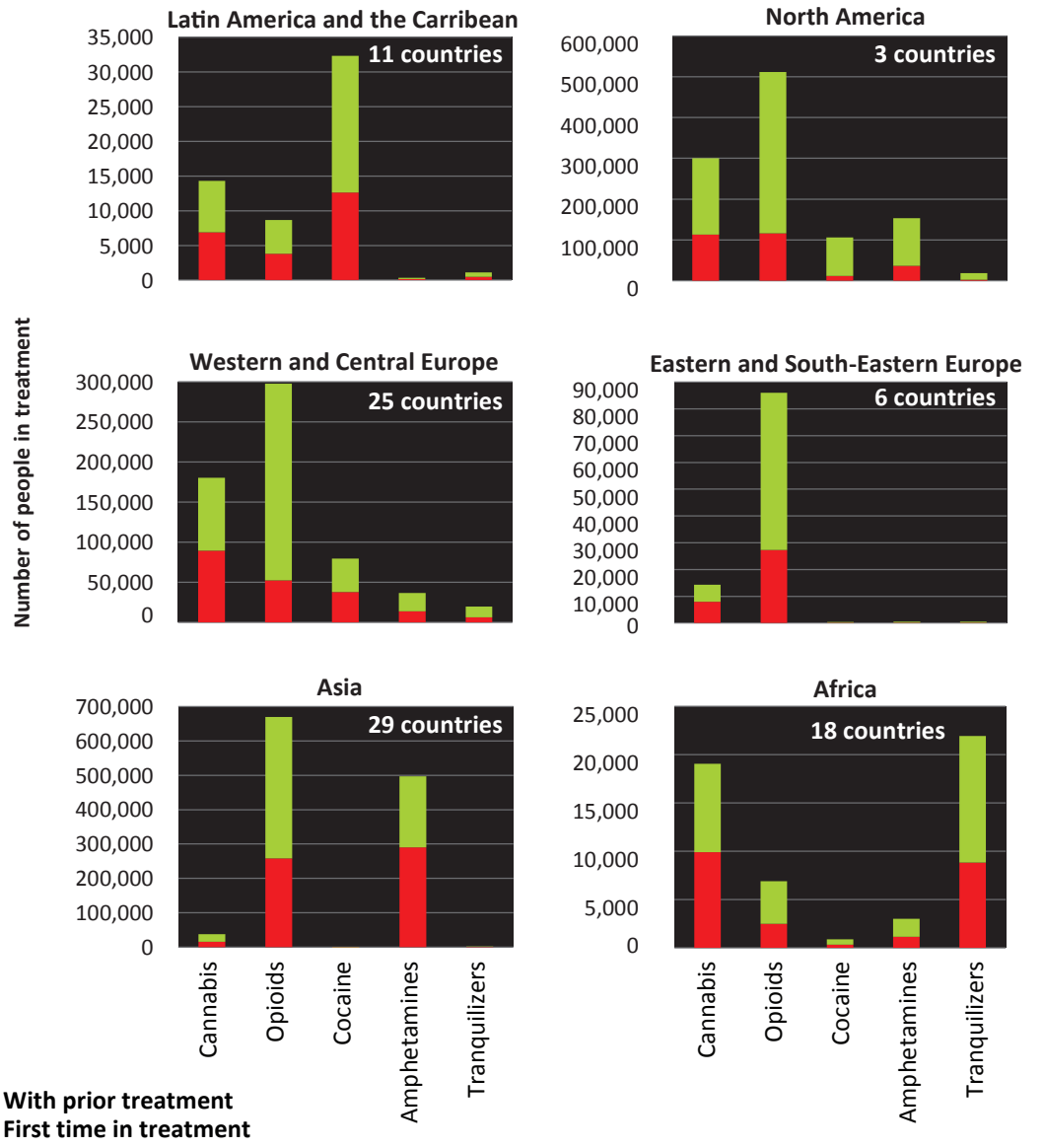
5 Wayne Hall, Maria Renström and Vladimir Poznyak, eds., *The Health and Social Effects of Nonmedical Cannabis Use* (Geneva, WHO, 2016).

6 Jan Copeland, Amie Frewen and Kathryn Elkins, *Management of Cannabis Use Disorder and Related Issues: A Clinician's Guide* (Sydney, National Cannabis Prevention and Information Centre, University of New South Wales, 2009).

7 Divya Ramesh and Margaret Haney, "Treatment of cannabis use disorders", *Textbook of Addiction Treatment: International Perspectives*, vol. I, Nady El-Guebaly, Giuseppe Carrà and Marc Galanter, eds. (Milan, Springer, 2015).

8 Alan J. Budney and others, "Marijuana dependence and its treatment", *Addiction Science and Clinical Practice*, vol. 4, No. 1 (2004), pp. 4-16.

FIG. 5 Total number of people in treatment, by drug type and by region, 2015 or latest available data



Source: UNODC, responses to annual report questionnaire.

Note: The figures are based on data for 2015 or the latest year since 2010. The number of people treated for different drugs in a region is weighted by the total number of people treated in a country. Member States in Oceania (Australia and New Zealand) do not provide information on the proportion of people in treatment for the first time, and therefore information for Oceania is not reflected in the above figures.

per cent and 80 per cent of people reported in treatment for drug use disorders are diagnosed with polydrug use, reflecting the complexity of the drug use phenomenon and the challenge of treating people with drug use disorders effectively.

B. HEALTH IMPACT OF DRUG USE

Almost 12 million people worldwide injected drugs in 2015

People who inject drugs (PWID) are among the most marginalized and disadvantaged drug users. They experience poor health outcomes with a greater chance of premature death, high rates of potentially life-threatening infectious diseases, such as HIV, hepatitis and tuberculosis, and increased risk of both fatal and non-fatal drug overdoses.[9, 10] The situation is often made worse by a lack of access to relevant evidence-based prevention and treatment services for drug dependence and infectious diseases.[11, 12] Infectious diseases acquired through the sharing of injection equipment for drug use further impact on those who do not inject or use drugs through other modes of transmission (for example, sexual).

The joint UNODC/World Health Organization (WHO)/Joint United Nations Programme on HIV/AIDS (UNAIDS)/World Bank estimate for the number of people worldwide who injected drugs in 2015 is 11.8 million (range: 8.6 to 17.4 million), corresponding to 0.25 per cent (range: 0.18 to 0.36 per cent) of the population aged 15-64 years. This estimate is based on the reporting of injecting drug use from 107 countries, covering 89 per cent of the global population aged 15-64 years.

Subregions where the prevalence of injecting drug use is above the global average are Eastern and South-Eastern Europe, Central Asia and Transcaucasia, North America, Oceania and South-West Asia. More than half (53 per cent) of PWID worldwide reside in just four countries (China, Pakistan, Russian Federation and United States).

9 Bradley M. Mathers and others, "Mortality among people who inject drugs: a systematic review and meta-analysis", *Bulletin of the World Health Organization*, vol. 91, No. 2 (2013), pp. 102-123.

10 Louisa Degenhardt and others, "Global burden of disease attributable to illicit drug use and dependence: findings from the Global Burden of Disease Study 2010", *The Lancet*, vol. 382, No. 9904 (2013), pp. 1564-1574.

11 Joint United Nations Programme on HIV/AIDS (UNAIDS), *The GAP Report 2014* (Geneva, 2014).

12 UNAIDS, *Do No Harm: Health, Human Rights and People Who Inject Drugs* (Geneva, 2016).

HIV and hepatitis markedly impact on people who inject drugs

PWID are a key population at increased risk of HIV infection as a result of unsafe injecting practices relating to the sharing of contaminated needles and syringes. The available data are sparse but suggest that, globally, new HIV infections among PWID climbed from an estimated 114,000 in 2011 to 152,000 in 2015.[13] The joint UNODC/WHO/UNAIDS/World Bank estimate for the prevalence of HIV among PWID in 2015 is 13.1 per cent. This suggests that roughly one in eight people who injected drugs in 2015 were living with HIV, which equates to 1.55 million PWID infected with HIV worldwide. This estimate is based on the reporting of HIV prevalence by 118 countries, covering 95 per cent of estimated PWID.

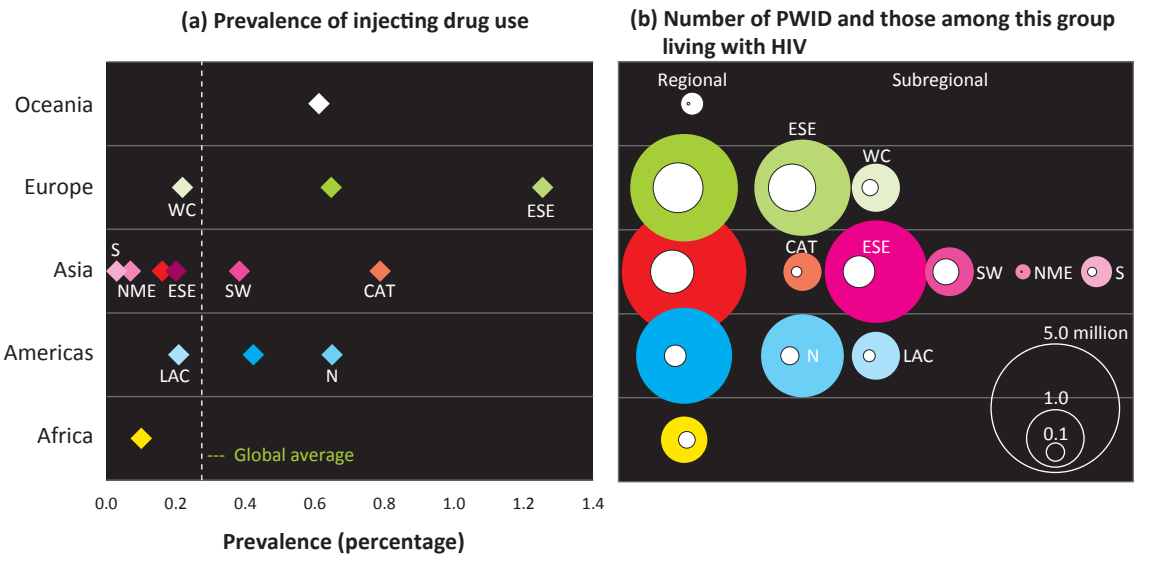
By far the highest prevalences of HIV among PWID are found in South-West Asia (28.5 per cent) and Eastern and South-Eastern Europe (24.0 per cent), where rates are approximately twice the global average (13.1 per cent). Together, China, Pakistan, the Russian Federation, Ukraine and the United States are home to one in three adults worldwide. However, the same five countries account for 68 per cent of PWID living with HIV. Despite the steady decline observed in the numbers of PWID in drug dependence treatment institutions (registered drug users) in the Russian Federation, the prevalence of HIV among registered PWID rose steadily over the period 2009-2014, from 13.2 per cent to 19.9 per cent.[14]

Hepatitis C is an infectious disease affecting the liver, which is responsible for considerable mortality and morbidity among PWID. The burden of disease among PWID, including people with a past history of injecting drug use (important because the health consequences might not be seen for many decades after initial infection), is far greater for hepatitis C than HIV infection. The number of deaths is more than 3.5 times higher for hepatitis C and the number of years of "healthy" life lost (as measured by DALYs)

13 UNAIDS, *Get on the Fast-Track: The Life-cycle Approach to HIV* (Geneva, 2016).

14 Russian Federation, Ministry of Health, *Main Indicators of Substance Abuse Services in the Russian Federation in 2013-2014: Statistical Yearbook* (Moscow, 2016).

FIG. 6 | Regional patterns in injecting drug use and HIV among people who inject drugs, 2015



Source: Responses to the annual report questionnaire; progress reports of UNAIDS on the global AIDS response (various years); the former Reference Group to the United Nations on HIV and Injecting Drug Use; published peer-reviewed articles and government reports.

Notes: Unlabelled symbols are regional estimates. Subregions are denoted as follows: Europe — Western and Central (WC) and Eastern and South-Eastern (ESE); Asia — Central Asia and Transcaucasia (CAT), East and South-East (ESE), South-West (SW), Near and Middle-East (NME) and South (S); and the Americas — North America (N) and Latin America and the Caribbean (LAC). For Oceania, estimates are based on data from Australia and New Zealand only.
Part (a): Percentage of population aged 15-64 years who inject drugs.
Part (b): Number of PWID (outer circle) and number of PWID living with HIV (inner circle).

is approximately 2.5 times higher. The vast majority of DALYs for both hepatitis C and HIV are the result of years of life lost as a result of premature death.[15] Hepatitis C is highly prevalent among PWID, with the joint UNODC/WHO/UNAIDS/World Bank estimate of 51.5 per cent for 2015, suggesting that 6.1 million PWID are infected with hepatitis C. For PWID living with HIV, co-infection with hepatitis C is highly prevalent, at 82.4 per cent, with hepatitis C among those living with HIV becoming a major cause of morbidity and mortality.[16] The prevalence of hepatitis B[17] among PWID is estimated at 7.4 per cent, suggesting that 880,000 PWID are infected with the disease.

New, highly effective hepatitis C treatments (direct-acting antivirals) have been shown to cure 90 to 95 per cent of chronic hepatitis in 12 or 24 weeks. In 2015, WHO included direct-acting antivirals in its Model List of Essential Medicines[18] and, in 2016, launched the first global strategy on hepatitis.[19] Despite the high burden of hepatitis C among PWID, treatment has occurred at very low levels, which is related to the substantial barriers that exist for PWID in accessing care.[20] These include lack of awareness, stigma and discrimination, limited access to hepatitis C testing and treatment and the cost of the medications. The median cost of a

15 Louisa Degenhardt and others, "Estimating the burden of disease attributable to injecting drug use as a risk factor for HIV, hepatitis C, and hepatitis B: findings from the Global Burden of Disease Study 2013", *The Lancet Infectious Diseases*, vol. 16, No. 12 (2016), pp. 1385-1398.

16 Lucy Platt and others, "Prevalence and burden of HCV co-infection in people living with HIV: a global systematic review and meta-analysis", *Lancet Infectious Diseases*, vol. 16, No. 7 (2016), pp. 797-808.

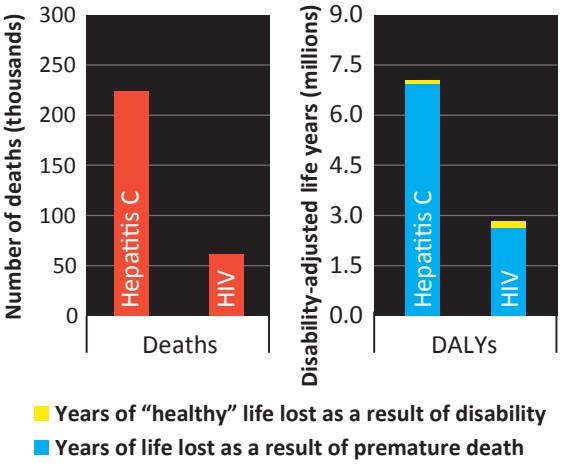
17 The hepatitis B prevalence estimate is intended to refer to active infection (HBsAg), rather than anti-HBc, which indicates previous exposure. However, it is not always possible to differentiate that in the data reported to UNODC.

18 *Model List of Essential Medicines: 19th List* (Geneva, April 2015) (amended November 2015).

19 *Global Health Sector Strategy on Viral Hepatitis 2016-2021: Towards ending viral hepatitis* (Geneva, 2016).

20 Philip Bruggmann and Jason Grebely, "Prevention, treatment and care of hepatitis C virus infection among people who inject drugs", *International Journal of Drug Policy*, vol. 26 (2015), pp. S22–S26.

FIG. 7 Comparison of burden of disease from hepatitis C and HIV attributable to injecting drug use, including past injecting, 2013



Source: Degenhardt and others, "Estimating the burden of disease attributable to injecting drug use as a risk factor for HIV, hepatitis C, and hepatitis B.

Notes: DALYs comprise "healthy" years of life lost as a result of both premature death and years lived with disability.

12-week course of the medication (sofosbuvir) in 26 OECD countries was $42,017, ranging from $37,729 in Japan to $64,680 in the United States.[21]

Only a few countries are taking steps towards universal access to treatment for all people with chronic hepatitis C infections. Some examples where action has been taken include Australia, which, since March 2016, has offered universal access to hepatitis C treatment and has identified prisoners and PWID as priority populations for the expansion of coverage of treatment. France has been providing universal access to hepatitis C treatment under its national health insurance system since September 2016. Georgia and Morocco have launched hepatitis C elimination programmes, and Portugal announced universal access to hepatitis C treatment in 2015.[22]

Drug use and tuberculosis

In previous *World Drug Reports*, limited attention had been devoted to tuberculosis, despite it being a possible consequence of drug use. Ending the global epidemic of tuberculosis is part of target 3.3. of the Sustainable Development Goals and is the aim of the WHO End Tuberculosis Strategy. However, evidence is required to understand how policy on drug use can be an inclusive and integral part of the efforts to achieve that goal. Tuberculosis is a potentially life-threatening infectious disease that is spread from person to person by breathing the same air as those with active tuberculosis, particularly when they cough, sneeze or spit. Despite being preventable and curable in most cases, tuberculosis is one of the top ten causes of death globally, and more people died from tuberculosis in 2015 than from HIV/AIDS. Tuberculosis is one of the leading causes of mortality among people who use drugs and are living with HIV.[23] One of the high-risk groups for the spread of tuberculosis are people who use drugs. Based on the limited data available from studies in Europe, Asia and the Americas,[24] the prevalence of tuberculosis among PWID is estimated at approximately 8 per cent (median prevalence based on 23 studies) with a range from 0.2 per cent to 66 per cent. The prevalence of tuberculosis in the general population at the global level is estimated at less than 0.2 per cent.[25]

People who use drugs are disproportionately affected by risk factors for tuberculosis such as poor social circumstances, infection with HIV and periods of incarceration. People who use drugs are often socioeconomically disadvantaged and vulnerable to poverty, homelessness and malnutrition. Infection with HIV is particularly serious because HIV dramatically increases the chance of latent tuberculosis infection progressing to active tuberculosis.[26] Infection with HIV is a major reason for the high prevalence of tuberculosis among PWID.[27] Without

21 Swathi Iyengar and others, "Prices, costs, and affordability of new medicines for hepatitis C in 30 countries: an economic analysis", *Plos Medicine*, vol. 13, No. 5 (2016), pp. 1-22.

22 WHO, *Global Report on Access to Hepatitis C Treatment: Focus on Overcoming Barriers* (Geneva, 2016).

23 WHO, *Global Tuberculosis Report 2016* (Geneva, 2016).

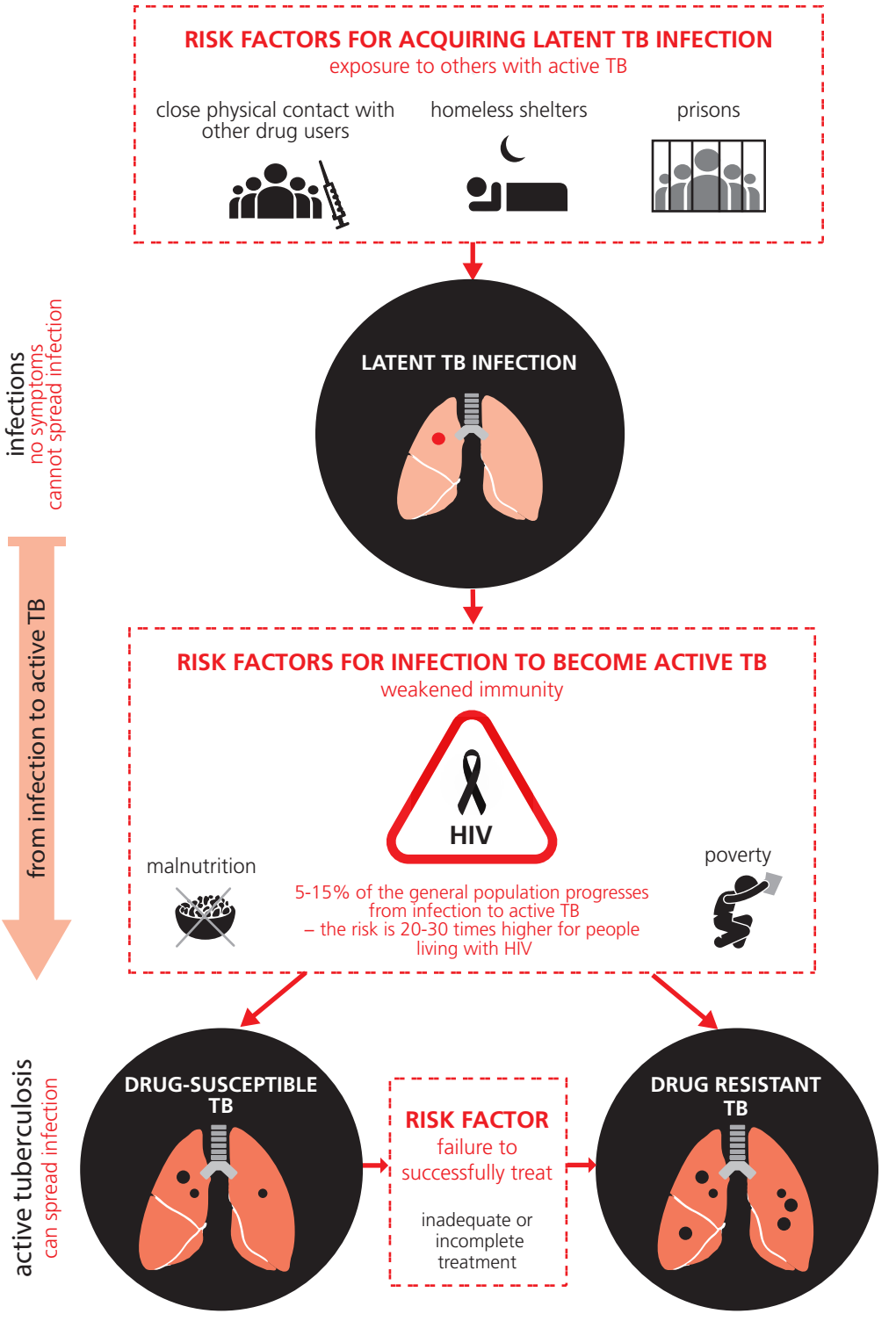
24 Pippa Grenfell and others, "Tuberculosis, injecting drug use and integrated HIV-TB care: A review of the literature", *Drug and Alcohol Dependence*, vol. 129, No. 3 (2013), pp. 180-209, supplemented by responses to annual report questionnaire.

25 WHO, *Global Tuberculosis Report 2015* (Geneva, 2015).

26 Helen McShane, "Co-infection with HIV and TB: double trouble", *International Journal of STD and AIDS*, vol. 16, No. 2 (2005), pp. 95-101.

27 European Centre for Disease Prevention and Control and EMCDDA, *Prevention and control of infectious diseases among people who inject drugs*. Joint publications series (Stockholm, ECDC, 2011).

FIG. 8 | High-risk factors for aquiring and progressing to active tuberculosis (TB) among people who use drugs



treatment, some 5-15 per cent of people with latent tuberculosis infection will develop active tuberculosis at some point in their lifetime.[28] However, people living with HIV are 20 to 30 times more likely to develop tuberculosis than those without HIV.[29] Furthermore, periods of incarceration may place people who use drugs in a high-risk environment for the spread of tuberculosis.

Although newly diagnosed cases of tuberculosis are declining slightly at the global level, one of the major threats and challenges to controlling the disease is the development and spread of tuberculosis that is resistant to the most effective medications used to cure the disease.[30, 31] Drug resistance continues to emerge and spread as a result of mismanagement of tuberculosis treatment, including inadequate compliance with evidence-based treatment and poor adherence to the full treatment regimen, and through person-to-person transmission.[32] The number of confirmed cases of drug-resistant tuberculosis increased globally from 19,500 in 2006 to 132,500 new cases in 2015.[33] Drug use has been identified as an independent risk factor for the spread of multidrug-resistant tuberculosis in some countries.[34, 35, 36, 37, 38, 39] The development of drug-resistant forms of tuberculosis leaves patients with fewer and less effective treatment options. Multidrug-resistant tuberculosis treatment takes much longer and it is more costly to cure, treatment failure is much more common and mortality rates are correspondingly higher, particularly among those who are living with HIV.[40, 41]

Latent tuberculosis infection

People with latent tuberculosis infection are infected with the *Mycobacterium tuberculosis* bacteria but do not have the active disease. They do not feel sick or have any symptoms, and they cannot spread the disease. Latent tuberculosis infection can be treated but, without treatment, it may progress to active tuberculosis, particularly among individuals with weak immune systems. Latent tuberculosis infection (which represents a pool of potential cases of active tuberculosis) and active tuberculosis are more prevalent among people who use drugs than among the general population.[a, b]

[a] Robert G. Deiss, Timothy C. Rodwell and Richard S. Garfein, "Tuberculosis and Illicit Drug Use: Review and Update", *Clinical Infectious Diseases*, vol. 48, No. 1 (2009), pp. 72-82.

[b] Pippa Grenfell and others, "Tuberculosis, injecting drug use and integrated HIV-TB care: A review of the literature", *Drug and Alcohol Dependence*, vol. 129, No. 3 (2013), pp. 180-209.

Drug users in prison contribute to higher level of tuberculosis in prison

According to a recently published review,[42] people who use drugs or have a history of drug use in prison

28 Emilia Vynnycky and Paul E. M. Fine, "Lifetime risks, incubation period, and serial interval of tuberculosis", *American Journal of Epidemiology*, vol. 152, No. 3 (2000), pp. 247-263.

29 Candice K. Kwan and Joel D. Ernst, "HIV and Tuberculosis: a Deadly Human Syndemic", *Clinical Microbiology Reviews*, vol. 24, No. 2 (2011), pp. 351-376.

30 *Global Tuberculosis Report 2016.*

31 Neel R. Gandhi and others, "Multidrug-resistant and extensively drug-resistant tuberculosis: a threat to global control of tuberculosis", *The Lancet*, vol. 375, No. 9728 (2010), pp. 1830-1843.

32 Surendra K. Sharma and Alladi Mohan, "Multidrug-resistant tuberculosis: a menace that threatens to destabilize tuberculosis control", *Chest*, vol. 130, No. 1 (2006), pp. 261-272.

33 Confirmed cases of rifampicin-resistant and multidrug-resistant TB (WHO, Global Health Observatory data repository. Available at http://apps.who.int/gho/data/node.home).

34 Pippa Grenfell and others, "Tuberculosis, injecting drug use and integrated HIV-TB care: A review of the literature", *Drug and Alcohol Dependence*, vol. 129, No. 3 (2013), pp. 180-209.

35 Laura F. Anderson and others, "Transmission of multidrug-resistant tuberculosis in the UK: a cross-sectional molecular and epidemiological study of clustering and contact tracing", *Lancet Infectious Diseases*, vol. 14, No. 5 (2014), pp. 406-415.

36 Patrick K. Moonan and others, "Transmission of multidrug-resistant tuberculosis in the USA: a cross-sectional study", *Lancet Infectious Diseases,* vol. 13, No. 9 (2013), pp. 777-784.

37 Marta Gomes and others, "Risk Factors for Drug-Resistant Tuberculosis", *Journal of Tuberculosis Research*, vol. 2, No. 3 (2014), pp. 111-118.

38 M. Casal and others, "A case-control study for multidrug-resistant tuberculosis: risk factors in four European countries", *Microbial Drug Resistance*, vol. 11, No. 1 (2005), pp. 62-67.

39 Nino Mdivani and others, "High Prevalence of Multidrug-Resistant Tuberculosis in Georgia", *International Journal of Infectious Diseases*, vol. 12, No. 6 (2008), pp. 635-644.

40 *Global Tuberculosis Report 2016.*

41 Gandhi and others, "Multidrug-resistant and extensively drug-resistant tuberculosis".

42 Dolan and others, "Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees".

Drug use, injecting drug use and HIV in prisons

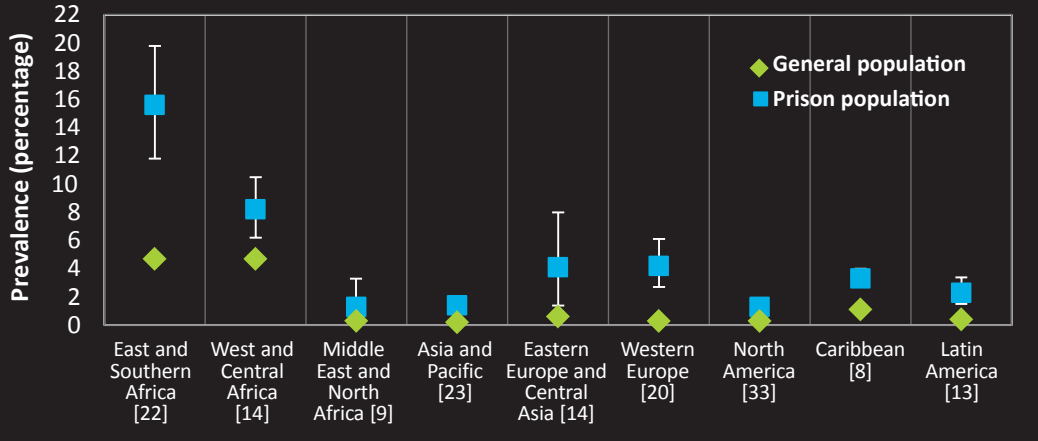
On any given day there are approximately 10 million people held in prison (including for pretrial detention) throughout the world,[a] although the number of people who pass through prison each year is considerably higher. Drug use, including the use of heroin and injecting drug use, occurs in many prisons, which are an environment where the prevalence of HIV is higher than among the general population.

Data on the prevalence of HIV among PWID in prison are scarce. Based on 34 studies in 16 countries identified in a systematic review,[b] covering the period 2005-2015, the unweighted mean prevalence of HIV among PWID in prison was 12.9 per cent. However, more than half of the studies were from just three countries (Australia, Iran (Islamic Republic of) and United States). Of the 34 studies, 4 reported a prevalence of HIV among PWID in prison of greater than 40 per cent; 6 studies reported a prevalence of greater than 20 per cent; 11 studies reported a prevalence of greater than 15 per cent. Overall, 16 studies reported a prevalence of greater than 10 per cent, while the remaining 18 studies reported a prevalence of below 10 per cent.

Data on the prevalence of HIV in prison populations in general are more readily available. People in prisons are five times more likely to be living with HIV than adults in the general population.[c] Overrepresentation of PWID among prison populations contributes to HIV prevalence in prisons, particularly in countries where the HIV epidemic in communities is largely driven by injecting drug use.[d] Globally, an estimated 3.8 per cent (3.2 per cent to 4.5 per cent) of prisoners are living with HIV.[b] In all subregions, the prevalence of HIV is higher in prisons than in the wider community, especially in certain subregions in Africa and in Europe and Central Asia (as shown in the figure below), where the prevalence of HIV is highest in prison populations (8-16 per cent and 4- 5 per cent, respectively).

People who use drugs often continue to do so while incarcerated, and other prisoners may initiate drug use or injecting while in prison. Globally, an estimated one in three prisoners have used an illicit substance at some point while incarcerated (median lifetime prevalence of 32.6 per cent, based on data from 32 studies), with 20.0 per cent reporting use in the past year (median past-year prevalence from 45 studies) and 16.0 per cent reporting current use (median past-month prevalence from 17 studies). Heroin is the second most popular drug (after cannabis), with 9.6 per cent reporting heroin use at some point while incarcerated (median lifetime prevalence from 22 studies) and 3.2 per cent reporting current use (median past-month prevalence from 18 studies). There is currently limited but increasing evidence of the use of NPS (especially synthetic cannabinoids) within prisons, but at present it is not possible to quantify the extent. Numerous studies have shown that injecting drug use is highly prevalent in many prisons, with the sharing of needles and syringes commonplace.[e] Unsafe injecting practices in prison, where rates of HIV are high, place PWID at an increased risk of HIV through the use of contaminated needles and syringes.

Prevalence of HIV in prisons compared with the general population, by region, 2005-2015



Source: Adeeba Kamarulzaman and others, "Prevention of transmission of HIV, hepatitis B virus, hepatitis C virus, and tuberculosis in prisoners", *The Lancet*, Vol. 388, No. 10049 (2016), pp. 1115-1126.

Note: Error bars represent 95 per cent confidence intervals. Based on a total of 156 studies. Number of studies included in regional estimates of HIV in prisons given in square brackets.

[a] Roy Walmsley, *World Prison Population List* (eleventh edition), Institute for Criminal Policy Research.

[b] Kate Dolan and others, "Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees", *The Lancet*, vol. 388, No. 10049 (2016), pp. 1089-1102.

[c] Political Declaration on HIV and AIDS: On the Fast-Track to Accelerating the Fight against HIV and to Ending the AIDS Epidemic by 2030 (General Assembly resolution 70/266, annex).

[d] Kate Dolan and others, "People who inject drugs in prison: HIV prevalence, transmission and prevention", *International Journal of Drug Policy*, vol. 26, Suppl No. 1 (2015), pp. S12-S15.

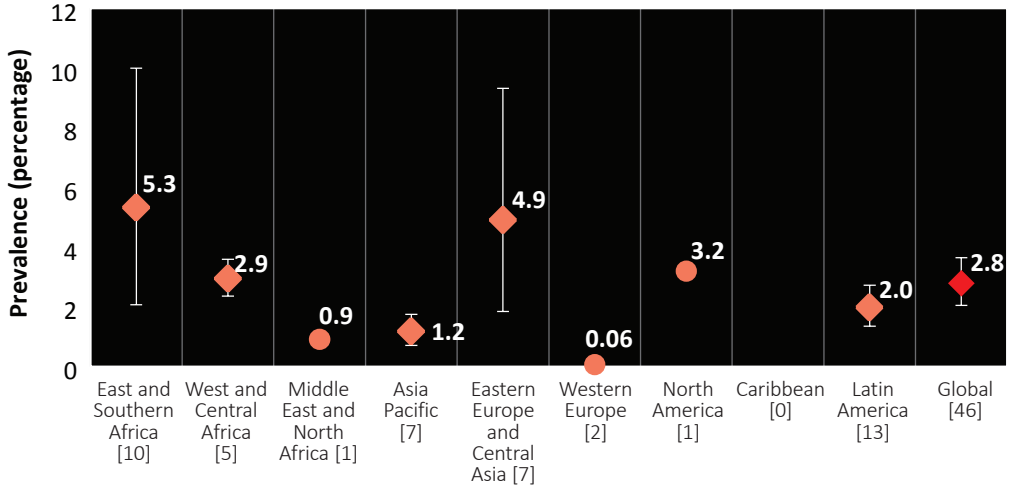
[e] Ralf Jürgens, Andrew Ball and Annette Verster, "Interventions to reduce HIV transmission related to injecting drug use in prison", *Lancet Infectious Diseases*, vol. 9, No. 1 (2009), pp. 57-66.

contribute to the higher prevalence of infectious diseases, including tuberculosis, in prison populations than in the general population.

Tuberculosis in prisons is a major public health problem, particularly in countries where there is a high incidence of the disease. The tuberculosis notification rate in prisons ranges from 11 to 81 times higher than in the general population and the situation is worsened by the emergence and spread of drug-resistant tuberculosis.[43] Globally, an estimated 2.8 per cent (2.05 per cent to 3.65 per cent) of prisoners have active tuberculosis, with the highest rates in Eastern Europe and Central Asia (4.9 per cent), and East and Southern Africa (5.3 per cent).[44] The prevalence of tuberculosis in European prisons has been estimated to be almost 15 times greater than among the wider community.[45] People with drug use problems, such as PWID, often spend time in prison: according to UNAIDS, an estimated 56-90 per cent of PWID are incarcerated at some point in their lives.[46] Regardless of the offence, the proportion of prisoners reporting a history of drug use has been estimated at 10-48 per cent for men and 30-60 per cent for women.[47] The overall higher prevalence of tuberculosis observed in prison populations compared with in the general population may be partially attributed to the fact that a high proportion of prisoners have a history of drug use, and people who use drugs might have a history of higher exposure to the risk factors for tuberculosis and HIV than people in the general population.

Compared with the general population, people who use drugs in prison have a higher risk of contracting tuberculosis because of their history of drug use and because they are confined in an environment that puts them at a higher risk of infection. The risk of latent tuberculosis infection and tuberculosis are at least one order of magnitude greater in prisons and

FIG. 9 | Prevalence of tuberculosis in prison populations, by region, 2005-2015



Source: Kate Dolan and others, "Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees", *The Lancet*, vol. 388, No. 10049 (2016), pp. 1089-1102.

Notes: Diamonds represent regional estimates. Circles are from a single study. The number of studies included in each region is given in square brackets. Pooled regional estimates could not be made for the Middle East and North Africa, Western Europe or North America because of the lack of studies. For Western Europe, the maximum prevalence from the two studies is presented. No studies from the Caribbean were identified. Error bars represent 95 per cent confidence intervals.

43 Stefan Enggist and others, eds., *Prisons and Health* (Copenhagen, WHO Regional Office for Europe, 2014).

44 Dolan and others, "Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees".

45 A. Aerts and others, "Tuberculosis and tuberculosis control in European prisons", *International Journal of Tuberculosis and Lung Disease*, vol. 10, No. 11 (2006), pp. 1215-1223.

46 *The GAP Report 2014*.

47 Seena Fazel, Parveen Bains and Helen Doll, "Substance abuse and dependence in prisoners: a systematic review", *Addiction*, vol. 101, No. 2 (2006), pp. 181-191.

are estimated to be 26.4 and 23 times higher, respectively, than in the corresponding general populations.[48] Overcrowding, poor ventilation, poor nutrition and a lack of screening, prevention and treatment of tuberculosis put prisoners at risk of the disease. Furthermore, as HIV plays a significant role in the spread of tuberculosis, in prison settings where there is an absence of evidence-based prevention programmes, unsafe injecting practices and the associated risk of HIV (see box on page 24) can substantially increase the chance of acquiring tuberculosis. All those factors can place people who use drugs, especially PWID, at increased risk of tuberculosis while in prison.

Almost all of the people who are incarcerated will eventually return to their communities. The health of prisoners will therefore have an impact on the general population. Ultimately, the elevated risk of tuberculosis in prisons is likely to affect the burden of tuberculosis on the general population. In high-income countries, it has been estimated that 8.5 per cent (1 in every 11 cases) of tuberculosis in the general population is attributable to exposure in prisons. For low- and middle-income countries, the corresponding proportion is 6.3 per cent (1 in every 16 cases).[49]

Challenges in treating tuberculosis among people who use drugs

Access to quality treatment and adherence to the schedule and completion of treatment are imperative to cure and prevent the development of drug-resistant tuberculosis and avoid the further spread of the disease to others. Awareness of the risks of tuberculosis and the treatment options that are available may be low among people who use drugs. Certain barriers to care are typically experienced by some people who use drugs, such as the fear of reprisal by authorities and the stigmatization of drug use. These factors can lead to a delay in people seeking treatment, even when they have symptoms, and could limit access to or result in the underutilization of tuberculosis, HIV and health services in general.[50, 51] For those who use drugs and who are in treatment for tuberculosis, poor adherence and low completion rates have been reported.[52, 53] These factors increase the likelihood that drug resistance will develop, or that tuberculosis is not diagnosed and treated, including in those infected with the drug-resistant form, with the possibility of further people being infected.

Treatment of tuberculosis (especially for drug-resistant forms) is lengthy and complex. It is even more complex for people who use drugs as they may be living with multiple, concurrent, infectious diseases in addition to drug dependency, requiring a particular effort and an integrated approach to their care.[54, 55, 56, 57, 58, 59]

At least 190,000 mostly preventable drug-related deaths in 2015

Drug-related deaths are the most extreme consequence resulting from drug use. The definition and reporting of drug-related deaths may vary from country to country but it includes all or some of the following conditions: overdoses, deaths from HIV/

48 Iacopo Baussano and others, "Tuberculosis Incidence in Prisons: A Systematic Review", *PLoS Medicine*, vol. 7, No. 12 (2010).

49 Ibid.

50 Robert G. Deiss, Timothy C. Rodwell and Richard S. Garfein, "Tuberculosis and Illicit Drug Use: Review and Update", *Clinical Infectious Diseases*, vol. 48, No. 1 (2009), pp. 72-82.

51 Anya Sarang and others, "Delivery of effective tuberculosis treatment to drug dependent HIV-positive patients" (Moscow, Andrey Rylkov Foundation for Health and Social Justice, 2011).

52 G. M. Craig and others, "The impact of social factors on tuberculosis management", *Journal of Advanced Nursing,* vol. 58, No. 5 (2007), pp. 418-424.

53 Deiss, Rodwell and Garfein, "Tuberculosis and Illicit Drug Use".

54 Ibid.

55 Grenfell and others, "Tuberculosis, injecting drug use and integrated HIV-TB care".

56 WHO, *Integrating Collaborative TB and HIV Services within a Comprehensive Package of Care for People who Inject Drugs: Consolidated Guidelines* (Geneva, 2016).

57 Haileyesus Getahun, Annabel Baddeley and Mario Raviglione, "Managing tuberculosis in people who use and inject illicit drugs", *Bulletin of the World Health Organization*, vol. 91, No. 2 (2013), pp. 154-156.

58 WHO, UNODC and UNAIDS, *Policy Guidelines for Collaborative TB and HIV Services for Injecting and Other Drug Users: An Integrated Approach*, Evidence for Action Technical Papers (Geneva, 2008).

59 Haileyesus Getahun and others, "Tuberculosis and HIV in people who inject drugs: evidence for action for tuberculosis, HIV, prison and harm reduction services", *Current Opinion in HIV AIDS*, vol. 7, No. 4 (2012), pp. 345-353.

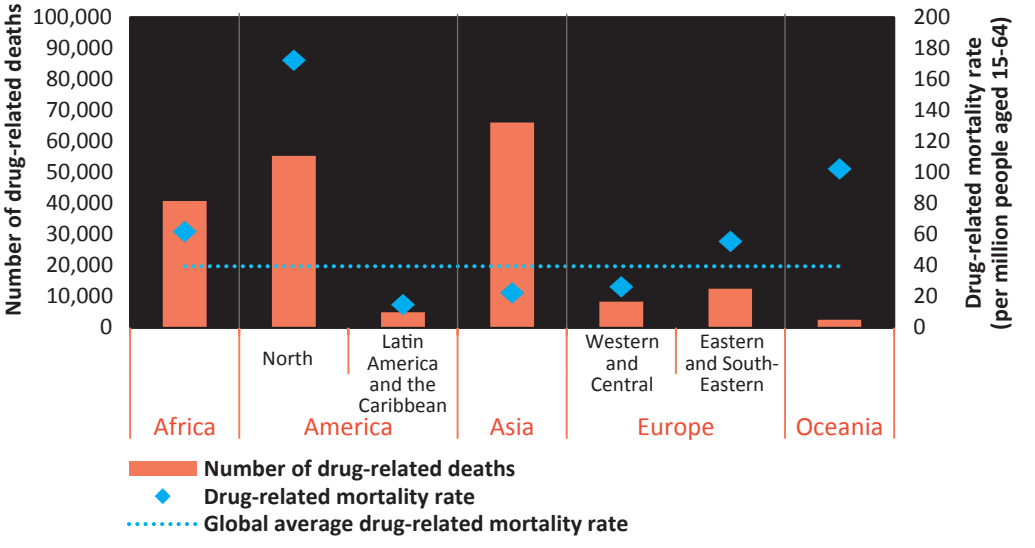
AIDS and hepatitis C acquired through injecting drug use; behavioural disorders caused by use of psychoactive substances; intentional self-harm and self-poisoning (suicide) by exposure to psychotropic substances; and unintentional deaths and trauma resulting from drug use (motor vehicle accidents and other forms of accidental deaths).

Globally, UNODC estimates that there were 190,900 (range: 115,900 to 230,100) drug-related deaths in 2015, or 39.6 (range: 24.0 to 47.7) deaths per million people aged 15-64 years. This is based on the reporting of drug-related deaths by 86 countries. Given differences in the definition and reporting of drug-related deaths by Member States that often only report on overdose deaths to UNODC, and the difficulty in categorically ascertaining that a death is in fact drug-related, this global estimate is most likely an underestimate of all deaths that could be attributable to drug use.[60]

The deaths from all causes of morbidity and mortality from drug use, as presented by the Global Burden of Disease Study 2015, take into account most of the causes of death that could be attributable to drug use. In that study, the deaths attributable to drug use disorders alone (170,000) match most closely those presented by UNODC as being mostly related to overdose. In addition, the Global Burden of Disease Study 2015 presents deaths related to HIV and hepatitis C as well as other causes that are mostly omitted from UNODC reporting.

At more than four times the global average, North America continues to experience the highest drug-related mortality rate, with the subregion accounting for more than one in four drug-related deaths globally. Oceania (based on data from Australia and New Zealand only) also has a high drug-related mortality rate, at more than 2.5 times the global average. A large number of drug-related deaths (35 per cent of the global total) are estimated to occur in Asia, although this number is tentative because of poor regional coverage and reporting of mortality data. Despite the large number of deaths, the drug-related mortality rate in Asia is below the global average. Because of differences in reporting, comparisons across countries and regions should be made with the greatest of care.

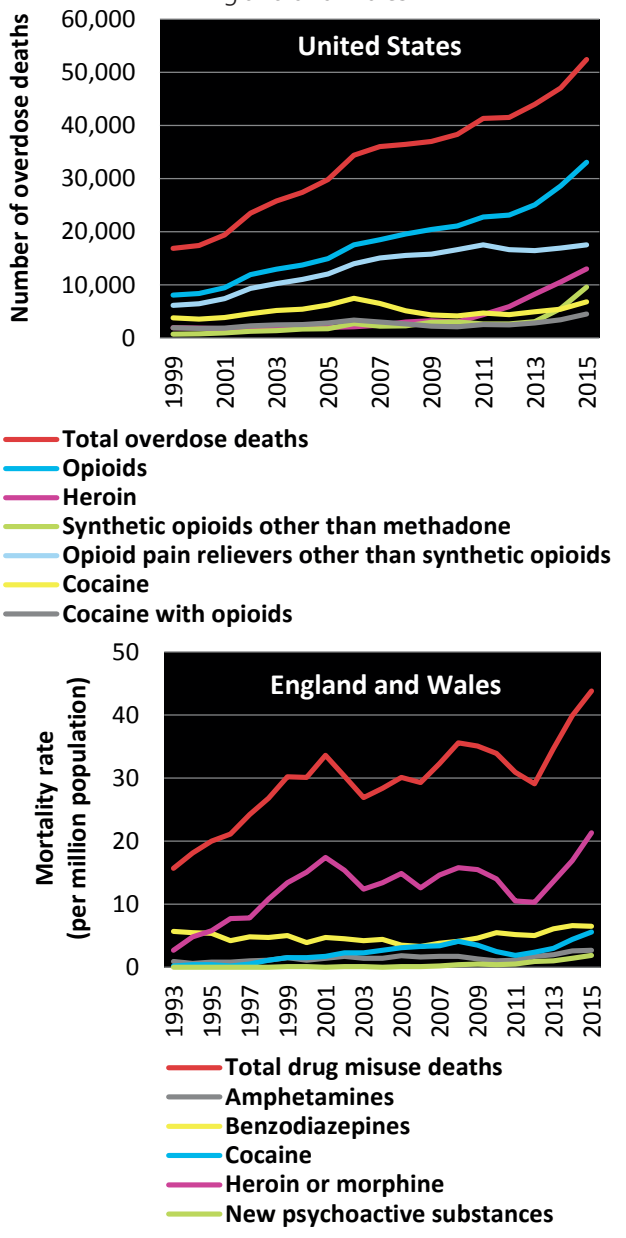
FIG. 10 | Regional variation in drug-related deaths, 2015



Sources: Responses to the annual report questionnaire; Inter-American Drug Abuse Control Commission; and Louisa Degenhardt and others, "Illicit drug use", in *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*, vol. 1, Majid Ezzati and others, eds. (Geneva, WHO, 2004).

60 *World Drug Report 2016* (United Nations publication, Sales No. E.16.XI.7).

FIG. 11 Drug-related deaths from selected substances in the United States and in England and Wales



Sources: United States, National Institute on Drug Abuse, National Center on Health Statistics, Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research; and United Kingdom of Great Britain and Northern Ireland, Office for National Statistics, "Deaths related to drug poisoning in England and Wales: 2015 registrations", Statistical Bulletin (Newport, 9 September 2016).

Notes: For England and Wales, chart shows age-standardized mortality rates per million population, standardized to the 2013 European standard; figures are for deaths registered, rather than deaths occurring in each calendar year.

The estimated number of drug-related deaths remained essentially stable at the global level in 2015. However, this masks the concern in several countries in North America and Europe (where there are large numbers of drug-related deaths) that 2015 was a year in which new record levels of drug-related deaths occurred. Opioids were the drug type most often implicated in the rising numbers of deaths in those countries, and they remain the drug type associated with most overdose deaths in many countries, although the specific opioid substance may change across countries and over time. In the Islamic Republic of Iran, for example, opium used to be the drug most associated with overdoses, although the number of such overdoses has now declined and, following recent increases, overdoses involving methadone are now more common (combining methadone with other drugs, such as benzodiazepines and/or alcohol, drastically increases the risk of fatal overdose).[61, 62]

In the United States, where approximately one quarter of estimated global drug-related deaths are recorded, overdose deaths continue to rise.[63] Mostly driven by opioids, overdose deaths more than tripled in the period 1999-2015 and increased by 11.4 per cent in the past year alone, to reach the highest level ever recorded. Recent increases in opioid overdoses since 2011 are mostly driven by heroin and synthetic opioids other than methadone (a category dominated by fentanyl-related overdoses). Between 2012 and 2015, overdose deaths from synthetic opioids other than methadone increased by 265 per cent, and between 2014 and 2015 by 72 per cent (most likely driven by illicit fentanyl); in the case of heroin overdose deaths, the corresponding increases were 119 per cent and 23 per cent over those two periods. Overdose deaths related to misuse of opioid pain relievers other than synthetic opioids (reflecting

61 United Kingdom, National Treatment Agency for Substance Misuse, "Does the combined use of heroin or methadone and other substances increase the risk of overdose?" (London, February 2007).

62 Hossein Hassanian-Moghaddam and others, "Acute adult and adolescent poisoning in Tehran, Iran: the epidemiologic trend between 2006 and 2011", *Archives of Iranian Medicine,* vol. 17, No. 8 (2014), pp. 534-538.

63 Rose A. Rudd and others, "Increases in Drug and Opioid-Involved Overdose Deaths: United States, 2010-2015", *Morbidity and Mortality Weekly Report*, vol. 65, Nos. 50 and 51 (2016), pp. 1445-1452.

deaths from prescription opioids), although still at a high level, have stabilized over the past four years, possibly because of changes in policy and changes in the health system, including the review of the prescription monitoring programme and prescribing guidelines. Cocaine overdoses have also increased recently, largely as a result of the involvement of an opioid (mainly fentanyl), with overdoses from this drug combination more than doubling since 1999.

In British Colombia, Canada, the overdose death rate (285 per million population aged 15-64 years)[64] is even higher than in the United States (246 per million aged 15-64 years), with 914 overdose deaths in the province in 2016. That was by far the highest number ever recorded, representing an increase of 79 per cent from 2015 (when there were 510 deaths) and a 240 per cent increase from 2012 (when there were 269 deaths). Deaths related to the use of fentanyl largely account for the increase observed in overdose deaths since 2012.[65]

The United Kingdom of Great Britain and Northern Ireland accounts for a large proportion (36 per cent) of the total number of reported overdose deaths that occur in Europe.[66] In England and Wales, the highest mortality rate from drug misuse[67] since comparable records began in 1993 was recorded in 2015, when there were 2,479 deaths, an increase of 10.3 per cent from 2014.[68, 69] Deaths involving heroin and/or morphine have doubled over the past three years to reach their highest levels, partly driven by increases in heroin purity and availability, and also because the ageing cohort of heroin users have a range of medical conditions resulting from long-term drug use, making them particularly vulnerable. Deaths involving cocaine, amphetamine (including "ecstasy") and NPS (most commonly mephedrone) also reached an all-time high. Similarly, 706 deaths related to drug misuse were registered in Scotland in 2015, which was 15 per cent higher than in 2014 and the largest number recorded since comparable records began, in 1996.[70] Opioids (including heroin/morphine and methadone) were implicated in, or potentially contributed to, 606 of those deaths (86 per cent).

C. PHARMACEUTICAL OPIOIDS

Pharmaceutical opioids[71] are used effectively in the management of acute and chronic pain resulting from different conditions and for the treatment of opioid use disorders.[72, 73, 74] The need for pain management can vary from post-surgical care to palliative therapy for people with cancer and chronic conditions.[75] Palliative care is an approach that improves the quality of life of patients and their families facing problems associated with life-threatening illness through the prevention and relief of suffering by means of early identification, assessment and treatment of pain and other related problems.[76]

64 Calculation based on the population aged 15-64 in British Columbia in 2016 of 3,209,661 (British Columbia Statistics, People, Population and Community, Population Estimates). Available at www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-estimates.

65 Canada, British Colombia Coroners' Service, "Illicit drug overdose deaths in BC. January 1, 2007-December 31, 2016" (Office of the Chief Coroner, Burnaby, British Columbia, 18 January 2017).

66 EMCDDA, *European Drug Report 2016: Trends and Developments* (Luxembourg, Publications Office of the European Union, 2016).

67 The definition of a drug misuse death is either a death where the underlying cause is drug abuse or drug dependence or a death where the underlying cause is drug poisoning and where any of the substances controlled under the United Kingdom Misuse of Drugs Act 1971 are involved.

68 United Kingdom, Office for National Statistics, "Deaths related to drug poisoning in England and Wales: 2015 registrations", Statistical Bulletin (Newport, 9 September 2016).

69 United Kingdom, Office for National Statistics, "Deaths related to drug poisoning in England and Wales: 2014 registrations", Statistical Bulletin (Newport, 3 September 2015).

70 National Records of Scotland, *Drug-related deaths in Scotland in 2015* (Edinburgh, 17 August 2016).

71 In this section, the terms "pharmaceutical opioids", "prescription opioids" and "synthetic opioids" are used interchangeably.

72 Charles E. Inturrisi, "Clinical pharmacology of opioids for pain", *Clinical Journal of Pain*, vol. 18, No. 4 (2002), pp. S3-S13.

73 Howard B. Gutstein and Huda Akil, "Opioid analgesics", in *Goodman and Gilman's the Pharmacological Basis of Therapeutics*, 11th ed., Laurence L. Brunton, ed. (New York, McGraw-Hill, 2006), pp. 547-590.

74 WHO, *Ensuring Balance in National Policies on Controlled Substances: Guidance for Availability and Accessibility of Controlled Medicines* (Geneva, 2011).

75 Ibid.

76 WHO and World Palliative Care Alliance, *Global Atlas of Palliative Care at the End of Life*, Stephen R. Connor and

Despite the fact that controlled medicines for pain relief and for the treatment of opioid use disorders are included in the WHO List of Essential Medicines, access to them is very limited. It is estimated that, each year, millions of people with terminal cancer, end-stage AIDS, severe injuries caused by accident, women in labour, paediatric patients, people recovering from surgery and patients with chronic illnesses such as cardiovascular or respiratory diseases and diabetes are subjected to untreated or undertreated moderate to severe pain.[77] There is strong evidence regarding the efficacy of treatment of opioid dependence with long-acting opioid agonists (opioid substitution therapy). Such treatment can significantly reduce opioid and other drug use, criminal activity, HIV risk behaviours and transmissions, opioid overdose and all-cause mortality, in addition to helping retain people in treatment, including antiretroviral therapy and tuberculosis treatment.[78]

Access to pain medication: key issues and considerations

In spite of the need for pharmaceutical opioids for the management of different conditions, in most parts of the world there remain significant disparities in the availability of and access to pain medication for improving the quality of life of people suffering from those conditions. In 2014, the International Narcotics Control Board (INCB) conducted a survey on countries' policies and practices for ensuring the availability of narcotic drugs for medical and scientific purposes.[79] The three major areas identified as impediments to the availability of and access to pain medications were lack of training or awareness among medical professionals, fear of addiction and limited resources. Many other interlinked factors, such as fear of diversion, fear of prosecution, onerous regulatory frameworks or sanctions and control measures, and social and cultural attitudes, were also reported as impediments to the availability of and access to pain medications.[80, 81, 82]

The fear of addiction to opioid painkillers, despite the risk of addiction being very low, contributes to the complex dynamics influencing access to and availability of controlled medicines. A structured review of 67 studies found that 3 per cent of chronic non-cancer pain patients regularly taking opioids developed opioid use disorders.[83] Research has also shown that the factors that have been associated with increased risk of misuse leading to addiction to prescription opioids among patients include young age, a history of substance use disorder, major depression and the use of other medications, such as benzodiazepines.[84, 85, 86, 87]

Preventing diversion of prescription opioids within long-term opioid agonist treatment programmes

Although a valid concern, the diversion of prescription opioids, including within long-term opioid agonist treatment programmes, can be addressed through implementing a set of recommended strategies. In 2015, a systematic review of published

María C. Sepulveda Bermedo, eds. (London, World Palliative Care Alliance, 2014).

77 *Ensuring Balance in National Policies on Controlled Substances*.

78 WHO, *Guidelines for the Psychosocially Assisted Pharmacological Treatment of Opioid Dependence* (Geneva, 2009).

79 *Availability of Internationally Controlled Drugs: Ensuring Adequate Access for Medical and Scientific Purposes–Indispensable, Adequately Available and not Unduly Restricted* (E/INCB/2015/1/Supp.1).

80 *Ensuring Balance in National Policies on Controlled Substances*.

81 Deborah Dowell, Tamara M. Haegerich and Roger Chou, "CDC guideline for prescribing opioids for chronic pain: United States, 2016", *Morbidity and Mortality Weekly Report: Recommendations and Reports*, vol. 65, No. 1 (2016), pp. 1-49.

82 Nat Wright and others, "Addressing misuse and diversion of opioid substitution medication: guidance based on systematic evidence review and real-world experience", *Journal of Public Health*, vol. 38, No. 3 (September 2016), pp. e368-e374.

83 David A. Fishbain and others, "What percentage of chronic non-malignant pain patients exposed to chronic opioid analgesic therapy develop abuse/addiction and/or aberrant drug related behaviours? A structured evidence-based review", *Pain Medicine*, vol. 9, No. 4 (May 2008), pp. 444-459.

84 Dowell, Haegerich and Chou, "CDC guideline for prescribing opioids for chronic pain".

85 Jette Højsted and others, "Classification and identification of opioid addiction in chronic pain patients", *European Journal of Pain,* vol. 14, No. 10 (2010), pp. 1014-1020.

86 Caleb J. Banta-Green and others, "Opioid use behaviors, mental health and pain: development of a typology of chronic pain patients", *Drug and Alcohol Dependence*, vol. 104, Nos. 1 and 2 (2009), pp.34-42.

87 Nora D. Volkow and A. Thomas McLellan, "Opioid abuse in chronic pain: misconceptions and mitigation strategies", *The New England Journal of Medicine*, vol. 374, No. 13 (March 2016), pp. 1253-1263.

Common pharmaceutical opioids include:

Morphine, oxycodone, oxymorphone, hydrocodone, fentanyl, codeine, buprenorphine, methadone and tramadol.

While morphine is prescribed for the relief of severe pain, other opioids such as oxycodone and oxymorphone could be prescribed for the management of severe to moderate pain.

Fentanyl is used for the management of post-operative pain by intravenous and epidural routes of administration. Transdermal patches are used for chronic pain, whereas transmucosal dosage is used for breakthrough cancer pain.

Opioids such as buprenorphine and methadone are also used for the management and treatment of opioid use disorders.

literature identified 37 highly relevant sources of evidence on effective strategies to prevent the diversion of prescription opioids in opioid dependence treatment programmes.[88] Experts were asked to review that evidence and, based on their clinical experience, rank the list of strategies with high impact, which was defined as effectiveness in preventing diversion and ease of implementation. Based on the study findings, eight strategies were found to have a high impact on preventing the diversion of prescription opioids in opioid dependence treatment programmes. Those measures included: (a) supervising consumption among those patients most likely to misuse or divert, while providing extended take-home medications only for patients when their dosage and social situation are stable and who accept abuse deterrent formulations; and (b) restricting take-home formulations that could put children at risk through unintentional exposure. Formulations that make opioids harder to misuse, particularly in the case of opioids that are prone to be injected, can be applied in different ways. Such formulations can either have a mechanical deterrence, such as being crush proof, or contain the addition of an opioid antagonist such as naltrexone, to limit misuse and diversion. Finally, increasing training for health-care practitioners and combining psychosocial interventions, including cognitive and behavioural approaches and contingency management techniques, along with medically assisted treatment of opioid use disorders, were found to be the most effective.

88 Wright and others, "Addressing misuse and diversion of opioid substitution medication".

Misuse of prescription opioids

In the past two decades, concerns about the misuse of opioids and its related harms have been increasing. Those concerns include dependence and fatal and non-fatal overdose resulting from the misuse of opioids, particularly in combination with other substances such as benzodiazepines. High levels of misuse of prescription opioids have been seen in countries such as Australia and the United States, where there is easy access to and some of the highest per-capita consumption of opioids for medical purposes.[89] However, making prescription opioids available does not necessarily lead to their misuse and addiction. The opposite is also true: some countries have limits or restrictions on the availability and accessibility of opioid painkillers and have low per-capita consumption of opioids for medical purposes yet have high levels of misuse of such substances.[90, 91]

Are the dynamics of the misuse of prescription opioids the same in all regions?

Available literature suggests that the dynamics of the misuse of prescription opioids remain different in different countries and regions. In North America, the increase in the misuse of prescription opioids has been attributed in part to the organization of the health system's structures for regulation and access control, prescription practices, dispensing and medical culture and patient expectations.[92] The misuse of prescription opioids in Europe is

89 E/INCB/2015/1/Supp.1.

90 *World Drug Report 2014* (United Nations Publication, sales No. E.14.XI.7).

91 Louisa Degenhardt and others, *Benefits and Risks of Pharmaceutical Opioids: Essential Treatment and Diverted Medication – A Global Review of Availability, Extra-Medical Use, Injection and the Association with HIV* (Sydney, National Drug and Alcohol Research Centre, University of New South Wales, 2007).

92 Bendikt Fischer and others, "Non-medical use of prescription opioids and prescription opioid-related harms: why so markedly higher in North America compared to the rest of the world?", *Addiction*, vol. 109, No. 2 (February 2014), pp. 177-181.

considered to have been shaped by the response to the opiate problem, in which the misuse of prescription opioids, many of which are either diverted from legal sources or manufactured illicitly, is seen primarily in the context of legal alternatives to heroin.[93] In middle-income or developing countries, the misuse of prescription opioids seems to occur in an environment of health-care systems, including the systems for the monitoring and dispensing of prescription opioids, that are neither well developed nor regulated, coupled with the wider availability of counterfeit or illicitly manufactured or trafficked prescription opioids to meet the demand for the misuse of substances.[94, 95]

Use of prescription opioids and heroin in the United States

The United States is currently experiencing combined and interrelated opioid epidemics of prescription opioids and heroin.[96] The increase in the misuse of prescriptions opioids was driven from 1997 onwards by the medical practice of prescribing more and higher doses of opioids,[97] which also resulted in the diversion and misuse of prescription opioids, as they were considered less stigmatized than heroin. This was followed in 2010 by changes in the formulation of commonly prescribed opioids, such as OxyContin,® to make them controlled-release and tamper proof, thereby preventing their misuse by snorting or injecting. From 2007 onwards, an increase in heroin use was also observed, which was attributed to the availability of pure and cheaper heroin in the market.[98] It has been shown that each $100 decrease in the price per pure gram of heroin

93 Paul Griffiths, Michael Evans-Brown and Roumen Sedefov, "The (mis)use of psychoactive medicines: getting the balance right in complex system", *Addiction*, vol. 109, No. 2 (February 2014), pp. 182-188.

94 Ibid.

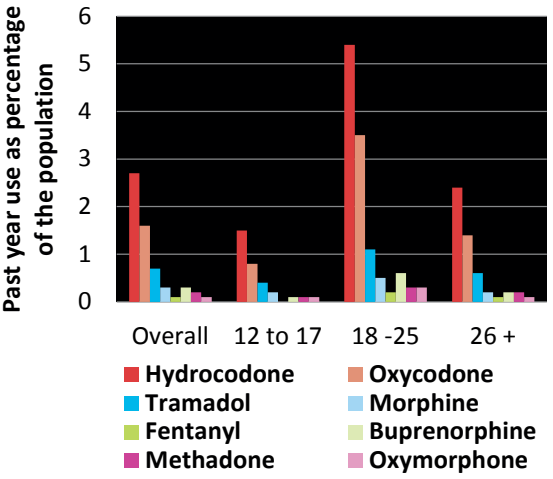
95 *Report of the International Narcotics Control Board for 2012* (E/INCB/2012/1).

96 Compton and others, "Relationship between nonmedical prescription-opioid use and heroin use".

97 Nicholas B. King and others, "Determinants of increased opioid-related mortality in the United States and Canada, 1990-2013: a systematic review", *American Journal of Public Health*, vol. 104, No. 8 (August 2014).

98 United States, Center for Behavioral Health Statistics and Quality, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health*, HHS Publication No. SMA 16-4984, NSDUH Series H-51 (Rockville, Maryland, 2016).

FIG. 12 Misuse of prescription opioids in the past year, by age group, United States, 2015



Source: United States, Center for Behavioral Health Statistics and Quality, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health*, HHS Publication No. SMA 16-4984, NSDUH Series H-51 (Rockville, Maryland, 2016).

resulted in a 2.9 per cent increase in the number of hospitalizations for heroin overdose.[99] Current heroin users are also more likely to have used prescription opioids and then switched to heroin use.[100, 101] Available data suggest that the non-medical use of prescription opioids is neither necessary nor sufficient for the initiation of heroin use, and other factors could have contributed to the increase in heroin use and related mortality.[102]

In 2015, an estimated 828,000 people aged 12 years or older used heroin in the United States and over 12 million people misused prescription opioids.[103]

99 George Unick and others, "The relationship between US heroin market dynamics and heroin-related overdose, 1992-2008", *Addiction*, vol. 109, No. 11 (November 2014), pp. 1889-1898.

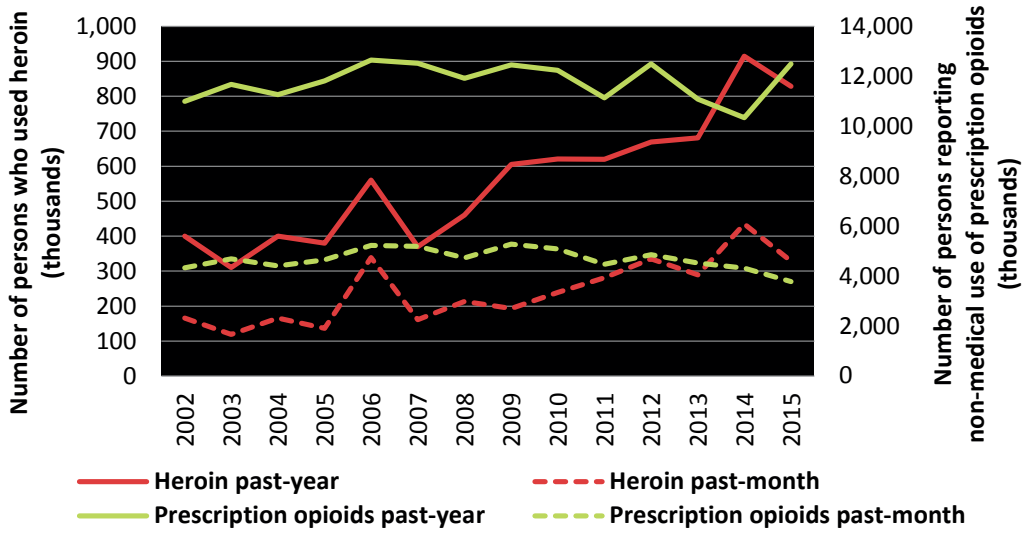
100 For details see *World Drug Report 2016*.

101 Andrew Kolodny and others, "The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction", *Annual Review of Public Health*, vol. 36 (March 2015), pp. 559-574.

102 Compton and others, "Relationship between nonmedical prescription-opioid use and heroin use".

103 According to the United States Substance Abuse and Mental Health Services Administration, misuse of prescription drugs is defined as: use in any way not directed by a doctor, including use without a prescription of one's own medica-

FIG. 13 | Trends in the use of heroin and prescription opioids in the United States, 2002-2015



Source: United States, Center for Behavioral Health Statistics and Quality, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health*, HHS Publication No. SMA 16-4984, NSDUH Series H-51 (Rockville, Maryland, 2016).

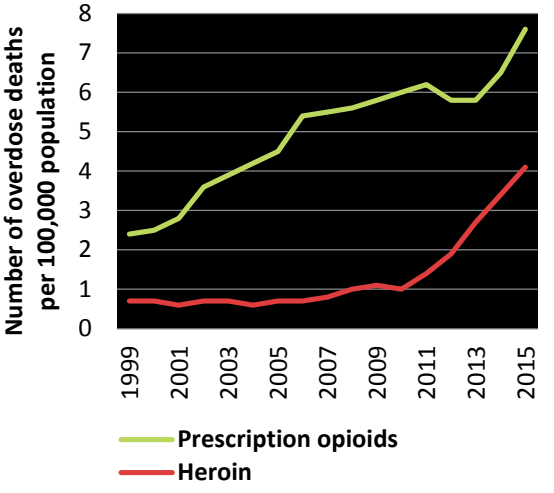
Those figures were similar to those observed in the previous few years. Moreover, one third of people who had misused prescription opioids in the past year (3.8 million) reported using in the past month.

Among prescription opioids misused in the United States, hydrocodone and oxycodone still remain the most common, but the use of other opioids such as tramadol, morphine and fentanyl is also reported not infrequently. The misuse of prescription opioids remains highest among those aged 18-25 years, followed by among persons aged 26 years and older.

Opioid-related deaths in the United States

The opioid epidemic has taken its toll. Of the 52,000 total drug-related deaths, those related to opioids accounted for more than 60 per cent. Rates of deaths involving opioids, specifically heroin and synthetic opioids, the latter probably driven primarily by illicit fentanyl, have increased considerably across the United States. In 2015, the death rate from synthetic opioids, increased by 72 per cent compared with the previous year, whereas heroin overdose deaths increased by 23 per cent over the

FIG. 14 | Age-adjusted rates of death caused by prescription opioids and heroin in the United States, 1999-2015



Source: United States Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Mortality. Available at Available at www.cdc.gov/nchs/health_policy/mortality.htm.

tion; use in greater amounts, more often, or longer than told to take a drug; or use in any other way not directed by a doctor.

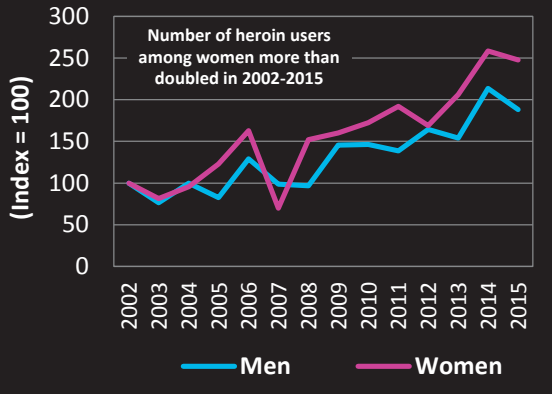
Women adversely affected by heroin and prescription opioids in the United States

Heroin use in the United States has been increasing since 2007, with the past-year prevalence of heroin use nearly doubling since then. While heroin use has remained high among men, the rate of increase of heroin use among women has been higher than among men: between 2002 and 2004, the average rate of past-year heroin use was 2.4 per 1,000 men and 0.8 per 1,000 women, whereas between 2013 and 2015, the rate of past-year heroin use increased to 4.3 per 1,000 men and 2.0 per 1,000 women.

As discussed above, the increase in heroin use has occurred against the backdrop of a prescription opioids epidemic. Women, particularly those aged 45 years or older, are more likely to suffer from and receive treatment for chronic pain related to musculoskeletal conditions or with visceral origins (arthritis-related pains, irritable bowel syndrome, fibromyalgia, etc.).[a, b] The most common forms of pain are more prevalent among women, and pain is more intense and of longer duration in women than in men.[c, d] It is therefore not surprising that women use prescription opioids more than men. As the progression to addiction to opioids may be accelerated among women, the development of addiction among women following treatment with opioids for a legitimate medical condition (iatrogenic addiction) may explain the comparable levels of misuse of prescription opioids among the sexes.[e] In 2015, 4 per cent of women, compared with 5.3 per cent of men, had misused prescription opioids in the previous year.

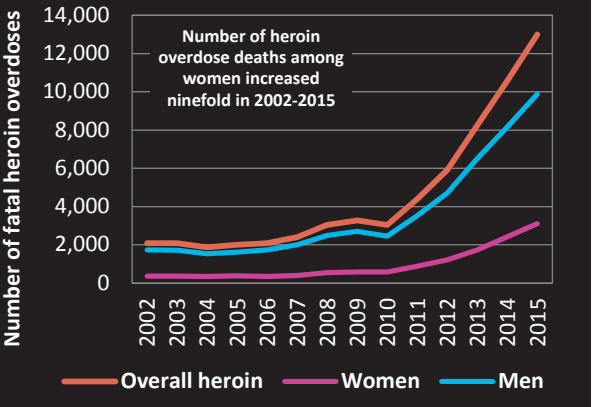
Most heroin users have a history of non-medical use of prescription opioid pain relievers, and an increase in the rate of heroin overdose deaths has occurred concurrently with an epidemic of prescription opioid overdoses. In 2015, there were nearly 13,000 overdose deaths related to heroin use, with nearly a quarter of them among women. However, the alarming trend is that between 2002 and 2015, heroin overdose deaths among women increased nearly ninefold. The highest numbers and rates of heroin overdose deaths were reported among women aged 25 to 44 years old.[f]

Trends in heroin use among men and women, United States, 2002-2015



Source: Data from Center for Behavioral Health Statistics and Quality, Key substance use and mental health indicators in the United States 2002-2015.

Trends in fatal heroin overdoses among men and women, United States, 2002-2015



Source: Centres for Disease Control and Prevention Wide-ranging ONline Data for Epidemiologic Research.

[a] Cynthia I. Campbell and others, "Age and Gender Trends in Long-Term Opioid Analgesic Use for Noncancer Pain", American Journal of Public Health, vol. 100, No. 12 (December 2010), pp. 2541-2547.

[b] Robert W. Hurley and Meredith C. B. Adams, "Sex, gender, and pain: an overview of a complex field", *Anesthesia and Analgesia*, vol. 107, No. 1, pp. 309-317.

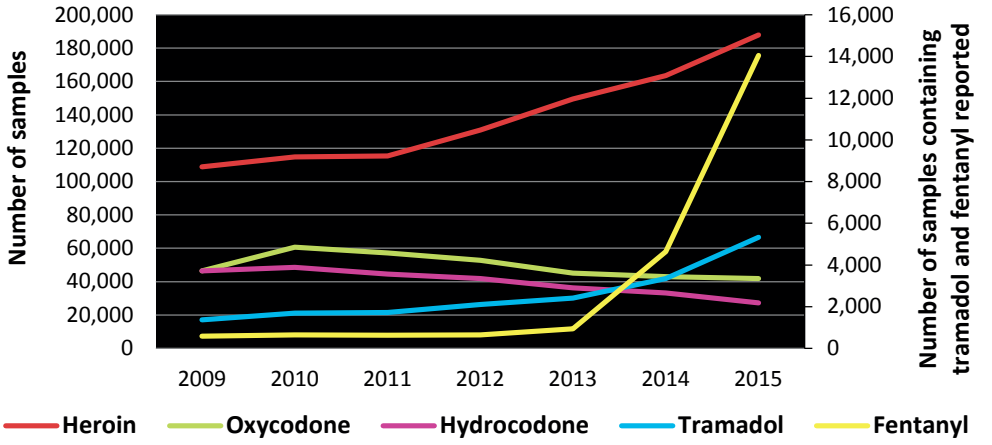
[c] Robert B. Fillingim and others, "Sex, gender, and pain: a review of recent clinical and experimental findings" *Journal of Pain*, vol. 10, No. 5 (May 2009), pp. 447-85.

[d] Anita M. Unruh, "Gender variations in clinical pain experience", *Pain*, vol. 65, Nos. 2 and 3 (1996) pp. 123-167.

[e] Andrew Kolodny and others, "The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction", *Annual Review of Public Health*, vol. 36 (March 2015), pp. 559-574.

[f] Rose A. Rudd and others, "Increases in Drug and Opioid-Involved Overdose Deaths: United States, 2010-2015", *Morbidity and Mortality Weekly Report*, vol. 65, Nos. 50 and 51 (2016), pp. 1445-1452.

FIG. 15 Number of samples submitted to and analysed by laboratories, by type of drug identified, United States, 2009-2015



Source: United States Drug Enforcement Administration, National Forensic Laboratory Information System reports.

same period.[104, 105] It is estimated that nearly 40 per cent of heroin-related deaths involved fentanyl, with many of those who overdose on fentanyl being unaware of what they had been using.[106] In addition to being mixed with heroin, fentanyl is also sold as other drugs, such as "ecstasy", or as counterfeit versions of prescription drugs such as OxyContin,® alprazolam and hydrocodone, among others. Moreover, the fentanyl analogue acetylfentanyl was also confirmed in at least 25 deaths reported by different states during the period 2013-2014.[107]

Appearance of fentanyl and its analogues

One of the most potent opioids, fentanyl is increasingly reported in the United States. Mixed with other commonly used opioids as well as heroin, it has resulted in an upsurge in mortality in recent years. With approximately 2 mg amounting to a lethal dose for humans, fentanyl has a narrow margin of safety. Pharmaceutical products containing fentanyl can easily prove toxic if users increase the dose or change the route of administration.

Since 2013, the number of substances containing fentanyl reported to and analysed by the National Forensic Laboratory Information System in the United States has been increasing, and it increased dramatically over the period 2014-2015.[108] The number of reports of fentanyl and other drugs within the same item analysed has also increased considerably, with 93 per cent of reports showing fentanyl and heroin in the same substance. Although pharmaceutical fentanyl is diverted for abuse in the United States, the majority of reports of fentanyl, both individually and mixed with other drugs, result from clandestinely produced and trafficked fentanyl, rather than from diverted pharmaceutical fentanyl.[109] There have also been reports of the emergence of many fentanyl analogues, such as acetylfentanyl and carfentanyl, and of other synthetic opioids, such as AH-7921 and MT-45, in Canada, the United States and in Europe.

104 Rudd and others, "Increases in drug and opioid-involved overdose deaths".

105 R. Matthew Gladden, Pedro Martínez and Puja Seth, "Fentanyl law enforcement submissions and increases in synthetic opioid-involved overdose deaths: 27 states, 2013-2014", *Morbidity and Mortality Weekly Report*, vol. 65, No. 33 (August 2016), pp. 837-843.

106 Richard G. Frank and Harold A. Pollach, "Addressing the Fentanyl Threat to Public Health", *New England Journal of Medicine*, vol. 376, No. 7 (February 2017) pp. 605-607.

107 United States Drug Enforcement Administration, Office of Diversion Control, "Special report: opiates and related drugs reported in NFLIS, 2009-2014" (Springfield, Virginia, National Forensic Laboratory Information System 2015).

108 United States Department of Justice, Drug Enforcement Administration, Diversion Control Division, *National Forensic Laboratory Information System: 2015 Annual Report* (Springfield, Virginia, 2016).

109 "Special report: opiates and related drugs reported in NFLIS, 2009-2014".

Misuse of opioids in Europe

The misuse of prescription opioids in Europe has been primarily observed in the context of heroin use. In the past decade, the availability of heroin has declined in Europe,[110] while the availability of substitution treatment for heroin use disorders has increased considerably. Thus, transitions between heroin and other opioids, such as fentanyl and opioid substitution medicines, have been observed in parts of Europe. In some countries, such as Estonia and Finland, where the heroin market plummeted in 2002 and 2001, respectively, heroin has been entirely displaced by fentanyl (mostly illicit) and buprenorphine, respectively. In recent years, prescription opioids and new synthetic opioids, which can be purchased online, have also been appearing in other markets in Europe.[111]

While heroin still remains the most commonly used opioid in Europe, and the opioid for the use of which most people seek treatment, there has been an increase in treatment demand related to prescription opioids. In 2014, 18 countries reported that more than 10 per cent of all opioid treatment admissions were for problems related to opioids other than heroin, an increase from 11 countries in 2013. The most common opioids for the use of which treatment was sought were methadone (diverted), buprenorphine, fentanyl, codeine, morphine, tramadol and oxycodone. Similarly, opioids other than heroin seized in European countries in 2014, although not in large quantities, were opium, morphine, methadone, buprenorphine, tramadol and fentanyl. Some pharmaceutical opioids seized may have been diverted from pharmaceutical supplies, while others were manufactured specifically for the illicit market.[112] The availability of acetylfentanyl has also been reported in the European Union since at least 2013 and has been detected in nine countries. Although the quantities of acetylfentanyl seized are small, it still remains a concern, especially given the 32 reported deaths in Europe between 2013 and 2015 (2 in Germany, 1 in Poland, 27 in Sweden and 2 in the United Kingdom). The presence of acetylfentanyl was confirmed in all of those cases.[113]

Monitoring of and research into the misuse of prescription opioids in Europe have focused on the diversion of buprenorphine and methadone from substitution treatment and fentanyl diverted from licit channels or illicitly produced.[114] However, it is important to consider that some potentially important developments in the misuse of prescription opioids may have remained largely underreported in Europe because of the limitations of current monitoring systems. For example, the misuse of tramadol, gabapentin and pregabalin (both used to treat epilepsy) appears to be increasing, although it is difficult to detect using the routine, available data sources.

European Union Medicine Study

Implemented as a parallel series of national surveys conducted in Denmark, Germany, Spain, Sweden and the United Kingdom in 2014,[115] the European Union Medicine Study looked at the extent of the non-medical use of prescription drugs (stimulants, opioids and sedatives) and its characteristics among persons aged 12 to 49 years. The past-year prevalence of the non-medical use of opioids among respondents was estimated at 5 per cent, with the highest prevalence of both lifetime and past-year use among those living in Spain, followed by the United Kingdom. Comparable levels of misuse of prescription opioids were seen among men (past-year prevalence of 5.7 per cent) and among women (past-year prevalence of 4.2 per cent).

Higher levels of misuse of prescription opioids were seen among older age groups and the unemployed. Being arrested in childhood (prior to age 15) and having a sexually transmitted disease or HIV were also associated with a greater likelihood of past-year misuse of prescription medications, including

110 *European Drug Report 2016: Trends and Developments*.

111 EMCDDA and European Police Office (Europol), *EU Drug Markets Report: In-Depth Analysis*, Joint publications series (Luxembourg, Publications Office of the European Union, 2016).

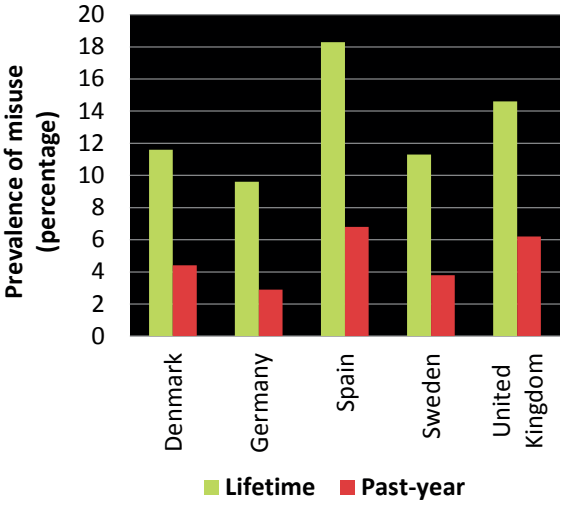
112 *European Drug Report 2016: Trends and Developments*.

113 EMCDDA and Europol, *Acetylfentanyl: EMCDDA–Europol Joint Report On A New Psychoactive Substance: N-phenyl-N-[1-(2-phenylethyl)piperidin-4-yl]acetamide (acetylfentanyl)*, Joint Reports Series (Luxembourg, Publications Office of the European Union, 2016).

114 Griffiths, Evans-Brown and Sedefov, "The (mis)use of psychoactive medicines".

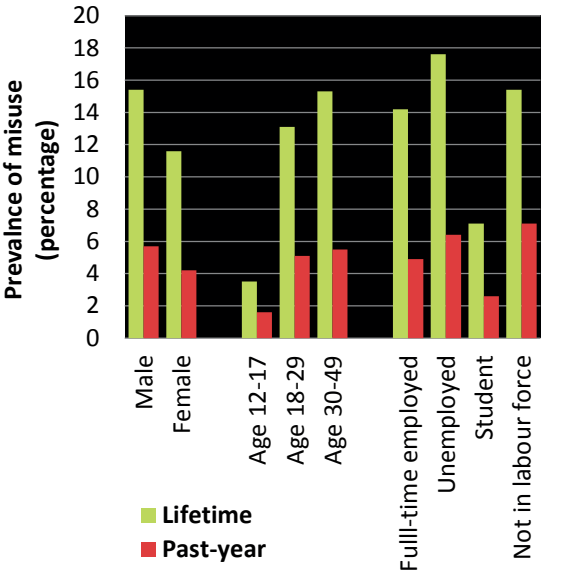
115 Scott P. Novak and others, "Nonmedical use of prescription drugs in the European Union", *BMC Psychiatry*, vol. 16 (2016).

FIG. 16 Misuse of prescription opioids among 12-49 year olds, five European countries



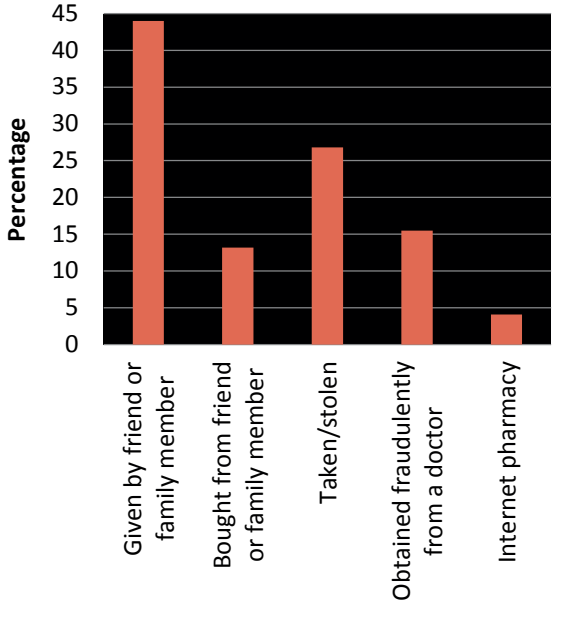
Source: Scott P. Novak and others, "Nonmedical use of prescription drugs in the European Union", *BMC Psychiatry*, vol. 16 (2016).

FIG. 17 Misuse of prescription opioids, by sex, age and employment status, five European countries



Source: Scott P. Novak and others, "Nonmedical use of prescription drugs in the European Union", *BMC Psychiatry*, vol. 16 (2016).

FIG. 18 Sources of non-medical prescription drugs among past-year users, five European countries



Source: Scott P. Novak and others, "Nonmedical use of prescription drugs in the European Union", *BMC Psychiatry*, vol. 16 (2016).

opioids. However, the prescription of a pain reliever was associated with a risk of non-medical use of prescription opioids some eight times higher than other predictors.

Consistent with findings in the United States, most people reporting past-year misuse of prescription opioids in the five European countries in the study had obtained them through their social networks (i.e., from friends or family), but many had also stolen or obtained them fraudulently from a doctor. Also consistent with findings in other recent reports, the European Union Medicine Study showed that the purchase of prescription opioids from online pharmacies also figured as one of the sources.

Among other findings, polydrug use, particularly the use of illicit drugs among past-year non-medical prescription opioid users, was also quite common in the five European countries, ranging from 21 per cent of past-year users in Spain to 43 per cent in the United Kingdom. Among people reporting the non-medical use of prescription opioids, those more likely to engage in use of illicit drugs were also more likely to report severe psychological distress and to have

been arrested during childhood. Similarly, those who obtained prescription opioids through theft, forgery or doctor-shopping were about twice as likely to have used illicit drugs as those who had not.

Although at lower levels than in the United States, the misuse of prescription opioids and the appearance of new synthetic opioids that can be purchased online are appearing in Europe and are likely to have increasing importance for both public health and law enforcement in the coming years.

Misuse of tramadol in Africa and Asia

Tramadol is an opioid that is widely used to treat moderate to severe pain, and has also been used in the treatment of sexual dysfunction, such as premature ejaculation.[116] In addition to the high levels of misuse of prescription opioids reported by many countries in Asia and Africa,[117] there is growing evidence of the non-medical use of tramadol in some countries in Africa and the Near and Middle East. These have been corroborated in recent years by seizures of considerable amounts of tramadol in North, West and Central Africa and in the Near and Middle East.[118] Between 2012 and 2014, the Islamic Republic of Iran, countries in the Near and Middle East and many countries in Africa reported to UNODC that seizures had been made of large amounts of tramadol that was being trafficked into those countries. Countries in the Middle East reported seizures of 310 kg in 2012; a quantity that increased to over 22 tons in 2014. Similarly, in Benin, the Central African Republic, Cote d'Ivoire, Niger and the Sudan, over 300 kg of tramadol were seized in 2013 and over 2.6 tons in 2014. In 2015, Benin alone reported a seizure of 110 tons of the substance. The non-medical use of tramadol has been reported by many countries, including Egypt, Jordan, Lebanon, Libya, Mauritius, Saudi Arabia and Togo, and many have put tramadol under national control in recent years.

Misuse of tramadol among adolescents and young people in countries such as Egypt, Iran (Islamic Republic of) and the United Arab Emirates has been reported as quite common. For example, in a study of people with drug use disorders in an outpatient addiction clinic in Egypt during the period 2012-2013, tramadol was the most common opioid used,[119] the majority of whom were polydrug users. In a study of secondary school students in Egypt in 2013, the most commonly used substances were tramadol, cannabis and alcohol. In a study among adolescents in the Islamic Republic of Iran in 2013, the lifetime prevalence of tramadol use was 4.8 per cent (7.6 per cent among males and 1.8 percent among females). Polydrug use was common with the likelihood of past-month use of other substances such as alcohol, "ecstasy", methamphetamine and opium was reported as high among that cohort of adolescents.[120]

In the United Arab Emirates, a cohort study in 2015 of male patients at the national treatment centre showed opioids and alcohol to be the most common substances used.[121] Nearly 67 per cent of opioid users were using tramadol for non-medical purposes. Among the older group within the cohort (those aged 30 years or older), heroin was the most commonly used opioid; tramadol and codeine were commonly used and preferred over heroin among the younger group. The majority of the cohort using tramadol were doing so on a daily basis, at an average of eight to nine tablets (100 mg per tablet). The proportion of polydrug users in the cohort was also high, with nearly 85 per cent being polydrug users, of whom the majority had been using a combination of four or more substances.

Common reasons cited for the misuse of tramadol in the above-mentioned studies included its mood-enhancing effect, to prolong sexual intercourse, to

116 Emad A. Salem and others, "Tramadol HCl has promise in on-demand use to treat premature ejaculation", *Journal of Sexual Medicine*, vol. 5, No. 1 2008, pp.188-193.

117 See *World Drug Report 2014* and *World Drug Report 2015*.

118 E/INCB/2012/1.

119 Nabil R. Mohamed and others, "An epidemiological study of tramadol HCl dependence in an outpatient addiction clinic at Heliopolis Psychiatric Hospital", *Menoufia Medical Journal*, vol. 28, No. 2 (2015), pp. 591-596.

120 Milad Nazarzadeh, Zeinab Bidel and Kristin V. Carson, "The association between tramadol hydrochloride misuse and other substances use in an adolescent population: phase I of a prospective survey", *Addiction Behaviors*, vol. 39, No. 1 (2014), pp. 334-337.

121 Hiba Alblooshi and others, "The pattern of substance use disorder in the United Arab Emirates in 2015: results of a National Rehabilitation Centre cohort study", *Journal of Substance Abuse Treatment, Prevention and Policy*, vol. (2016).

relieve fatigue and as self-medication for pain relief or depression or anxiety. The non-medical use of prescription opioids in the Near and Middle East and North Africa, particularly among young people, appears to be more for recreational purposes than as a result of developing addiction (iatrogenic addiction) following treatment for a legitimate medical condition involving pharmaceutical opioids.[122] Different studies have concluded that the high levels of misuse of tramadol are a result of its easy availability in pharmacies and on the illicit market (as it is trafficked in large quantities), its lower price compared with illicit drugs, perceptions among users that tramadol is safe as it is a prescription medication, and the ease with which it can be hidden.[123, 124, 125, 126]

D. EXTENT OF DRUG SUPPLY

Cultivation and production

On the basis of reports received by Member States, there are strong indications that cannabis continues to be the most widely illicitly produced drug worldwide, both in terms of the size and geographical spread of the area under cultivation and the volume actually produced. Over the period 2010-2015, cultivation of cannabis was reported to UNODC, directly or indirectly, by 135 countries in all regions, covering 92 per cent of the total global population.[127] This is almost triple the 49 countries (mostly in Asia) where opium poppy cultivation might take place and more than 16 times the number of countries (8, all located in the Americas) where coca bush cultivation might take place.

122 David F. Musto, "Iatrogenic addiction: the problem its definition and history", *Bulletin of the New York Academy of Medicine*, vol. 61, No. 8 (October 1985), pp. 694-705.

123 Nazarzadeh, Bidel and Carson, "The association between tramadol hydrochloride misuse and other substances use in an adolescent population".

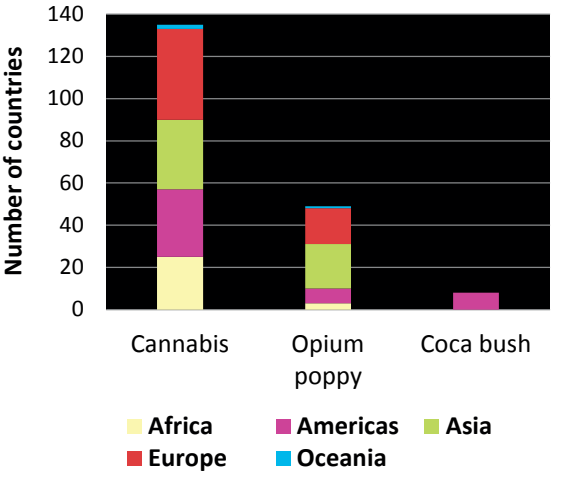
124 Alblooshi and others, "The pattern of substance use disorder in the United Arab Emirates in 2015".

125 Mohamed and others, "An epidemiological study of tramadol HCl dependence in an outpatient addiction clinic at Heliopolis Psychiatric Hospital".

126 This is especially true in countries where possession of alcohol and illicit drugs carries severe penalties.

127 Some 80 per cent of all countries from which UNODC received data through the annual report questionnaire.

FIG. 19 Number of countries reporting drug cultivation,[a] 2010-2015



[a] *Countries reporting cultivation, production and eradication of cannabis plants, opium poppy and coca bush, countries reporting seizures of cannabis plants, opium poppy plants and coca bush, and countries identified by other Member States as countries of origin for cannabis plants, opium poppy plants and coca leaf.*

Source: UNODC, responses to the annual report questionnaire.

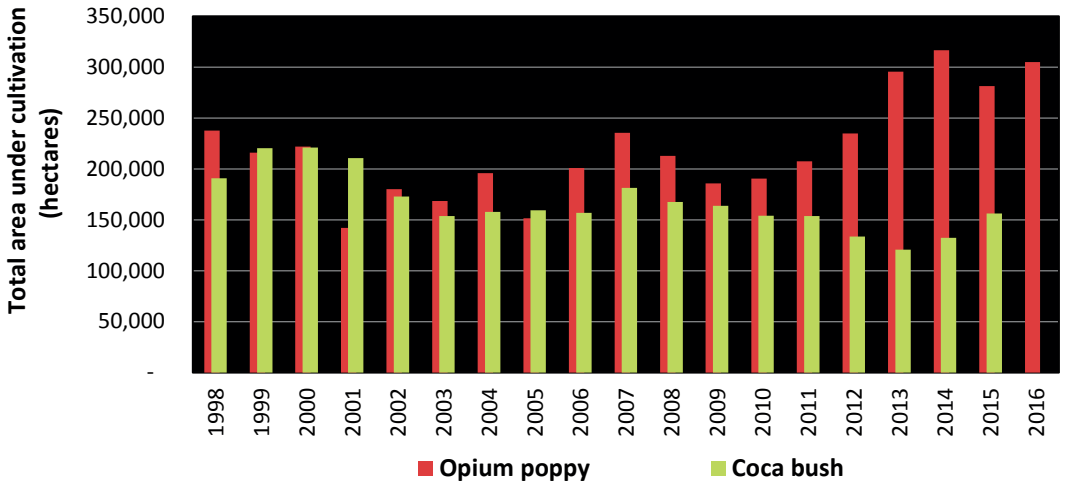
Cultivation of opium poppy remains at high levels and the downward trend in coca bush cultivation has come to an end

At 305,000 hectares, the total global area under opium poppy cultivation in 2016 was roughly twice the size of the total area under coca bush cultivation. Representing an increase in size of 60 per cent over the period 2010-2016, largely as a result of the rise in opium poppy cultivation in Afghanistan, this is the second-largest total area under opium poppy cultivation recorded in recent years (after the peak in 2014). However, as opium poppy surveys were not conducted in Myanmar (the world's second largest opium-producing country in 2015) or in the Lao People's Democratic Republic in 2016, the global estimates for 2016 have to be interpreted with caution.[128]

Mostly linked to a decrease in coca bush cultivation in Colombia, the global area under coca bush

128 Myanmar and the Lao People's Democratic Republic together accounted for 22 per cent of the total global area under opium poppy cultivation and 12 per cent of total opium production over the period 2010-2015. The 2015 estimates have been used here as proxies for opium poppy cultivation and production in both countries for 2016.

FIG. 20 | Total area under opium poppy and coca bush cultivation, 1998-2016



Sources: UNODC coca and opium surveys in various countries; responses to the annual report questionnaire; and United States, Department of State, *International Narcotics Control Strategy Report*, various years.

cultivation was nearly halved during the period 2000-2013. The global area then increased by 30 per cent during the period 2013-2015, mainly because coca bush cultivation started to increase again in Colombia, which has offset the decreasing levels of coca bush cultivation reported by Bolivia (Plurinational State of) and Peru in recent years. Reaching 156,500 hectares in 2015, the global area under coca bush cultivation was more or less the same as in 2010, but still 29 per cent less than its peak in 2000.

Recent increase in opium production

In 2016, global opium production showed an increase of some 30 per cent compared with the previous year. Greater than the increase in the size of the area under cultivation, this was primarily the result of improved yields in Afghanistan, where there was a partial recovery from the very low levels recorded in the previous year. However, at 6,380 tons, total global opium production was still some 20 per cent lower than the peak in 2014, and close to the average reported in recent years.

Cocaine manufacture is on the increase again

Irrespective of the conversion ratios used for converting coca leaf to pure cocaine hydrochloride, total cocaine manufacture fell during the period 2006-2013, before increasing again during the period 2013-2015. Based on the "new" conversion ratios, total cocaine production in 2015 was 1,125 tons, representing an overall increase of 25 per cent over the period 2013-2015, and thus a return to its 2008 level.[129]

After cannabis, cocaine accounts for the largest quantities seized

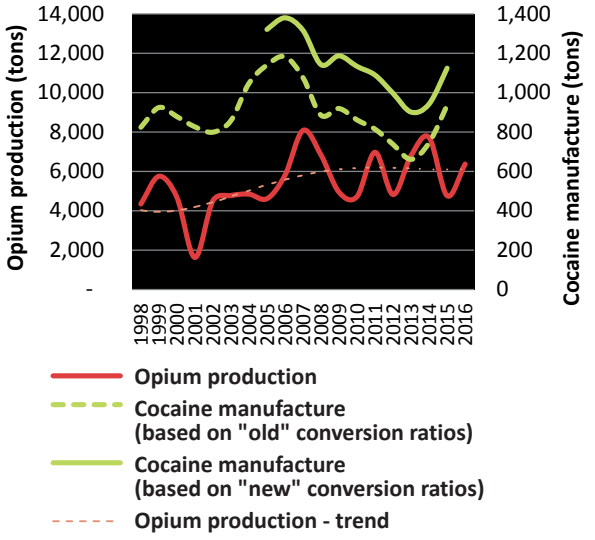
The distribution of seizures across the different drug types can be analysed in terms of number of cases and quantity seized. These two types of analysis show slightly different patterns.

The distribution of drug seizure cases reported worldwide in 2015 shows that more than half of seizure cases were of cannabis (mostly cannabis herb), followed by ATS (mostly methamphetamine), opioids (mostly heroin), coca/cocaine-related substances and NPS (mostly synthetic cannabinoids, followed by plant-based NPS (mostly khat), synthetic cathinones and ketamine).

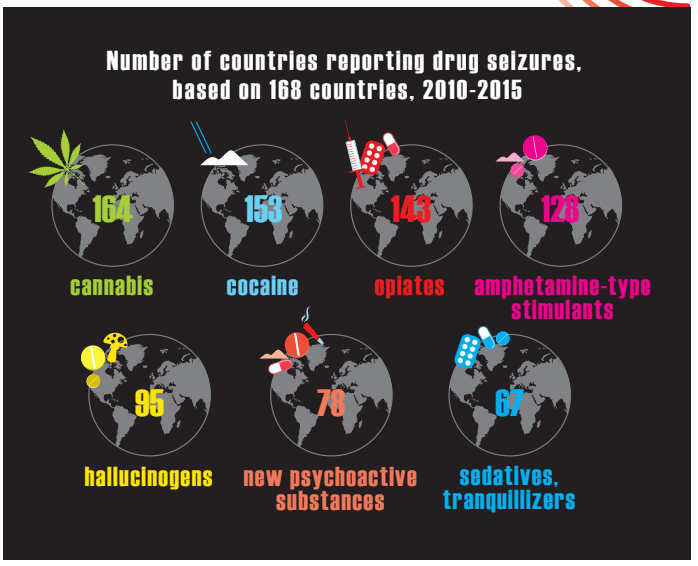
After cannabis (primarily cannabis herb and, to a lesser extent, cannabis resin), the largest seizures at the global level in 2015, in terms of quantity, involved coca/cocaine-related substances. Excluding seizures of coca leaf, the bulk of all coca-related seizures were in the form of the end product, cocaine

129 More information on the "old" and "new" conversion ratio can be found in the online methodology section of the *World Drug Report 2017*.

FIG. 21 | Global potential opium production and global (100 per cent pure) cocaine manufacture, 1998-2016



Sources: UNODC coca and opium surveys in various countries; responses to the annual report questionnaire; and United States, Department of State, *International Narcotics Control Strategy Report*, various years.

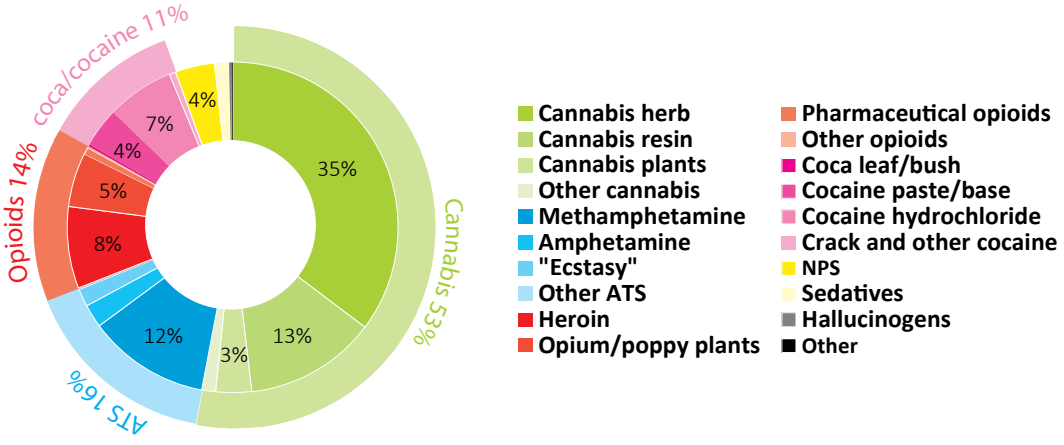


Source: UNODC.

hydrochloride, which accounted for almost 90 per cent of all cocaine seizures, while "crack" cocaine seizures accounted for less than 1 per cent of cocaine seizures.

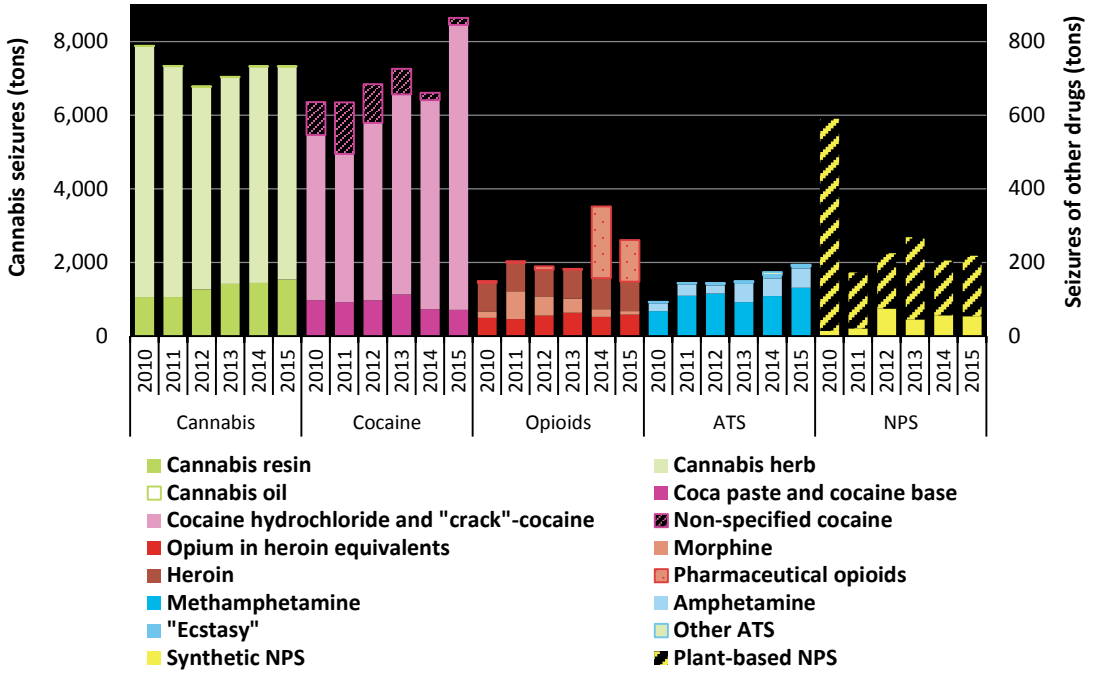
The largest quantities of opioids seized involved opium. Although expressed in morphine or heroin equivalents, the largest quantities of opioids seized were of pharmaceutical opioids (mostly tramadol in 2015, followed by codeine and hydrocodone) and heroin. The next-largest quantities reported were of NPS, the largest seizures of plant-based NPS being of khat, followed by kratom. The largest seizures of synthetic NPS reported were of ketamine, followed by synthetic cannabinoids and synthetic cathinones. The largest quantities of ATS seized were of methamphetamine, followed by amphetamine and "ecstasy".

FIG. 22 | Distribution of total drug seizure cases, 2015 (2.4 million cases)



Source: UNODC, responses to the annual report questionnaire.
Note: Based on information from 64 countries.

FIG. 23 | Global drug seizures of selected drugs, by quantity, 2010-2015



Source: UNODC, responses to the annual report questionnaire.

Note: A rate of 10:1 was used to convert seizures of opium into seizures expressed in heroin equivalents.

Increases in seizures reported mainly for synthetic drugs and cocaine

As a result of sharp increases in the quantities of amphetamine and methamphetamine seized, total seizures of ATS doubled over the period 2010-2015. Seizures of "ecstasy" were on the decline until 2011, but probably started to increase thereafter, reflecting increased supply due to improved access to alternative precursor chemicals and/or pre-precursors used in the drug's manufacture.

The quantities of synthetic NPS seized increased fourfold over the period 2010-2015, reflecting a sharp increase in seizures of synthetic cannabinoids and synthetic cathinones, although seizures of synthetic cannabinoids have actually fallen in recent years. Overall, plant-based NPS seizures declined after 2010, owing to a decrease in the amount of khat seized.

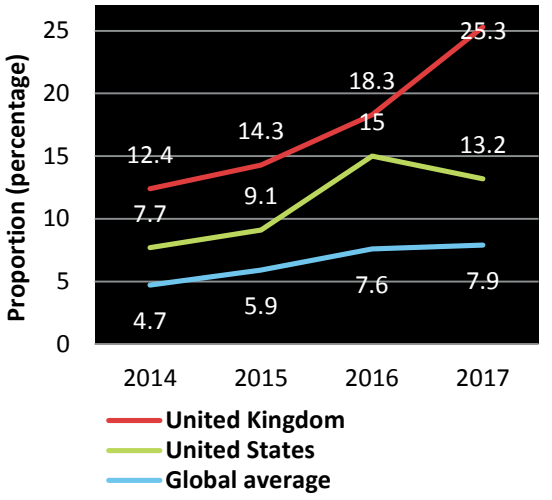
Seizures of cocaine increased over the period 2010-2015, in particular during 2015, in line with reports of rising levels of cocaine manufacture. Although seizures of opiates remained stable, seizures of pharmaceutical opioids increased sharply over the period 2010-2015, driven by sharp increases in the quantities of tramadol, hydrocodone and fentanyl seized. Notwithstanding some increases in seizures of cannabis resin, the amount of cannabis seized declined slightly over the period 2010-2015 as whole, although they showed an upward trend from 2012.

Drug trafficking over the darknet continues to increase at a fast pace

The "surface web", which is accessible through traditional search engines, contains just 4 per cent of all information available on the Internet. The remaining 96 per cent is stored on the "deep web". A part of it, the darknet, contains information that is intentionally hidden and only accessible using special web browsers.[130] The darknet is used for all kinds of activities, illicit included, particularly drug trafficking. Users typically access the darknet through the "Onion router" (TOR) to ensure that

130 *EU Drug Markets Report.*

FIG. 24 Annual drug users obtaining drugs over the darknet in the past 12 months, 2014-2017



Note: Based on annual information from more than 60,000 past-year drug users. In 2014, the question was asked specifically in relation to the Silk Road, the then dominant darknet market, as the survey was conducted just after the Silk Road's closure; from 2015, the question was asked in relation to all darknet markets.

Sources: Global Drug Survey 2017 findings (www.globaldrugsurvey.com); and Global Drug Survey 2017, detailed findings on drug cryptomarkets. Available from Dr. Monica Barratt, National Drug and Alcohol Research Centre, Australia.

their true identities remain concealed.[131] According to the European Police Office (Europol), as of January 2017, the TOR network had over 1.7 million directly connecting users and hosted over 60,000 unique domains.[132] Products bought on marketplaces on the darknet are typically paid for in crypto-currencies, such as bitcoins, which can be subsequently used to purchase other goods and services or can be exchanged into various national currencies. Delivery of the drugs is usually carried out by public or private postal services,[133] and parcels are often sent to anonymous post office boxes or automated booths ("pack stations") designed for self-service parcel collection.[134]

Studies show that while the proportion of drug market operations through the Internet remains small, their rapid growth may represent a significant threat.[135] Information on the extent to which drug users purchase drugs over the Internet can be found in the findings of the Global Drug Survey, which has been conducted several times in recent years. Although these data are derived from a non-representative sample, the self-reports of around 100,000 Internet users in over 50 countries provide a rough idea of the propensity of drug users to obtain drugs over the darknet, as well as how easily they can access it. Among survey participants who had used drugs in the past year, the proportion who obtained drugs over the darknet in the previous 12 months rose by 70 per cent during the period 2014-2017.

An increase in use of the darknet was particularly pronounced in the United Kingdom, where the proportion of annual drug users participating in the survey who reported having obtained drugs over the darknet has doubled since 2014 to reach 25.3 per cent in 2017, and in the United States, where the proportion increased more rapidly but then declined slightly in 2017 to 13.2 per cent.[136]

Nonetheless, this suggests that the upward trend in the use of the darknet continues to gain momentum in some countries, despite various market disruptions, linked to the closure of several darknet market sites by the authorities, as well as exit scams in which market owners closed down their sites unexpectedly, stealing funds from their clients.

The increases in the use of the darknet for drug purchases are remarkable as, overall, drug trafficking (not limited to the darknet) appears to have increased only slightly in recent years: from 2.1 million cases in 2013 to 2.4 million cases in 2015.[137]

131 EMCDDA, *The Internet and Drug Markets*, Insights Series No. 21 (Luxembourg, Publications Office of the European Union, 2016).

132 Europol, *SOCTA 2017: European Union Serious and Organised Crime Threat Assessment – Crime in the Age of Technology* (The Hague, 2017), p. 22.

133 World Customs Organization, *Illicit Trade Report 2015* (Brussels, December 2016), p. 44.

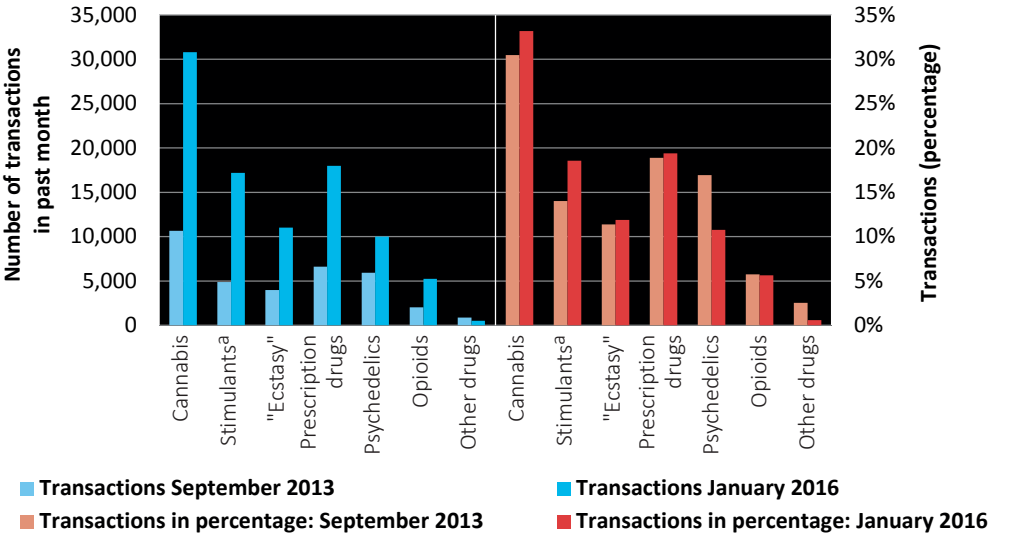
134 Based on the findings of an international conference on joint investigations to combat drug trafficking via the virtual market (darknet) in the European Union, held in Bad Erlach, Austria, from 10 to 12 November 2015.

135 Kristy Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands*, Research Report Series (Santa Monica, California, Rand Corporation, 2016).

136 Global Drug Survey 2017, detailed findings on drug cryptomarkets. Available from Dr. Monica Barratt, National Drug and Alcohol Research Centre, Australia.

137 This is based on overall seizure case data reported to UNODC through the annual report questionnaire, which increased only slightly in recent years.

FIG. 25 | Number of transactions by substance, and market share of transactions by substance on the darknet, September 2013-January 2016



[a] *Amphetamines and cocaine*

Source: Kruithof and others, *Internet-facilitated Drugs Trade.*

"Ecstasy", cannabis, LSD and NPS[138] were the drugs that Global Drug Survey respondents most commonly obtained over the darknet in 2017.[139]

Another study[140] used "web scraping/crawling" techniques[141] to look at eight major darknet markets that were in existence as of January 2016 (AlphaBay, Cryptomarket, Dark Net Heroes League, Dreammarket, French Dark Net, Hansa, Nucleus and Python) and which accounted for 106,000 listings, representing around three quarters of all listings on the darknet. Based on the activities of identified vendors, the study found that 71 per cent of vendors in those eight darknet markets sold drugs (including 62 per cent who sold only drugs and drug-related products and 9 per cent who sold drugs and non-drug-related products) and only 29 per cent operated exclusively in other activities. The largest share of those vendors was located in North America (38 per cent), followed by Europe (more than 32 per cent) and Oceania (more than 7 per cent). Most revenue was made in North America and Europe and most of the sales and purchases took place in the same regions. The largest interregional traffic was from Asia to North America. In terms of e-mail addresses linked to drug listings, another study finding was the dominance of North America (43 per cent) and Europe (more than 32 per cent), followed by Asia (more than 13 per cent, mostly China, followed by India and Afghanistan) and Oceania (more than 9 per cent). Vendors in countries in Asia seemed to be more involved in the wholesale business, while retail sales were dominated by vendors in North America and Europe.

The study suggested that transactions for all drug types had increased. Overall, the value of transactions in the eight markets that dominated the darknet in January 2016 was 2.6 times greater than that of transactions on the Silk Road market in September 2013, which dominated the darknet at that time. That is equivalent to an average annual growth of some 50 per cent during that period. Above-average growth rates of transactions were identified for stimulants (cocaine and amphetamines) and cannabis, while growth in "psychedelics" turned out

138 The definition of NPS used in the Global Drug Survey is not comparable to the definition used by the UNODC.

139 Global Drug Survey 2017, Detailed findings on drug cryptomarkets. Available from Dr. Monica Barratt, National Drug and Alcohol Research Centre, Australia.

140 Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands.*

141 For further details, see the online methodology section of the *World Drug Report 2017.*

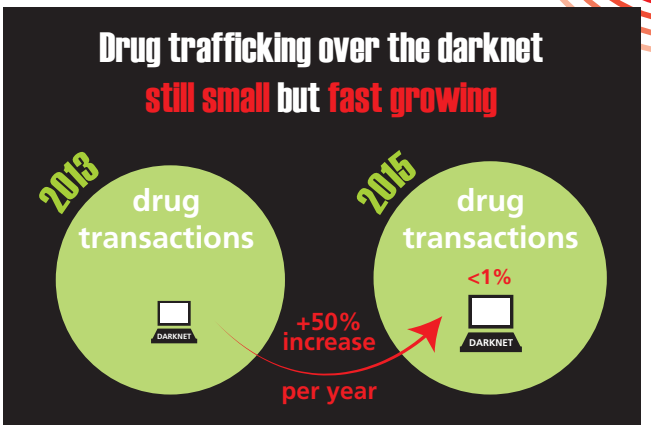
to be below average. The growth rates for prescription drugs, "ecstasy" and opioids was close to the overall average.

The study also calculated "minimum" revenue by multiplying the number of transactions by the prices listed (assuming the purchase of one unit per transaction), thus arriving at monthly minimum revenues of $14.2 million. This was twice the minimum revenue (based on the same methodology) calculated for the Silk Road in September 2013.

Sales of cannabis, stimulants (cocaine and amphetamine) and "ecstasy" accounted for 70 per cent of total drug-related revenues in the eight darknet markets investigated.[142] When compared with the overall distribution of drugs in the United States[143] and European Union[144] markets, methamphetamine and heroin appear to be underrepresented on the darknet, while "ecstasy" and "psychedelics" (hallucinogens) are overrepresented in sales over the darknet.[145, 146]

The largest share of transactions in the eight markets considered in the study (64 per cent) concerned transactions of less than $100, typical of what one would expect of retail sales to the end consumer. However, such sales only accounted for 18 per cent of total revenue, with most revenue (57 per cent) being generated by transactions of $100-$1,000. Transactions exceeding $1,000 accounted for 25 per cent of total revenue, suggesting that large wholesale business activities to date are not really taking place to a significant extent over the darknet and that drug cartels and other large organizations are apparently not yet that involved in the buying and selling of drugs over the darknet.

Equivalent to just 0.1-0.2 per cent of combined United States and European Union drug market sales (United States: $109 billion in 2010;[147] European Union: 24.3 billion euros in 2013),[148] the overall revenue calculated by the study (from $14.2 million to $25 million per month, or equivalent to between $170 million and $300 million per annum) is, however, rather small. Nevertheless, caution needs to be applied as the methodology used in the study is likely to have underestimated the amount purchased per transaction, and thus overall revenue.



Source: Kristy Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands*.

In the Netherlands, a further study,[149] based on samples submitted by users for anonymous testing purposes (32,663 drug samples from January 2013 to January 2016), revealed that the total proportion of online purchases tripled, from 1.4 per cent in 2013 to 4.1 per cent in 2015. Overall, 15 per cent of the drug users who had purchased drugs online used the darknet for those purchases over the period 2013-2015 and 26 per cent used Google-indexed webshops; no additional information was obtained for the remaining 59 per cent. This suggests that the proportion of drugs purchased in the Netherlands over the darknet ranged from 0.6 per cent to 1.5 per cent in 2015.[150]

That study also suggested that more than one third of NPS samples were bought online (very few over the darknet), while online purchases of each controlled substance did not exceed 6 per cent ("ecstasy":

142 Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands*.

143 Beau Kilmer and others, *What America's Users Spend on Illegal Drugs: 2000-2010* (Santa Monica, California, Rand Corporation, 2014).

144 *European Drug Report 2016: Trends and Developments*.

145 Global Drug Survey 2016, "Results of the world's biggest drug survey"

146 Kruithof and others, *Internet-facilitated Drugs Trade: An Analysis of the Size, Scope and the Role of the Netherlands*.

147 Kilmer and others, *What America's Users Spend on Illegal Drugs*.

148 *European Drug Report 2016: Trends and Developments*.

149 Daan van der Gouwe and others, "Purity, adulteration and price of drugs bought on-line versus off-line in the Netherlands", *Addiction* vol. 112, No. 4 (April 2017), pp. 640-648.

150 For further details on the calculation, see the online methodology section of the *World Drug Report 2017*.

1 per cent; cocaine: 1 per cent; LSD: 5 per cent). Although purchases of controlled substances over the darknet were significant (LSD: 53 per cent; amphetamine: 48 per cent; cocaine: 46 per cent; "ecstasy": 35 per cent), no online purchases of heroin were recorded. In contrast to general perceptions, the purity of drugs bought online was, on average, no better than of drugs purchased elsewhere in the Netherlands. Prices of drugs purchased online were on average, however, 10-23 per cent higher than of drugs purchased elsewhere.

Annual prevalence of the use of cannabis, opioids and opiates, by region and globally, 2015

Region or subregion	Cannabis						Opioids (opiates and prescription opioids)						Opiates					
	Number (thousands)			Prevalence (percentage)			Number (thousands)			Prevalence (percentage)			Number (thousands)			Prevalence (percentage)		
	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper
Africa	**49,410**	**21,100**	**64,380**	**7.5**	**3.2**	**9.8**	**2,130**	**920**	**3,500**	**0.32**	**0.14**	**0.53**	**2,010**	**950**	**2,540**	**0.30**	**0.14**	**0.39**
East Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Africa	6,280	2,500	10,380	4.3	1.7	7.1	360	110	620	0.24	0.08	0.43	360	110	620	0.24	0.08	0.43
Southern Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West and Central Africa	31,510	13,050	33,750	12.4	5.1	13.3	-	-	-	-	-	-	-	-	-	-	-	-
Americas	**49,220**	**48,380**	**51,320**	**7.5**	**7.3**	**7.8**	**14,710**	**13,410**	**16,230**	**2.23**	**2.03**	**2.46**	**1,760**	**1,500**	**2,360**	**0.27**	**0.23**	**0.36**
Caribbean	610	240	1,980	2.1	0.8	7.0	70	30	180	0.24	0.12	0.64	40	20	140	0.15	0.07	0.48
Central America	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North America	39,780	39,580	40,000	12.4	12.3	12.4	14,210	13,170	14,620	4.42	4.10	4.55	1,520	1,370	1,600	0.47	0.43	0.50
South America	8,070	7,870	8,480	2.9	2.8	3.0	380	170	1,380	0.14	0.06	0.49	180	90	600	0.06	0.03	0.21
Asia	**53,660**	**29,070**	**88,780**	**1.8**	**1.0**	**3.0**	**12,950**	**9,070**	**17,340**	**0.44**	**0.31**	**0.59**	**10,780**	**7,480**	**15,340**	**0.37**	**0.25**	**0.52**
Central Asia	-	-	-	-	-	-	530	470	580	0.93	0.83	1.03	510	450	560	0.90	0.80	1.00
East and South-East Asia	-	-	-	-	-	-	3,260	2,340	4,970	0.20	0.15	0.31	3,260	2,340	4,970	0.20	0.15	0.31
Near and Middle East/South-West Asia	7,930	5,640	11,200	2.7	1.9	3.9	6,180	3,950	8,160	2.14	1.36	2.82	4,060	2,410	6,200	1.40	0.83	2.14
South Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Europe	**28,400**	**27,370**	**29,450**	**5.2**	**5.0**	**5.4**	**4,520**	**4,330**	**4,850**	**0.83**	**0.79**	**0.89**	**3,110**	**2,950**	**3,300**	**0.57**	**0.54**	**0.60**
Eastern and South-Eastern Europe	5,340	5,030	5,720	2.4	2.2	2.5	3,140	3,060	3,230	1.38	1.35	1.42	1,920	1,850	2,000	0.85	0.82	0.88
Western and Central Europe	23,060	22,340	23,730	7.2	7.0	7.4	1,380	1,260	1,620	0.43	0.40	0.51	1,190	1,100	1,300	0.37	0.34	0.41
Oceania	**2,620**	**2,190**	**3,730**	**10.3**	**8.7**	**14.7**	**750**	**620**	**770**	**2.96**	**2.43**	**3.03**	**30**	**30**	**40**	**0.10**	**0.10**	**0.17**
Global estimate	**183,310**	**128,110**	**237,670**	**3.8**	**2.7**	**4.9**	**35,050**	**28,340**	**42,690**	**0.73**	**0.59**	**0.88**	**17,670**	**12,890**	**23,580**	**0.37**	**0.27**	**0.49**

Source: UNODC estimates based on annual report questionnaire data and other official sources.

Annual prevalence of the use of cocaine,[a] amphetamines[b] and "ecstasy", by region and globally, 2015

Region or subregion	Cocaine						Amphetamines and prescription stimulants						"Ecstasy"					
	Number (thousands)			Prevalence (percentage)			Number (thousands)			Prevalence (percentage)			Number (thousands)			Prevalence (percentage)		
	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper	Best estimate	Lower	Upper
Africa	**2,840**	**870**	**5,130**	**0.43**	**0.13**	**0.78**	**5,900**	**1,520**	**10,150**	**0.90**	**0.23**	**1.54**	**1,430**	**390**	**2,160**	**0.22**	**0.06**	**0.33**
East Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Africa	25	21	26	0.02	0.01	0.02	860	290	1,430	0.58	0.20	0.98	-	-	-	-	-	-
Southern Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West and Central Africa	1,770	600	2,680	0.69	0.24	1.05	-	-	-	-	-	-	-	-	-	-	-	-
Americas	**8,500**	**7,820**	**9,090**	**1.29**	**1.18**	**1.38**	**7,500**	**6,270**	**8,800**	**1.13**	**0.95**	**1.33**	**3,370**	**3,280**	**3,510**	**0.51**	**0.50**	**0.53**
Caribbean	180	50	350	0.62	0.18	1.23	240	10	540	0.86	0.05	1.91	40	10	130	0.16	0.03	0.47
Central America	170	110	240	0.61	0.38	0.83	200	150	270	0.71	0.52	0.95	20	10	30	0.06	0.03	0.11
North America	5,680	5,550	5,800	1.77	1.73	1.80	6,340	5,430	7,260	1.97	1.69	2.26	2,860	2,860	2,860	0.89	0.89	0.89
South America	2,480	2,110	2,710	0.88	0.75	0.96	700	680	730	0.25	0.24	0.26	440	400	490	0.16	0.14	0.17
Asia	**1,300**	**370**	**2,230**	**0.04**	**0.01**	**0.08**	**20,690**	**4,400**	**36,980**	**0.70**	**0.15**	**1.26**	**12,490**	**1,880**	**23,100**	**0.43**	**0.06**	**0.79**
Central Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
East and South-East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Near and Middle East/South-West Asia	-	-	-	-	-	-	890	580	1,580	0.31	0.20	0.55	-	-	-	-	-	-
South Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Europe	**4,060**	**3,540**	**5,340**	**0.74**	**0.65**	**0.98**	**2,460**	**1,940**	**3,250**	**0.45**	**0.36**	**0.59**	**3,750**	**3,200**	**4,700**	**0.69**	**0.59**	**0.86**
Eastern and South-Eastern Europe	620	290	1,640	0.27	0.13	0.72	720	410	1,260	0.32	0.18	0.56	1,340	900	2,070	0.59	0.40	0.91
Western and Central Europe	3,440	3,260	3,700	1.08	1.02	1.16	1,740	1,540	1,980	0.55	0.48	0.62	2,400	2,290	2,640	0.75	0.72	0.83
Oceania	**390**	**390**	**480**	**1.54**	**1.54**	**1.89**	**480**	**380**	**530**	**1.91**	**1.51**	**2.08**	**610**	**560**	**630**	**2.42**	**2.22**	**2.49**
Global estimate	**17,090**	**12,990**	**22,280**	**0.35**	**0.27**	**0.46**	**37,030**	**14,520**	**59,700**	**0.77**	**0.30**	**1.24**	**21,650**	**9,310**	**34,110**	**0.45**	**0.19**	**0.71**

Source: UNODC estimates based on annual report questionnaire data and other official sources.

[a] *Cocaine includes cocaine salt, "crack" cocaine and other types such as coca paste, cocaine base, "basuco", "paco" and "merla".* [b] *Amphetamines include both amphetamine and methamphetamine.*

Estimated number and prevalence (percentage) of people who inject drugs and those living with HIV among this group, by region, 2015

Region or subregion	People who inject drugs							HIV among people who inject drugs				
	Estimated number			Prevalence (%)			Data coverage of population aged 15-64	Estimated number			Prevalence (%) Best estimate	Data coverage of estimated number of people who inject drugs
	Low	Best	High	Low	Best	High		Low	Best	High		
Africa	**350,000**	**650,000**	**2,160,000**	**0.05**	**0.10**	**0.33**	**58.3%**	**36,000**	**84,000**	**651,000**	**12.8**	**67.8%**
America	**2,180,000**	**2,790,000**	**3,730,000**	**0.33**	**0.42**	**0.57**	**85.4%**	**97,000**	**142,000**	**249,000**	**5.1**	**93.5%**
North America	1,800,000	2,080,000	2,390,000	0.56	0.65	0.75	100%	83,000	99,000	118,000	4.7	100%
Latin America and the Caribbean	380,000	700,000	1,340,000	0.11	0.21	0.39	71.5%	15,000	43,000	132,000	6.1	74.1%
Asia	**3,480,000**	**4,700,000**	**5,970,000**	**0.12**	**0.16**	**0.20**	**94.2%**	**383,000**	**567,000**	**857,000**	**12.1**	**96.3%**
Central Asia and Transcaucasia	400,000	440,000	510,000	0.71	0.79	0.90	93.6%	27,000	33,000	42,000	7.3	93.6%
East and South-East Asia	2,220,000	3,180,000	4,130,000	0.14	0.20	0.26	95.1%	180,000	305,000	524,000	9.6	96.4%
South-West Asia	550,000	720,000	910,000	0.29	0.38	0.48	100%	154,000	205,000	258,000	28.5	100%
Near and Middle East	20,000	70,000	130,000	0.02	0.07	0.12	13.3%	200	800	4,800	1.1	55.3%
South Asia	290,000	290,000	300,000	0.03	0.03	0.03	99.9%	21,000	25,000	29,000	8.5	99.9%
Europe	**2,420,000**	**3,510,000**	**5,370,000**	**0.45**	**0.65**	**0.99**	**99.9%**	**416,000**	**755,000**	**1,427,000**	**21.5**	**100%**
Eastern and South-Eastern Europe	1,780,000	2,810,000	4,580,000	0.79	1.25	2.04	100%	346,000	675,000	1,333,000	24.0	100%
Western and Central Europe	640,000	700,000	780,000	0.20	0.22	0.25	99.9%	70,000	80,000	94,000	11.4	99.9%
Oceania	**120,000**	**160,000**	**190,000**	**0.47**	**0.61**	**0.75**	**74.1%**	**1,300**	**2,200**	**2,900**	**1.4**	**74.1%**
Global	**8,550,000**	**11,810,000**	**17,420,000**	**0.18**	**0.25**	**0.36**	**88.7%**	**930,000**	**1,550,000**	**3,190,000**	**13.1**	**94.9%**

Sources: Responses to the annual report questionnaire; progress reports of the Joint United Nations Programme on HIV/AIDS (UNAIDS) on the global AIDS response (various years); the former Reference Group to the United Nations on HIV and Injecting Drug Use; published peer-reviewed articles; and government reports.

Note: Prevalence of people who inject drugs is the percentage of the population aged 15-64 years.

Opium/Heroin

Illicit cultivation of opium poppy, 2005-2016 (hectares)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SOUTH-WEST ASIA												
Afghanistan (best estimate)	104,000	165,000	193,000	157,000	123,000	123,000	131,000	154,000	209,000	224,000	183,000	201,000
lower bound [a]					102,000	104,000	109,000	125,000	173,000	196,000	163,000	182,000
upper bound [a]					137,000	145,000	155,000	189,000	238,000	247,000	202,000	221,000
SOUTH-EAST ASIA												
Lao People's Democratic Republic [b, f] (best estimate)	1,800	2,500	1,500	1,600	1,900	3,000	4,100	6,800	3,900	6,200	5,700	..
lower bound [a]	904	2,040	1,230	710	1,100	1,900	2,500	3,100	1,900	3,500	3,900	
upper bound [a]	2,890	2,990	1,860	2,700	2,700	4,000	6,000	11,500	5,800	9,000	7,600	
Myanmar [b] (best estimate)	32,800	21,500	27,700	28,500	31,700	38,100	43,600	51,000	57,800	57,600	55,500	..
lower bound [a]	..	..	22,500	17,900	20,500	17,300	29,700	38,249	45,710	41,400	42,800	
upper bound [a]	..	..	32,600	37,000	42,800	58,100	59,600	64,357	69,918	87,300	69,600	
AMERICAS												
Colombia (best estimate)	1,950	1,023	715	394	356	341	338	313	298	387	595	..
Mexico [c, e] (best estimate)	3,300	5,000	6,900	15,000	19,500	14,000	12,000	10,500	11,000	17,000	26,100	..
lower bound [a]											21,800	
upper bound [a]											30,400	

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
OTHER												
Other countries [d]	7,650	5,977	5,885	10,509	9,479	12,221	16,462	12,282	13,293	11,522	*10,597*	*103,750*
TOTAL (best estimate)	**151,500**	**201,000**	**235,700**	**213,003**	**185,935**	**190,662**	**207,500**	**234,895**	**295,291**	**316,709**	***281,492***	***304,750***
lower bound					**152,935**	**149,762**	**170,000**	**189,444**	**245,201**	**269,809**	***242,692***	***265,750***
upper bound					**211,835**	**233,662**	**249,400**	**287,952**	**338,309**	**372,209**	***320,792***	***346,150***
TOTAL (best estimate rounded)	**151,500**	**201,000**	**235,700**	**213,000**	**185,900**	**190,700**	**207,500**	**234,900**	**295,300**	**316,700**	***281,500***	***304,800***

Sources: Afghanistan, Lao People's Democratic Republic and Myanmar: national illicit crop monitoring system supported by the United Nations Office on Drugs and Crime (UNODC). Colombia: Government of Colombia. Mexico: up to 2014, estimates derived from surveys by the Government of the United States of America (international narcotics control strategy reports); for 2015, joint Mexico/UNODC project entitled "Monitoring of the illicit cultivation on Mexican territory".

Notes: Figures in italics are preliminary and may be revised when updated information becomes available. Two dots indicate that data were unavailable. Information on estimation methodologies and definitions can be found in the online methodology section of the World Drug Report 2017.

[a] *Bound of the statistically derived confidence interval.*

[b] *May include areas that were eradicated after the date of the area survey.*

[c] *Up to 2014, the estimates for Mexico are sourced from the Department of State of the United States. The Government of Mexico does not validate the estimates provided by the United States as they are not part of its official figures and it does not have information on the methodology used to calculate them.*

[d] *Includes countries with low levels of cultivation (less than 300 hectares in the latest year with available data) and countries with indirect evidence of illicit cultivation (eradication of opium poppy) but no direct measurement. See table on page 54.*

In addition, for 2016 only, best estimates for countries for which data are not available (Colombia, Lao People's Democratic Republic, Mexico and Myanmar) are included in this category.

Starting in 2008, a new methodology was introduced to estimate opium poppy cultivation and opium/heroin production in countries with no data on illicit cultivation of opium poppy. These estimates are higher than the previous figures but have a similar order of magnitude. A detailed description of the estimation methodology is available in the online methodology section of the World Drug Report 2017.

[e] *The figures for 2015, as published in the World Drug Report 2016 (United Nations publication, Sales No. E.16.XI.7), have been revised owing to a statistical adjustment processed by UNODC. These figures are based on the estimation period July 2014-June 2015.*

[f] *Owing to the late timing of the monitoring activities in 2013, the survey may not have captured cultivation in its entirety.*

Potential production of oven-dry opium, 2005-2016 (tons)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SOUTH-WEST ASIA												
Afghanistan (best estimate)	4,100	5,300	7,400	5,900	4,000	3,600	5,800	3,700	5,500	6,400	3,300	4,800
lower bound [a]						3,000	4,800	2,800	4,500	5,100	2,700	4,000
upper bound [a]						4,200	6,800	4,200	6,500	7,800	3,900	5,600
SOUTH-EAST ASIA												
Lao People's Democratic Republic [b, f] (best estimate)	14	20	9	10	11	18	25	41	23	92	..	..
lower bound [g]	7.2	16	7	4	7	11	15	18	11	51	84	
upper bound [g]	23.1	24	11	16	16	24	36	69	35	133	176	
Myanmar [b] (best estimate)	312	315	460	410	330	580	610	690	870	670	647	..
lower bound					213	350	420	520	630	481	498	
upper bound					445	820	830	870	1,100	916	815	
AMERICAS												
Colombia (best estimate)	24	13	14	10	9	8	8	8	11	12	17	..
Mexico [c, e] (best estimate)	71	108	150	325	425	300	250	220	225	360	*499*	..
lower bound											*279*	
upper bound											*693*	

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
OTHER												
Other countries [d]	99	55	58	187	178	224	290	172	182	198	*178*	*782*
TOTAL (best estimate)	4,620	5,810	8,091	6,841	4,953	4,730	6,983	4,831	6,810	7,732	*4,771*	*6,376*
lower bound						**3,894**	**5,783**	**3,738**	**5,558**	**6,202**	***3,756***	***5,105***
upper bound						**5,576**	**8,214**	**5,539**	**8,052**	**9,419**	***5,779***	***7,624***
TOTAL (best estimate rounded)	**4,620**	**5,810**	**8,090**	**6,840**	**4,950**	**4,730**	**6,980**	**4,830**	**6,810**	**7,730**	***4,770***	***6,380***

Sources: Afghanistan, Lao People's Democratic Republic and Myanmar: national illicit crop monitoring system supported by the United Nations Office on Drugs and Crime (UNODC). Colombia: National illicit crop monitoring system supported by UNODC. Since 2008, production was calculated based on updated regional yield figures and conversion ratios from the Department of State and the Drug Enforcement Administration of the United States of America. Mexico: up to 2014, estimates derived from surveys by the United States Government; for 2015, UNODC estimate.

Notes: Figures in italics are preliminary and may be revised when updated information becomes available. Two dots indicate that data were unavailable. Information on estimation methodologies and definitions can be found in the online methodology section of the World Drug Report 2017.

[a] *Bound of the statistically derived confidence interval.*

[b] *Based on cultivation figures which may include areas eradicated after the date of the area survey.*

[c] *Up to 2014, the estimates are sourced from the Department of State of the United States. The Government of Mexico does not validate the estimates provided by the United States as they are not part of its official figures and it does not have information on the methodology used to calculate them.*

[d] *Includes countries with low levels of cultivation (less than 300 hectares in the latest year with available data) and countries with indirect evidence of illicit cultivation (eradication of opium poppy) but no direct measurement. See table on page 54.*

In addition, for 2016 only, best estimates for countries for which data are not available (Colombia, Lao People's Democratic Republic, Mexico and Myanmar) are included in this category.

Starting in 2008, a new methodology was introduced to estimate opium poppy cultivation and opium/heroin production in countries with no data on illicit cultivation of opium poppy. These estimates are higher than the previous figures but have a similar order of magnitude. A detailed description of the estimation methodology is available in the online methodology section of the World Drug Report 2017.

[e] *The figures for 2015, as published in the World Drug Report 2016 (United Nations publication, Sales No. E.16.XI.7), have been revised owing to a statistical adjustment processed by UNODC. The Government of Mexico does not validate any opium production estimates. The production figures will be presented once yield data from the joint Mexico/UNODC project entitled "Monitoring of the illicit cultivation on Mexican territory" become available.*
Opium production estimated by UNODC for 2015 is based on: (a) the area under cultivation, established by the joint project of the Government of Mexico and UNODC; (b) yield data, based on yield studies conducted by the United States in Mexico over the period 2001-2003. The opium production figures shown for 2015 are preliminary and, for methodological reasons, are not comparable with the production figures over the period 1998-2014.

[f] *Owing to the late timing of the monitoring activities in 2013, the survey may not have captured illicit cultivation in this year in its entirety.*

[g] *Bound of the statistically derived confidence interval, with the exception of 2015. The figures for 2015 represent independently derived upper and lower estimates; the midpoint was used for the calculation of the global total.*

Cultivation of opium poppy and production of opium in other countries, and eradication of opium poppy, 2006-2016

	Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Guatemala	Cultivation (hectares)							220	310	640	260	
Guatemala	Production (tons)							4	6	14	6	
Pakistan	Cultivation (hectares)	1,545	1,701	1,909	1,779	1,721	362	382	493	217	372	130
Pakistan	Production (tons)	39	43	48	44	43	9	9	12	5	9	3
Thailand	Cultivation (hectares)	157	205	288	211	289	289	209	265			
Thailand	Production (tons)	2	3	5	3	5	6	3	4			
Afghanistan	Eradication (hectares)	15,300	19,047	5,480	5,351	2,316	3,810	9,672	7,348	2,692	3,760	355
Algeria	Eradication (plants)					868	340	204	2,721	7,470		
Azerbaijan	Eradication (hectares)						2	0	0	0		
Azerbaijan	Eradication (plants)						201	2,628	34	284		
Bangladesh	Eradication (hectares)					8	22					
Canada	Eradication (hectares)					7	7					
Canada	Eradication (plants)					60,000	60,000					
Colombia	Eradication (hectares)	1,697	375	381	546	712	294	320	514	813	613	450
Ecuador	Eradication (plants)			74,555	115,580	257,306	44,200	4,025,800	2,554,865	2,023,385	183,573	

	Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Egypt	Eradication (hectares)	50	98	121	98	222	1		3		98	
Greece	Eradication (plants)							192	60	144	145	
Guatemala	Eradication (hectares)	720	449	536	1,345	918	1,490	590	2,568	1,197	428	
India	Eradication (hectares)	247	8,000	624	2,420	3,052	5,746	1,332	865	1,636	3,461	2,635
Iran (Islamic Republic of)	Eradication (hectares)					2		1	1	1		
Iran (Islamic Republic of)	Eradication (plants)							140,000	100,000	120,000		
Italy	Eradication (plants)					1,797	2,007	6,717				
Kazakhstan	Eradication (plants)						1,692			2,254	19,510	
Lao People's Democratic Republic	Eradication (hectares)	1,518	779	575	651	579	662	707	397		809	
Lebanon	Eradication (hectares)		8		21	14	4		6	1		
Mexico	Eradication (hectares)	16,890	11,046	13,095	14,753	15,491	16,389	15,726	14,662	21,644	26,659	24,926
Myanmar	Eradication (hectares)	4,187	3,612	4,835	4,087	8,273	7,058	23,771	12,257	15,188	13,274	
Nepal	Eradication (hectares)	1		21	35							
Pakistan	Eradication (hectares)	354	614	0	105	68	1,053	592	568	1,010	605	1,470
Peru	Eradication (hectares)	88	28	23	32	21						

	Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Poland	Eradication (hectares)				9							
Republic of Moldova	Eradication (plants)						32,413	11,255				
Republic of Korea	Eradication (plants)								25,369			
Russian Federation	Eradication (hectares)		2		3		1	1	1	1	1	
Russian Federation	Eradication (plants)									645		
Tajikistan	Eradication (plants)						13	5,400	103			
Thailand	Eradication (hectares)	153	220	285	201	278	208	205	264			
Ukraine	Eradication (hectares)			28		436			39		48	
Ukraine	Eradication (plants)					1,185,118		474,000	22,800,000			
Uzbekistan	Eradication (hectares)						1		1	0	0	
Viet Nam	Eradication (hectares)		38	99	31		38	35	25	19	18	

Sources: United Nations Office on Drugs and Crime annual report questionnaire, government reports, reports of regional bodies, and international narcotics control strategy reports of the United States of America.

Global manufacture of heroin from global illicit opium production, 2005-2016 (tons)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total potential opium production	4,620	5,810	8,091	6,841	4,953	4,730	6,983	4,831	6,810	7,723	*4,771*	*6,376*
Potential opium not processed into heroin	1,169	1,786	3,078	2,360	1,680	1,728	3,400	1,850	2,600	2,450	*1,360*	*2,080*
Potential opium processed into heroin	3,451	4,024	5,012	4,481	3,273	3,002	3,583	2,981	4,210	5,273	*3,411*	*4,296*
Total potential heroin manufacture	472	553	686	600	427	383	467	377	555	542	*327*	*448*

The calculation shows the potential amount of heroin that could have been manufactured out of the opium produced in a given year; it does not take into account changes in opium inventories, which may also be used for the manufacture of heroin and which may be important. Afghanistan is the only country for which the proportion of potential opium production not converted into heroin within the country is estimated. For all other countries, for the purposes of this table, it is assumed that all opium produced is converted into heroin. If all of the opium produced in Afghanistan in 2016 had been converted into heroin, total potential heroin manufacture would have amounted to 668 tons at the global level (510 tons in Afghanistan).

The amount of heroin produced in Afghanistan is calculated using two parameters that may change: (a) the distribution between opium that is not processed and opium processed into heroin; and (b) the conversion ratio into heroin. The first parameter is indirectly estimated, based on seizures of opium versus seizures of heroin and morphine reported by Afghanistan and neighbouring countries. For 2016, this calculation results in a proportion of 57 per cent of potential opium production in Afghanistan converted into heroin. For the second parameter, from 2005 to 2013, a conversion ratio of opium to morphine/heroin of 7:1 was used, based on interviews conducted with Afghan morphine/heroin "cooks", on an actual heroin production exercise conducted by two (illiterate) Afghan heroin "cooks", documented by the German Bundeskriminalamt in Afghanistan in 2003 (published in Bulletin on Narcotics, vol. LVII, Nos. 1 and 2, 2005, pp. 11-31) and UNODC studies on the morphine content of Afghan opium (12.3 per cent over the period 2010-2012, down from 15 per cent over the period 2000-2003). Starting from 2014, a different approach to the conversion was adopted, reflecting updated information on morphine content and a different method for taking purity into account. The revised approach uses a ratio of 18.5 kg of opium for 1 kg of 100 per cent pure white heroin hydrochloride (see MCN and UNODC, Afghanistan Opium Survey 2014); based on an estimated export quality of 51 per cent in 2016, this translates into a ratio of 9.5 kg (range: 9-10 kg) of opium for 1 kg of export-quality heroin (for 2016). For more details, see MCN and UNODC, Afghanistan Opium Survey 2016 – Cultivation and Production. For countries other than Afghanistan, a "traditional" conversion ratio of opium to heroin of 10:1 is used. The ratios will be adjusted when improved information becomes available. Figures in italics are preliminary and may be revised when updated information becomes available.

Coca/Cocaine

Global illicit cultivation of coca bush, 2005-2015 (hectares)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bolivia (Plurinational State of)	25,400	27,500	28,900	30,500	30,900	31,000	27,200	25,300	23,000	20,400	20,200
Colombia [a]	86,000	78,000	99,000	81,000	73,000	62,000	64,000	48,000	48,000	69,000	96,000
Peru [b]	48,200	51,400	53,700	56,100	59,900	61,200	64,400				
Peru [c]							62,500	60,400	49,800	42,900	40,300
Total	**159,600**	**156,900**	**181,600**	**167,600**	**163,800**	**154,200**	**155,600 [d]**	**133,700**	**120,800**	**132,300**	**156,500**

Sources: Plurinational State of Bolivia: national illicit crop monitoring system supported by the United Nations Office on Drugs and Crime (UNODC). Colombia: national illicit crop monitoring system supported by UNODC. Peru: national illicit crop monitoring system supported by UNODC.

Note: Different area concepts and their effect on comparability were presented in the World Drug Report 2012 (United Nations publication, Sales No. E.12.XI.1, p. 41-42). Efforts to improve the comparability of estimates between countries continue; since 2011 the net area under coca bush cultivation on the reference date of 31 December was estimated for Peru, in addition to Colombia. The estimate presented for the Plurinational State of Bolivia represents the area under coca cultivation as interpreted on satellite imagery.

[a] *Net area on 31 December.*

[b] *Figures represent the area under coca cultivation as interpreted on satellite imagery.*

[c] *Net area on 31 December, deducting fields eradicated after satellite imagery was taken.*

[d] *The global coca cultivation figure was calculated with the "area as interpreted on satellite imagery" for Peru.*

Reported eradication of coca bush, 2006-2015

	Method of eradication	Unit	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bolivia (Plurinational State of)	manual	hectare	5,070	6,269	5,484	6,341	8,200	10,509	11,044	11,407	11,144	11,020
Colombia	manual	hectare	41,346	66,392	96,003	60,565	43,804	35,201	30,456	22,121	11,703	13,473
	spraying	hectare	172,025	153,134	133,496	104,772	101,940	103,302	100,549	47,052	55,532	37,199
Peru	manual	hectare	10,136	11,056	10,143	10,025	12,033	10,290	14,171	23,785	31,205	35,868
Ecuador	manual	hectare	9	12	12	6	3	14	..	..	..	..
		plants	64,000	130,000	152,000	57,765	3,870	55,030	122,656	41,996	15,874	45,266

Source: UNODC annual report questionnaire and government reports.

Note: The totals for Bolivia (Plurinational State of) since 2006 include voluntary and forced eradication. The totals for Peru include voluntary and forced eradication. Reported eradication refers to the sum of all areas eradicated in a year, including repeated eradication of the same fields. Two dots indicate that data are not available.

Potential manufacture of 100 per cent pure cocaine, 2005-2015 (tons)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bolivia (Plurinational state of)	80	94	*104*	*113*	..	..	..	..	..	..	..
Colombia	801	809	683	471	488	424	384	333	290	442	646
Peru	260	*280*	*290*	*302*	..	..	..	..	..	..	..
Total based on "old" conversion ratios [a]	**1,141**	**1,183**	**1,077**	**886**	**920**	**862**	**815**	**738**	**662**	**746**	**937**
Total based on "new" conversion ratios [a]	***1,322***	***1,381***	***1,317***	***1,143***	***1,188***	***1,134***	***1,090***	***997***	***902***	***943***	***1,125***

Sources: Plurinational State of Bolivia: own calculations based on coca leaf yield surveys by the United Nations Office on Drugs and Crime (UNODC) (Yungas de La Paz) and scientific studies by the Drug Enforcement Administration of the United States of America (Chapare). Colombia: UNODC/Government of Colombia. Peru: own calculations based on coca leaf to cocaine conversion ratio from scientific studies by the Drug Enforcement Administration. Detailed information on the ongoing revision of conversion ratios and cocaine laboratory efficiency is available in the *World Drug Report 2010* (United Nations publication, Sales No. E.10.XI.13), p. 249.

[a] *Conversion of areas under coca cultivation into coca leaf and then into cocaine hydrochloride, taking yields, amounts of coca leaf used for licit purposes and cocaine laboratory efficiency into account.*

Notes: Owing to a lack of updated conversion factors in Bolivia (Plurinational State of) and Peru, no final estimates of the level of cocaine production can be provided.

With respect to data published in the World Drug Report 2016 (United Nations publication, Sales No. E.16.XI.7), the following amendments have been made: (a) data for Colombia (2005-2008) have been revised in order to ensure a consistent implementation of revisions to the methodology, affecting the way coca production is calculated, for the entire time series 2005-2015 (for details, see Colombia Coca Cultivation Survey Report 2014 (UNODC, 2015) and Colombia Survey of territories affected by illicit crops 2015, Annex 3 (UNODC 2016)); (b) totals for 2009-2012 based on "old" and "new" conversion ratios have been revised to rectify minor inaccuracies in data processing.

Figures in italics are subject to revision. Two dots indicate that data are not available. Information on estimation methodologies and definitions can be found in the online methodology section of the World Drug Report 2017.

Cannabis

Cannabis cultivation, production and eradication, latest year available from the period 2011-2016

Year	Country	Product	Outdoors/ indoors	Area cultivated (ha)	Area eradicated (ha)	Harvestable area (ha)	Production (tons)	Plants eradicated	Sites eradicated
2012	Afghanistan	resin	outdoors	10,000			1,400		
2014	Albania	herb	outdoors				540	551,414	2,235
2014	Algeria	resin	outdoors					2,522	
2011	Argentina	herb	outdoors					5,605	2,335
2015	Armenia	herb	outdoors	0.50 [a]	0.50	0.00		1,911	109
2014	Azerbaijan	herb	outdoors	17.50 [a]	17.50	0.00		14,889	195
2012	Australia	herb	indoors					17,668	322
2012	Australia	herb	outdoors					35,146	240
2015	Austria	herb	outdoors	3.00 [a]	3.00	0.00			
2013	Azerbaijan	herb	outdoors	23.95 [a]	23.95	0.00	263.96	8,469	151
2012	Belarus	herb	oudoors		81.20				
2015	Belgium	herb	indoors					345,518	1,164
2015	Belgium	herb	outdoors					4,885	93
2014	Belize	herb	outdoors					110,000	
2015	Bolivia (Plurinational State of)	herb	outdoors	8.40 [a]	8.40	0.00			16
2015	Bosnia and Herzegovina	herb	outdoors					1,300	
2015	Bosnia and Herzegovina	herb	indoors					32	
2014	Brazil	herb	outdoors		44.01			1,364,316	
2015	Bulgaria	herb	indoors					323	
2015	Bulgaria	herb	outdoors				37.77	9,488	
2014	Chile	heb	indoors					40,947	1,592
2014	Chile	heb	outdoors					215,671	227
2015	Colombia	herb	outdoors		208.00				
2015	Costa Rica	herb	outdoors		18.37			1,727,175	164
2015	Costa Rica	herb	indoors						16

Year	Country	Product	Outdoors/ indoors	Area cultivated (ha)	Area eradicated (ha)	Harvestable area (ha)	Production (tons)	Plants eradicated	Sites eradicated
2014	Côte d'Ivoire	herb	outdoors	1.00 [a]		1.00			
2015	Czechia	herb	indoors					27,715	220
2015	Czechia	herb	outdoors					3,055	
2014	Dominican Republic	herb	outdoors	6.00 [a]	6.00	0.00	0.21	111	8
2015	Ecuador	herb	outdoors					326	13
2015	Egypt	herb/resin	outdoors		140.00				
2014	El Salvador	herb	outdoors					1,321	77
2011	Estonia	herb	indoors					385	1
2014	France	herb	outdoors					158,592	837
2015	Germany	herb	indoors					135,925	786
2015	Germany	herb	outdoors					9,136	127
2015	Greece	herb	indoors					10,085	
2015	Greece	herb	oudoors					50,837	
2015	Guatemala	herb	outdoors		9.00			692,375	250
2015	Guyana	herb	outdoors	20.00	9.40	10.60	1,000.00	419,700	19
2014	Hungary	herb	indoors						10
2014	Hungary	herb	outdoors						25
2013	Iceland	herb	indoors					6,652	323
2016	India	herb	outdoors		3,414.74				
2015	Indonesia	herb	outdoors	367.00	132.00	235.00	4.00	211,200	22
2014	Ireland	herb	indoors					15,463	357
2014	Italy	herb	indoors					51,534	639
2014	Italy	herb	outdoors					70,125	1,134
2011	Jamaica	herb	outdoors		372.69			1,053,000	
2015	Kazakhstan	herb	outdoors	12.00	4.50	7.50		56,772	140
2015	Kenya	herb	outdoors					8,747	46
2015	Kyrgyzstan	herb	outdoors	5,014.00		5,014.00			
2015	Latvia	herb	indoors					1,595	14

Year	Country	Product	Outdoors/ indoors	Area cultivated (ha)	Area eradicated (ha)	Harvestable area (ha)	Production (tons)	Plants eradicated	Sites eradicated
2015	Latvia	herb	outdoors					973	12
2012	Lebanon	herb	outdoors	3,500.00	800.00	2,700.00			
2015	Lithuania	herb	indoors						6
2015	Madagascar	herb	outdoors		11.00			21,325	
2013	Malta	herb	indoors					27	
2015	Mexico	herb	outdoors		5,910.50		8,334.9		
2013	Mongolia	herb	outdoors	15,000.00	4,000.00	11,000.00		4,000	4,000
2015	Morocco	resin	outdoors	47,000.00	1,147.00	45,853.00	38,000.00		
2015	Morocco	resin	indoors				760.00		
2010	Mozambique	herb	outdoors					1,079	
2014	Myanmar	herb	outdoors	15.00	10.00	5.00			3
2014	Netherlands	herb	indoors						5,722
2014	Netherlands	herb	outdoors						284
2014	Netherlands	herb	indoors/ outdoors					1,600,000	
2014	New Zealand	herb	indoors					18,508	704
2014	New Zealand	herb	outdoors					104,849	
2014	Nicaragua	herb	outdoors		0.30		1,507.00	3,014	30
2014	Nigeria	herb	outdoors	4,529.15 [a]	4,529.15	0.00			
2013	Panama	herb	indoors	0.50 [a]	0.50	0.00		37	2
2013	Panama	herb	outdoors	10.50 [a]	10.50	0.00		78,633	2
2015	Paraguay	herb	outdoors	2,783.00		2,783.00	8,349.00	12,122,750	
2014	Peru	herb	outdoors					6,200,578	
2015	Philippines	herb	outdoors		23.84			1,200,550	286
2015	Poland	herb	indoors					120,713	1,625
2013	Republic of Korea	herb	outdoors					8,072	
2014	Republic of Moldova	herb	outdoors	100.00	59.00	41.00	10,000.00	200,548	
2014	Republic of Moldova	herb	indoors		41.00				

Year	Country	Product	Outdoors/ indoors	Area cultivated (ha)	Area eradicated (ha)	Harvestable area (ha)	Production (tons)	Plants eradicated	Sites eradicated
2015	Romania	herb	indoors/ outdoors					5,365	
2015	Romania	herb	indoors						39
2015	Romania	herb	outdoors						37
2015	Russian Federation	herb	outdoors		0.53				562
2013	Sierra Leone	herb	outdoors	190.00		190.00		190	3
2012	Slovakia	herb	indoors					2,927	
2013	Slovakia	herb	outdoors						1,077
2014	Slovenia	herb	indoors					9,223	118
2014	Slovenia	herb	outdoors					1,844	
2015	Spain	herb	indoors					244,772	108
2015	Spain	herb	outdoors					135,074	44
2014	Sudan	herb	outdoors	8.00	8.00	0.00	345.00		
2014	Swaziland	herb	outdoors	1,500.00	1,069.50	430.50		3,000,000	210
2014	Sweden	herb	indoors					10,000	56
2015	Sweden	herb	outdoors				182.00		
2015	Switzerland	herb	indoors					53,392	1,280
2012	Tajikistan	herb	outdoors					2,180,121	
2015	Trinidad and Tobago	herb	outdoors		0.31			375,925	58
2012	Uganda	herb	outdoors	150.00	88.00	62.00			5
2015	Ukraine	herb	outdoors	85.00 [a]	85.00	0.00		7,550,000	1,698
2015	United States of America	herb	indoors			2,283.00			396,620
2015	United States of America	herb	outdoors			6,796.00			3,904,213
2015	Uzbekistan	herb	outdoors	0.20 [a]	0.20	0.00			580
2015	Viet Nam	herb	oudoors		1.00				

Sources: United Nations Office on Drugs and Crime annual report questionnaire, government reports and and international narcotics control strategy reports of the United States of America.

[a] *Area identified by the authorities for eradication.*



GLOSSARY

amphetamine-type stimulants — a group of substances composed of synthetic stimulants that were placed under international control in the Convention on Psychotropic Substances of 1971 and are from the group of substances called amphetamines, 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.

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 applied to alkaloids from opium poppy (opiates), 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 (tenth revision) of the World Health Organization.

people who suffer from drug use disorders/people with drug use disorders — a subset of people who use drugs. People with drug use disorders need treatment, health and social care and rehabilitation. Dependence is a drug use disorder.

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 there is 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:

- East Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Uganda and United Republic of Tanzania
- North Africa: Algeria, Egypt, Libya, Morocco, South Sudan, Sudan and Tunisia
- Southern Africa: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe
- West and Central Africa: Benin, Burkina Faso, Cameroon, Cabo Verde, 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 and Togo
- Caribbean: Antigua and Barbuda, Bahamas, Barbados, Bermuda, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines and Trinidad and Tobago
- Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama
- North America: Canada, Mexico and United States of America
- South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela (Bolivarian Republic of)
- 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 and Viet Nam
- South-West Asia: Afghanistan, Iran (Islamic Republic of) and Pakistan
- Near and Middle East: Bahrain, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, State of Palestine, Syrian Arab Republic, United Arab Emirates and Yemen
- South Asia: Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka
- Eastern Europe: Belarus, Republic of Moldova, Russian Federation and Ukraine
- South-Eastern Europe: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Romania, Serbia, the former Yugoslav Republic of Macedonia and Turkey
- 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, Norway, Poland, Portugal, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom of Great Britain and Northern Ireland
- Oceania: Australia, Fiji, Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu and small island territories

UNODC
United Nations Office on Drugs and Crime

UNODC Research

To celebrate 20 years since its inception, the *World Drug Report 2017* is presented in a new five-booklet format designed to improve reader friendliness while maintaining the wealth of information contained within.

Booklet 1 summarizes the content of the four subsequent substantive booklets and presents policy implications drawn from their findings. Booklet 2 deals with the supply, use and health consequences of drugs. Booklet 3 focuses on the cultivation, production and consumption of the three plant-based drugs (cocaine, opiates and cannabis) and on the impact of new cannabis policies. Booklet 4 provides an extended analysis of the global synthetic drugs market and contains the bulk of the analysis for the triennial global synthetic drugs assessment. Finally, Booklet 5 contains a discussion on the nexus between the drug problem, organized crime, illicit financial flows, corruption and terrorism.

Enhanced by this new format, the *World Drug Report 2017* is, as ever, aimed at improving the understanding of the world drug problem and contributing towards fostering greater international cooperation for countering its impact on health and security.

The statistical annex is published on the UNODC website:
www.unodc.org/wdr/2017

ISBN 978-92-1-148293-5



