

The future of the international drug control system and national drug prohibitions

Wayne Hall^{1,2,3} 

National Addiction Centre, Institute of Psychiatry, Psychiatry and Neuroscience, King's College, London, London, UK,¹ The Centre for Youth Substance Abuse Research, The University of Queensland, Herston, QLD, Australia² and National Addiction Centre, Institute of Psychiatry, Psychology & Neuroscience, King's College London, UK³

ABSTRACT

A major impediment to any nation abandoning the policy of drug prohibition has been the fact that international drug treaties to which the majority of United Nations (UN) member states are signatory prohibit the non-medical use of amphetamines, cannabis, cocaine and heroin. The future of these treaties is now uncertain because of decisions by Uruguay, eight US states and Canada to legalize cannabis use. This paper: (1) provides a brief account of the international drug control treaties; (2) outlines the major criticisms of the treaties; (3) analyses critically proposals for treaty reform; and (4) provides a personal view on policies that nation states could adopt to minimize the harms from the use of cannabis, party drugs and hallucinogens, opioids, stimulants and new psychoactive substances. It is argued that: a major risk of cannabis legalization in the United States is promotion of heavy use and increased harm by a weakly regulated industry; some cautious national experiments with the regulation of party drugs and hallucinogens would be informative; a strong case remains for prohibiting the nonmedical use of opioids while mitigating the adverse effects that this policy has on opioid-dependent people; stimulant legalization will probably increase problem use but prohibition is difficult to enforce, highlighting the urgency of finding better ways to reduce demand for these drugs and respond to problem users; and that it is unclear what the best approach is to reducing possible harms that may arise from the use of new psychoactive substances.

Keywords Cannabis, hallucinogens, international drug control treaties, opioids, party drugs, prohibition, stimulants.

Correspondence to: Wayne Hall, Centre for Youth Substance Abuse Research, University of Queensland, K Floor, Mental Health Centre, Royal Brisbane and Women's Hospital Site, Herston, QLD 4029, Australia and National Addiction Centre, Institute of Psychiatry, Psychology & Neuroscience, King's College London, 16 De Crespigny Park, Denmark Hill, London SE5 8AF, UK. E-mail: w.hall@uq.edu.au

Submitted 21 February 2017; initial review completed 21 April 2017; final version accepted 10 July 2017

Paper presented at the Annual Society Lecture at the Annual Conference of the Society for the Study of Addiction, York, UK, 10 November, 2016.

INTRODUCTION

Since the 1960s critics of prohibition have argued that the production, sale and adult use of cannabis should be legalized and regulated (e.g. [1,2]). In leading developed countries, the public has been opposed to this policy until recently. The international drug treaties have also been a major legal impediment to any national government adopting this policy, because they prohibit the non-medical use of amphetamines, cannabis, cocaine and heroin. The future of these international treaties is now uncertain, because eight states in the United States and the governments of Uruguay and Canada have decided to ignore the treaties' provisions and legalize the recreational use of cannabis. The treaties have also come under sustained criticism from a growing community of drug policy scholars, civil society groups, former politicians and public

figures who have argued for more liberal national policies towards all currently controlled substances [3–7].

This paper considers the significance of these developments for the future of the international drug control system and discusses how they may affect national policies that prohibit the non-medical use of amphetamines, cannabis, cocaine and heroin. It begins with a short account of the international drug control treaties, how they came about and how they have been enforced. It then outlines the major criticisms that have been made of the international system and describes the type of reforms that critics have advocated. Finally, the paper provides a personal analysis of policies that nation states should experiment with as ways to reduce the harms caused by each of the major drug classes under international control, while at the same time minimizing the harms that these drug control policies can produce.

What are the international drug control treaties?

The international drug control treaties are a series of international agreements that have been ratified by the majority of member states of the United Nations (UN) [4,8,9]. They include: the Single Convention of 1961, the 1971 Psychotropic Drug Treaty, the 1972 amendment to the Single Convention and the 1988 Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances [10–12].

The 1961 Single Convention aimed to unify older international drug policy agreements by applying similar policies to the three major illicit drug classes derived from plants; namely, cannabis, coca and opium [4,10,11]. The 1971 Psychotropic Drug Treaty included synthetic psychoactive drugs such as opioids, amphetamine-type stimulants and sedatives and hypnotics. The 1988 Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances banned the trade in chemical substances used to manufacture scheduled substances [6].

The 1988 Convention formalized how the drug control treaties have been interpreted by many member states since 1961; namely, that member states were required to criminalize the possession, use, manufacture and sale of prohibited drugs while allowing for their legitimate use for medical and scientific purposes [4,10,13]. Production of scheduled substances for medical and scientific purposes has been supervised by the International Narcotics Control Board (INCB). INCB has allowed a limited number of countries to produce these drugs in order to minimize their over-production and used a system of estimates to regulate the quantities of each drug that member states can import for medical and scientific use [6,11]. The INCB's role has been to ensure that there were sufficient quantities of these drugs available for medical use while minimizing their diversion for non-medical use [6,11].

The INCB has also been the UN body charged with ensuring that signatory states comply with the treaties [13]. The INCB has limited resources to pursue its mandate and so focuses on publicizing perceived breaches of the spirit and the letter of the treaties, e.g. in its annual reports to 'name and shame' noncompliant states [11]. For example, it has criticized the Netherlands for not enforcing criminal penalties for cannabis use and sales [14]; Switzerland for trialling heroin-assisted treatment for opioid dependence in the 1990s [14]; the establishment of supervised injection facilities in the 1990s and 2000s in Switzerland, Germany and Australia [15–17]; the legalization of medical cannabis use in the United States in the late 1990s [14] and of recreational cannabis use in the 2010s [18]; Bolivia's decision to legalize coca leaf cultivation for traditional use in 2012 [19]; Uruguay's decision to legalize cannabis in 2013 [18,19]; and extrajudicial killings of alleged drug dealers in the Philippines since

2016 'purportedly taken in pursuit of drug control objectives' [20].

The major goals of the international treaties are to protect public health and societal wellbeing by reducing the harmful use of prohibited drugs and to facilitate access to these drugs for medical and scientific purposes. The international system has been criticized for failing to prevent non-medical use and failing to provide access for medical use (e.g. [5,21,22]). This paper focuses on the extent to which the international system has minimized the public health harms from the non-medical use of prohibited drugs. Its performance in ensuring medical access is a large and important topic that is outside the scope of this paper.

Criticisms of the international drug control treaties

The claim that the international system has failed to eliminate the non-medical use of prohibited drugs is supported by evidence that illicit drug use has increased globally during the past 50 years in high-income countries and spread to low- and middle-income countries, making illicit drug trafficking a lucrative global trade (e.g. [2,4,6,7,22,23]).

The international treaties have also been criticized because they have been used to justify draconian enforcement of policies that conflict with UN human rights treaties [5] by incarcerating large numbers of drug users, subjecting drug users to enforced 'treatment' that often amounts to cruel and abusive imprisonment, and executing drug users and low-level drug dealers [5,7,23]. The INCB has been criticized for remaining silent about these policies (Csete, 2016 #4600), although it has recently condemned extra-judicial killings in the Philippines [20,24,25].

These draconian policies, critics charge, have increased the harms experienced by illicit drug users, e.g. HIV/AIDS infections; drug overdose deaths; and imprisonment, especially of minority drug users [5,23]. The militarization of efforts to reduce drug supply in source and transit countries (such as Colombia and Mexico) has intensified violence around large-scale drug black markets and produced extreme levels of violence in some of these countries [26,27]. These criticisms have been made most forcefully by politicians from Central and South American societies that have been plagued by large-scale criminal violence related to illicit drug markets [28]. The political stability of these countries has also been threatened by drug traffickers who have made enormous profits supplying amphetamine-type stimulants, cannabis, cocaine and heroin to the North American and European markets [5,27].

The phrase 'the war on drugs' is a reasonable characterization of the militarized enforcement of drug laws in the United States, China, the Philippines, Thailand and the Russian Federation. A war on drugs is now being

prosecuted in an egregious way in the Philippines via Presidentially-approved extra-judicial and vigilante killings of drug users and low-level drug dealers. These policies deserve to be condemned as inhumane policies that constitute gross breaches of human rights and have failed to achieve their professed goals of reducing drug-related harm.

Radical proposals for reform

One leading proposal for reform is that national drug policies should regulate drugs in ways that are proportionate to the harms that they cause (e.g. [7]). This proposal sounds reasonable *prima facie*: who would not want to regulate drugs in proportion to the harm that they cause to users and public health? There are major challenges, however, in implementing this approach.

First, there are major disagreements about the harms that different drugs cause (see below). The harms that our policies aim to prevent are affected by who uses the drug, how often they do so, in what quantities, in combination with what other drugs, under what social circumstances and so on [7]. These harms are affected by the policies that are used to discourage drug use. All these factors influence how much harm drug use causes to users and to people who do not use these drugs, such as drug users' families, friends and neighbours [4].

Secondly, our current understanding of these harms has been obtained under prohibition. It is uncertain how these harms will change if the use, production and sale of these drugs are made legal. It is plausible, as advocates of more liberal drug policies argue, that legalization will reduce the risks per occasion of drug use [29]. It is far less certain that the aggregate harm that drug use causes will also decrease after legalization because reductions in the risk per user may be offset if more people use the drug [29], or if current users engage in riskier use after the drug is legalized. MacCoun & Reuter [30] have argued that agnosticism about the effects of legalization on drug-related harm is more defensible than an unwarranted confidence that legalization will not increase drug use or drug-related harm.

Thirdly, currently illicit drugs could not be treated solely as a public health issue if their use was legal [4]. Intoxicated drug users may commit crimes, such as property offences, and affect adversely those closest to them in ways that require police intervention, e.g. drug-enabled violence towards spouses, children, other family members and neighbours. Substantial police resources are already devoted to dealing with alcohol-related violence and crime in many developed countries [31]. We could reasonably expect additional law-enforcement resources to be needed to deal with offences committed by people who use other intoxicating drugs, such as the stimulants, opioids and

sedative-hypnotics. After legalization, police will also need to minimize black market production and sale of these drugs [7].

Removing some drugs from the treaties

Another popular reform proposal is to remove cannabis from the international treaties so that nation states can experiment with different policies, including the legalization of recreational use by adults (e.g. [2,3,32]). The arguments for removing cannabis from the treaties are: that cannabis is widely used by young adults; that its use produces a small fraction of the harms of illicit drugs such as heroin or legal drugs such as alcohol and tobacco; that criminalization of use causes more harm to users and societies than use of the drug itself; and that the harms arising from use of cannabis would be better minimized by legalizing, regulating and taxing it (e.g. [2,7]).

The party drug 3,4-methylenedioxy-methamphetamine (MDMA), the hallucinogens and some amphetamine-type stimulants are drugs which, some argue, should also be regulated legally for many of the same reasons (e.g. [7]). These are: that these drugs are used widely by young people with minimal harm; that criminalizing their use affects users adversely; and that legalization of the production and sale would enable these drugs to be better regulated [7].

The challenges of treaty change

The major problem with all these proposals is that they require changes to the international treaties and these changes require the consent of all signatory states, which is very unlikely to be obtained [7,33]. It has proved difficult to even discuss the possibility of these changes being made at the UN's drug policymaking body, the Commission on Narcotic Drugs (CND), as shown by the absence of any discussion of cannabis policy during the most recent UN review of the global drug problem [34,35].

Individual states could make more limited changes to the treaties unilaterally. They could, for example, give notice to the UN of their intention to 'denounce' a treaty and then re-accede to the treaty with a specific reservation, e.g. that they will not enforce the treaty provisions as they apply to cannabis (or other drugs) [36]. Bolivia used this mechanism to allow its citizens to produce coca leaf for traditional purposes (e.g. coca leaf chewing) [36]. The same path could be used by other nations to exempt cannabis (and other illicit drugs), but so far none of the nations that have legalized cannabis use has expressed any intention to follow this route, preferring to ignore the treaties [37]. If this practice is adopted widely by major nations such as Canada and the United States then the international treaties may become a dead letter.

Enforcing the drug treaties in accordance with human rights conventions

Another popular reform proposal would not require treaty change: this would require INCB and CND to ensure that the signatories to international treaties enforce policies in ways that respect the human rights of drug users and mitigate the harmful effects that prohibition has on them [5]. Under this approach, governments would be encouraged to reduce the incarceration of drug users by decriminalizing possession and personal use, and by diverting drug users involved in low-level drug-dealing and non-violent offences into treatment [4,5]. Governments would also fund public health interventions such as: opioid substitution treatments for opioid-dependent people; needle and syringe programmes to reduce blood-borne virus (BBV) transmission by injecting drug users; distribution of the opioid antagonist naloxone to reduce opioid overdose deaths; and allowing medically supervised injection facilities to reduce overdoses among street drug users and encourage drug users to seek treatment and social care [4,5]. There is good evidence that these policies would reduce drug-related harm and the social exclusion of drug users by enabling them to obtain employment and contribute to their communities [7].

EVALUATING THE EFFECTS OF THE INTERNATIONAL TREATIES AND DRUG PROHIBITION

How much harm do illicit drugs cause globally?

The contribution that illicit drugs make to mortality and disability from major diseases, injuries and risk factors world-wide has been estimated by the Global Burden of Disease (GBD) project in ways that allow the contribution of illicit drugs to be compared to that of alcohol and

tobacco. The GBD combines data on estimated years of life lost from premature death (YLD) and estimated years lived with disability (YLD) attributable to different forms of drug use (and other disease risk factors) to produce a measure of total disability attributable to drugs, the disability-adjusted life year (DALY).

The estimated DALYs attributable to drug use come with caveats. There is a lack of data on the extent of drug use and dependence in many low- and middle-income countries, so the estimates apply best to high-income countries where rates of illicit drug use are highest [38]. There is considerable uncertainty about the long-term effects of using many of these drugs [39,40], and these estimates quantify harms experienced by drug users; they do not include the adverse effects—health, social, and economic—that drug users may have on non-drug-users. Most importantly, the estimates reflect patterns of drug use under drug prohibition in most countries.

The UN estimates that approximately one in five adults aged 15–64 years (approximately 250 million people) used an illicit drug in 2014 [41]. Cannabis was the most commonly used illicit drug globally (183 million) [41], and its prevalence of use was highest in high-income countries [39]. Fewer adults used amphetamines, cocaine or opioids and even fewer did so regularly. Approximately 29 million (one in eight illicit drug users) were estimated to be dependent upon one or more of these drugs and approximately 12 million injected a drug, primarily opioids and stimulants [41].

The majority of the disease burden attributable to illicit drugs was experienced by regular users of opioids, stimulants or cannabis, especially those who injected opioids and stimulants (see Fig. 1). Drug overdose was the most common cause of premature death, followed by HIV infection [39,40]. Illicit opioid injecting was the most harmful type of illicit drug use [40], because opioid injectors are

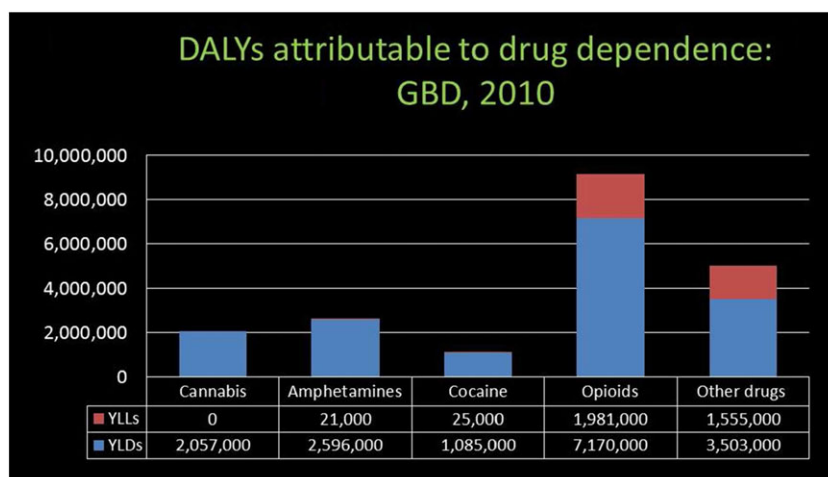


Figure 1 Disability-adjusted life years (DALYs) attributable to drug dependence: Global Burden of Disease, 2010 [Colour figure can be viewed at wileyonlinelibrary.com]

often dependent and at higher risk of fatal overdose, HIV/AIDS, trauma and suicide [39]. They also have higher rates of other BBV infections, especially hepatitis B and C, and of psychiatric disorders, such as depression, although the extent of drug-related morbidity has not been as well studied as that of mortality, even in high-income countries [40]. Amphetamines and cocaine have a lower overdose risk than the opioids but they can cause dependence, psychoses, violence, HIV and other BBV infections when injected or smoked, and cardiovascular diseases [42].

Cannabis dependence makes the largest contribution to the burden of disease because deaths attributable to cannabis are rare [43]. Cannabis dependence is associated with poor psychosocial outcomes in young adults; namely, educational underachievement, use of other illicit drugs, psychosis and other mental disorders [44,45], but there is considerable debate about the extent to whether these outcomes can be attributed to cannabis or are better explained by other risk behaviours of people who become regular cannabis users [45].

The 1% contribution that illicit drugs made to the global burden of disease in 2010 was less than the contributions of tobacco (6.3%) and alcohol (3.9%) [46], but still a substantial proportion of that attributable to these more widely used legal drugs. The smaller contribution of the illicit drugs reflects primarily: the much lower prevalence of problematic illicit drug use than problematic alcohol use and daily tobacco smoking; and the fact that most prevalent serious harms from using illicit drugs are caused by injecting opioids and stimulants whose prevalence of use is far lower than that of cannabis, alcohol and tobacco [39].

Has global drug prohibition failed?

The increasing contribution that illicit drugs have made to global disease burden during the past decade [40] supports the claim that drug prohibition has failed as an international and national policy (e.g. [2,5,7,22]). This is a reasonable conclusion if the international system is evaluated against the goals set for it by the United Nations: the achievement of a 'drug-free world' [29,47]. The drug control system has manifestly failed to achieve this goal [5,7,22], because illicit drug use has increased globally during the past half-century [7,23,40].

However, a drug-free world is an unrealistic policy goal for drug policy and, indeed, for any public health policy [7,12]. By this standard, all public health policies have failed because they have not eliminated the problems that they were designed to address, e.g. alcohol- and tobacco-related harm, AIDS and sexually transmitted infections [48].

The quality of debates about national and international drug policies would be improved greatly if we abandoned the unachievable goal of a drug-free world [7,12,22,29]

and adopted instead the related goals of minimizing (1) the harms caused by illicit drug use and (2) the harms caused by the policies we adopt to prevent drug-related harm [7,12,13,26,30,47].

Has national drug prohibition reduced drug use and drug-related harm?

The claim that national drug prohibition has failed assumes that it has not reduced drug use, dependence or drug-related harm [29,30]. There are good reasons to question this common assumption.

Those who claim that prohibition has often failed appeal to the alleged effects of National Alcohol Prohibition in the United States between 1920 and 1933; namely, that it made alcohol problems worse in the United States and produced organized crime and violence. Contrary to popular belief, alcohol consumption and indicators of alcohol-related harm declined steeply in the United States after the introduction of prohibition. Alcohol prohibition came into effect in half the states before the United States entered World War I, and a Federal prohibition on spirits production was introduced in 1918 as a wartime measure. Alcohol consumption in the United States increased after 1926, but US per-capita alcohol consumption did not return to the levels seen before National Alcohol Prohibition until nearly 40 years after its Repeal [49–51].

The fact that prohibition of illicit drugs has been national policy in most countries for more than 50 years makes it difficult to estimate the extent to which it has reduced the use of drugs under international control and, hence, the harm that these drugs cause [30]. There is, nonetheless, a case to be made that prohibition has reduced the use of most illicit drugs in the United States, the country with some of the highest rates of illicit drug use globally [39]. As shown in Table 1, the life-time rates of use of cocaine, heroin and methamphetamine in the United States in 2015 were much lower than those for alcohol and tobacco. The prevalence of past-month use of any of these illicit drugs was a very small fraction of that

Table 1 Prevalence (%) of life-time, past-year and past-month use of alcohol, tobacco and illicit drugs in the United States in 2015 (source Substance Abuse and Mental Health Services Administration, 2016).

<i>Drug</i>	<i>Life-time use</i>	<i>Past year</i>	<i>Past month</i>
Alcohol	81.0	65.7	51.7
Tobacco	63.9	29.2	23.9
Cannabis	44.0	13.5	8.3
Hallucinogens	15.3	1.8	0.5
Cocaine	14.5	1.8	0.7
Methamphetamine	5.4	0.6	0.3
Heroin	1.9	0.3	0.1

of regular alcohol or tobacco use [52]. Even in the case of cannabis, life-time use was just greater than half that for alcohol and past-month cannabis use and a small fraction of past-month alcohol use [52]. Survey data also indicate that the duration of problem cannabis and cocaine use is much shorter than that of alcohol and tobacco [53]. For example, the percentage of cases of drug dependence that had remitted by the age of 30 was 20% for nicotine and 40% for alcohol, as against 69% for cannabis and 70% for cocaine [53].

Other evidence that prohibition reduces problem use comes from Lee Robins *et al.*'s classic study of heroin use among US Vietnam veterans. Robins *et al.* showed that in Vietnam in the early 1970s, where heroin was very pure and cheap, a third of American servicemen used heroin, and 20% did so often enough to report withdrawal symptoms. Nonetheless, very few used heroin after they returned to the United States, and even fewer reported withdrawal symptoms or were treated for heroin dependence [54,55]. The veterans provided the following explanations of why they did not use heroin after their return to the United States: it was illegal, expensive, impure and had to be injected in the United States; they did not want to be arrested or become addicted; and they did not want to incur the strong disapproval of family and friends by using heroin [54–56].

This type of evidence suggests that prohibition has probably reduced drug use and drug-related harm, but it is difficult to quantify the extent in the absence of any data on what would have happened to drug use if prohibition had not been national policy. As critics of the international system argue, however, any reductions in drug-related harm attributable to prohibition have come at considerable social and economic costs for drug users and society. Drug policies unavoidably involve trade-offs between the public health benefits from reducing population levels of drug use, the harms that they cause to drug users and the social costs of enforcing them, which include criminal justice costs and the generation of drug black markets [47].

HOW CAN WE EVALUATE ALTERNATIVE DRUG POLICIES?

Critics of the current international system often underestimate the challenge of evaluating drug policies [4]. In an ideal world, we would conduct randomized controlled trials (RCT) that compared how current and alternative policies operated in comparable countries [4]. Unfortunately, RCTs are only feasible for drug policies of very limited scope, e.g. comparing different treatments for problem drug users, evaluating different types of school-based drug-prevention programmes or comparing different interventions for drug-related offenders [4]. The use

of the RCT has been limited in even these cases, because governments do not give a high priority to implementing policies in ways that make them amenable to controlled evaluation.

In the absence of controlled trials, policy evaluators have had to conduct quasi-experimental evaluations that compare the effects of different drug policies in different times and places on drug use, drug-related harm and adverse social effects. These comparisons are often made after the fact in the absence of baseline data in countries that differ in multiple ways, and are poorly funded and carried out by researchers using administrative or survey data collected for other purposes. They may, for example, assess the effects of a new drug policy by performing time-series analyses of survey data or indicators of drug-related harm, such as drug overdose deaths [4]. Alternatively, they may compare the effects of different policies on various groups of participants, who differ in ways that make it difficult to draw confident causal inferences about the effects of the policy. For example, a comparison of recidivism in drug court entrants with that in prisoners incarcerated for drug offences may be confounded by differences in drug use, criminal involvement or both, before the two groups were treated differently [4].

The major challenge in evaluating proposals for drug policy reform is the lack of any experience with the proposed policies [4,7,30]. As noted, currently illegal drugs have been prohibited in all developed countries for more than a century, and during this period the most radical policy changes have involved the elimination of criminal penalties for cannabis use and the tolerance of small scale retail cannabis sales in the Netherlands [37]. Any evaluation of policies other than prohibition must be an historical inquiry in which we look back a century or more to countries that allowed quasi-legal markets for opiates, cocaine and cannabis [57]. Unfortunately, the effects of these policies were not well documented, they applied to very different forms of illicit drugs (e.g. smoked opium versus injected heroin), rates of drug use were much lower than they are now and drugs were used by very different social groups, and state monopolies often sold these drugs to registered users rather than commercial companies marketing drugs to the general public [57,58]. The effects that these policies had on drug use and drug-related harm continue to be debated, as exemplified by very different views on the scale of the health and social problems that opium smoking caused in 19th century China (e.g. [59–62]).

Potential national policies for different illicit drugs

International drug treaty change looks unlikely in the short term, creating the risk that the treaties will fall into disrepute as signatories fail to respect their provisions.

Any changes in global drug policy may be in response to the results of policy experiments undertaken in influential member states. This is how harm reduction policies towards the opioids were introduced, despite opposition from the UN system. It is also the way in which cannabis decriminalization developed, and cannabis legalization is now under way in the Americas.

The following sections set aside the issues of treaty reform in favour of considering briefly the type of policies that nations could adopt to address the very different types of harm that different illicit drugs cause to users and others. They represent my analyses of the value of proposals for changes in national policies towards cannabis, party drugs, opioids, new psychoactive substances and stimulant drugs. Some of these would require treaty change, while others may be accomplished by more 'flexible interpretations' of treaty provisions by member states and UN agencies such as INCB.

WHAT POLICIES SHOULD NATION STATES ADOPT TOWARDS CANNABIS?

In countries with high rates of cannabis use among young adults the case for cannabis legalization and regulation has proved persuasive, as indicated above [3,7,59]. As also noted above, this is no doubt because cannabis causes much less harm than the opioids and stimulants [38,63]. The major risk that cannabis poses to non-users is a modest increase in accident risk if users drive while intoxicated, a fact that justifies policies to discourage users from driving after using, but not prohibition [45]. Cannabis is also very easy to grow indoors with minimal risk of detection, so it has been difficult for law enforcement to prevent its cultivation and sale [64]. The fact that cannabis is far less harmful than alcohol [65,66] has made it difficult to justify criminalizing its use when alcohol is freely available, heavily promoted and used widely. It has also served as a rationale for US states deciding to regulate cannabis in much the same way as alcohol [66].

These policies have been introduced in an incremental way. Criminal sanctions against cannabis users have often been enforced selectively against members of minority groups [67]. Fewer resources have been devoted to preventing cannabis cultivation and sale than to policing markets for illicit opioids and stimulants [8,29,64]. The *de-facto* removal of criminal penalties for cannabis use began in the 1970s in the Netherlands, which extended this policy later to small-scale retail cannabis sales in coffee shops [3]. A substantial proportion of US states in the 1970s decriminalized personal cannabis use [37], as did some Australian states in the 1980s and 1990s [68] and many countries in the European Union (EU) [37]. These policy changes had minimal, if any, effects on the use of cannabis [37].

It has long been debated whether the UN system allowed signatory states to remove criminal penalties legislatively for possession and use of cannabis. For most of its history the INCB has argued that this policy was inconsistent with the treaties, but it has ruled more recently that the treaties do allow the use of non-criminal penalties for personal possession and use [69].

There is no question, however, that the Single Convention forbids signatories from legalizing the recreational use of cannabis (or other drugs). It is therefore clear that the Single Convention has been contravened by the United States in allowing eight of its states (Alaska, Arizona, California, Colorado, Oregon, Maine, Massachusetts and Washington State) to legalize cannabis. The government of Uruguay is also in contravention [70], and Canada will be when it legalizes recreational cannabis use in 2018.

The US states that have legalized cannabis have chosen to regulate cannabis in the same way as alcohol. They have licensed growers, processors and sellers to sell cannabis at a profit, while limiting advertising, making the minimum age of legal purchase the same as alcohol (21 years) and taxing cannabis products on their sales price [71,72].

Critics argue that these policies give a higher priority to eliminating the cannabis black market and generating revenue for state governments than they do to protecting public health [71,73]. The protection of public health is given nominal support by earmarking cannabis tax revenue for prevention and treatment. State governments have been slow, however, to respond to the increased market share of very high potency cannabis products in Colorado and Washington [74]. This was not predicted by advocates of legalization, who argued instead that a legal industry would regulate cannabis products more effectively than prohibition, which created incentives for the production of high-potency cannabis (the 'iron law of prohibition' [75–78]). The legal cannabis industry is also being allowed to sell cannabis products that are more attractive to non-smokers and adolescents, such as cannabis-impregnated edibles and infusions.

These developments raise reasonable concerns that a for-profit cannabis industry will behave like the alcohol and tobacco industries in promoting heavy use among existing users and recruiting new, younger, users [29,79]. A legal cannabis industry may also become powerful enough to resist public health-orientated cannabis regulation [79]. It is still too early to tell whether these concerns will be borne out [73].

There are better prospects for public health-orientated cannabis regulation in Uruguay and Canada. Uruguay has given priority to protecting public health in the rationale for its policy change [70]. The proposed Canadian cannabis policy [80,81] also gives priority to public health goals in proposing a regulatory system that will minimize

advertising and allow provinces to operate cannabis retail monopolies [82].

SHOULD NATIONAL GOVERNMENTS LEGALIZE PARTY DRUGS?

The 'party drug' MDMA and the hallucinogens, lysergic acid diethylamide (LSD), psilocybin and magic mushrooms are also popular candidates for legalization and regulation [7,83–86]. These are used less commonly than cannabis but used more widely than opioids. Their users are usually better-educated and less criminally involved than users of cocaine, methamphetamine and heroin, and their drug use causes very little harm to non-drug users in comparison with opioids or stimulants [83].

MDMA has a much lower dependence risk than the opioids, stimulants or cannabis, and very few users seek medical help for problems related to MDMA use [87,88]. MDMA can cause fatal overdoses, but these deaths are much more rare than fatal opioid or stimulant overdoses, given the small number of MDMA deaths that occur in a much larger population of users [87,89,90].

Less is known about the harms of other party drugs, e.g. gamma hydroxybutyrate (GHB) and psychedelics (e.g. [91]). Few users of these drugs report serious harms in drug surveys, but we are less certain about how this may change if more people used these drugs under legalization or if legalization changed the characteristics of users and their patterns of use; e.g. it increased the number who used multiples of usual recreational doses, in combination with other drugs, such as alcohol and the stimulants, or via injection.

The most popular proposal is to license sellers and users (e.g. [7,83,85,92]). Legislation to license drug sellers was enacted in the National Psychoactive Substances Act in New Zealand to ensure that safer recreational drugs of known quality and strength were supplied to users who were well informed about the risks of using.

There have been major challenges in implementing the policy [93,94]. The major one is that it has been difficult for regulators to specify what sort of evidence would establish the relative safety of using these drugs. Would pre-clinical studies and studies of short-term acute drug effects in humans be enough? How expensive would it be to obtain this evidence? Would producers and sellers be liable for harms experienced by users? If so, how would they pay damages? How would the system reduce diversion to under-aged consumers, if we impose an age limit on legal use, such as 18 or 21 years [95]? Will the public be as tolerant of overdose deaths in under-aged users who use diverted party drugs as they are of alcohol-related deaths? Would that be a good policy outcome?

The Dutch policy towards party drugs and hallucinogens has been to allow small-scale retail sales of these

drugs and to allow drug testing. This approach, which does not involve legalization, may be worth cautious trials in other high-income countries which have an interest in and a capacity to evaluate its effects, but this option may be ahead of public opinion in many of these countries because it is easily portrayed as a policy that encourages the use of drugs that can kill some users, even if these deaths are rare.

SHOULD NATIONAL GOVERNMENTS LEGALIZE OPIOIDS AND STIMULANTS?

Those who advocate for more liberal policies towards other illicit drugs express the hope that more liberal cannabis policies will also encourage governments to experiment with the regulation of other illicit drugs [96]. They rarely advocate the legalization of these drugs in the same way as cannabis, and this is unlikely to happen for at least two reasons.

First, the arguments for legalizing cannabis contrast sharply the modest adverse health effects of cannabis with the much more serious adverse effects of opioids and stimulants, as the GBD study shows [39,40]. Secondly, in high-income countries, the general public (e.g. [97]) and adolescents [98] perceive heroin and cocaine use to be much riskier than cannabis use. This is why, libertarians aside, few are prepared to advocate for legalizing the commercial sale of opioids and stimulants for recreational use.

The case for mitigated prohibition of the opioids

A strong case can be made for continuing to prohibit the opioids while mitigating the adverse impacts that this policy has on people who use illicit opioids. The opioids are among the most addictive psychoactive substances after tobacco; opioid dependence can be very persistent and difficult to treat except by using opioid agonist substitution treatment [7,39,99,100], and illicit opioid dependence makes the largest contribution to GBD of all the illicit drugs [40].

Some critics of prohibition attribute fatal opioid overdoses implausibly to users' uncertainty about the potency of illicit opioids or the presence of impurities [2]. Impurities are rare causes of opioid overdose deaths [101], and variations in opioid tolerance and polydrug use play a larger role in opioid doses than ignorance of doses [101]. This is shown by the very large increases in rates of pharmaceutical opioid overdose deaths in Canada and the United States during the past decade [102–105]. These deaths have occurred in people using opioids of known potency, which they have used in multiples of therapeutic doses, or in combination with central nervous system (CNS) depressant drugs, such as alcohol and benzodiazepines [106], the same risk factors seen in heroin overdose deaths under prohibition [101].

It is more reasonable to attribute some BBV infections among injecting opioid and other drug users to prohibition (e.g. [5]). Rates of BBV infections are much higher in countries that prohibit legal access to injecting equipment [107], and distributing clean injecting equipment to injecting drug users reduces their rates of HIV substantially and, to a lesser extent, viral hepatitis infection [5,108].

Supporting a continuation of the prohibition on the non-medical use of opioids does not entail a 'war' on opioid users [30,47,95]. Prohibition can and should be implemented in ways that respect the human rights of opioid users by decriminalizing drug use and funding services to mitigate the adverse social and public health effects of opioid use [5,95]. As argued above, these include providing: ready access to opioid substitution treatment [95]; needle and syringe programmes [40]; supervised injection facilities in high-risk locations [5]; and diversion of low-level opioid-dependent offenders into treatment rather than imprisonment [5,30].

SHOULD NATIONAL GOVERNMENTS LEGALIZE SOME STIMULANT DRUGS?

The stimulants are a challenging class of illicit drugs to either regulate legally or prohibit [7,84]. Some amphetamine-type stimulants cause minimal harm and may benefit users when they are taken orally in low doses in sustained release forms to treat attention deficit hyperactivity disorder (ADHD) or narcolepsy, or to enable personnel in the US space programme to remain awake for prolonged periods [109]; but stimulants can also be used in ways that seriously harm users [110]. When methamphetamine or cocaine are smoked or injected repetitively over 24 or 48 hours [111] they can produce dependence [110,112], heightened aggression and assaults [113], suicide [112] and psychoses [111,114,115]. They may also cause serious cardiovascular events in young adults [116].

One proposal is to allow licensed sellers to sell less potent stimulant drugs in low doses of pharmaceutical quality to licensed adult users who would be required to be well informed about the risks of using these drugs [7,84]. The history of failures to control stimulant misuse via prescription systems does not encourage optimism about the success of such a system. Widespread recreational stimulant misuse in the United States in the 1960s and 1970s was facilitated by the diversion of prescribed stimulants to the black market [109].

The proposed regulatory system has a number of additional weaknesses. First, there is a greater risk of harm if stimulant users do not engage in safer patterns of use, as some will, e.g. by smoking or injecting these drugs. Secondly, it is very easy to convert less potent stimulants into more potent ones, e.g. using cold medicines containing pseudoephedrine to produce crystal methamphetamine

[110] or cocaine powder to produce crack cocaine [7]. Thirdly, there will be major challenges in controlling secondary markets for these drugs among under-aged users.

Prohibition has failed to reduce stimulant-related harm because it is very easy to manufacture methamphetamine from readily available precursors [117]. It is also more difficult to reduce the harms of stimulant use under prohibition than it has been for the opioids [7,84]. There is no stimulant analogue of opioid substitution treatment (OST) [111] because replacement medications, such as dexamphetamine and modafinil, are not as attractive to stimulant users or as effective in improving their health as is OST for opioid users [118]. Heavy stimulant users are more reluctant to seek treatment than opioid users and are more difficult to engage in treatment [111]. Residential treatment reduces methamphetamine use, but relapses are common [119]. Problem stimulant users are also much more likely to commit violent offences than opioid users, such as assault, that make them ineligible to be diverted from prisons into treatment.

How should national governments respond to new psychoactive substances?

Governments have struggled to respond to the large number of new psychoactive substances (NPS) that have been introduced into illicit drug markets in high- and middle-income countries [120,121]. The number of NPS has proliferated, but the prevalence of use of any individual NPS has been very low [122]. The harms of different NPS are not well understood by those who make or take them. Given their low prevalence of use, it is difficult to collect data on the risks of different NPS, but there have been enough fatalities and outbreaks of serious adverse events to raise concerns about the health risks of using NPS [123].

Some governments have imposed blanket bans on the sale of all psychoactive drugs, except for a short list of legal drugs, in order to deter their illicit production and sale. Some analysts have criticized this as a regulatory over-reaction [7,124]. It remains to be seen how successful this approach will be in reducing NPS use and what adverse effects it may have, such as deterring research into the therapeutic use of some NPS (e.g. [125]).

It is unclear to what extent NPS use is a by-product of prohibitions on cannabis, party drugs and stimulants [7]. Many NPS are synthetic cannabinoids or stimulants that have been produced illicitly to circumvent prohibitions on cannabis and stimulants [126]. We do not know if there would be the same interest among young people in using these drugs if cannabis and party drugs were legalized. Experience in the Netherlands suggests that *de-facto* legalization of cannabis and more tolerant policies towards party drugs has not eliminated drug users' interest in trying NPS [92].

As noted above, the New Zealand system to formally approve and license NPS for sale enacted in 2010 [93] was based partially on the approach used to test the safety of pharmaceutical drugs, e.g. by requiring sellers to demonstrate that the drugs did not cause serious adverse effects when used in the doses needed to achieve the desired effects. As noted above, the New Zealand government has struggled to specify methods for assessing drug safety that will not be so expensive that they deter applicants from seeking approval to market new NPS. If NPS manufacturers are held legally liable for any adverse effects, as are producers of other consumer goods, then very few companies may be prepared to apply to have NPS approved for sale. If insurers were prepared to cover NPS manufacturers and sellers, one would expect that very high premiums would be needed to protect them against legal action for any harms experienced by users.

CONCLUSIONS

The future of the drug prohibition policies in nation states that have adhered to the international drug control treaties is uncertain because of recent decisions to legalize cannabis in Canada, the United States and Uruguay. The legitimacy of the treaties has also been questioned by drug policy scholars and civil society organizations advocating for various types of drug policy reform.

The UN's insistence on the policy goal of a 'drug-free world' has made it easy for critics to argue that the international system has failed. The absence of policy counterfactuals against which to evaluate alternative policies to prohibition makes it difficult to assess to what extent prohibition has reduced drug-related harm or how much harm would increase if prohibition was replaced by legal markets for the recreational use of these drugs. It is plausible that prohibition has deterred young people from using illicit drugs and shortened the duration of illicit drug use, but it has been difficult to quantify the extent in the absence of any alternative policies with which to compare it. As critics of prohibition argue, any reduction in drug-related harm under prohibition comes with considerable social costs; namely, large-scale drug black markets, violent crime, high rates of incarceration and poorer health and social wellbeing among people who use illicit drugs.

Legalizing all currently illicit drugs for commercial sale for recreational use by adults would probably increase drug-related harm, but by how much is unclear. Given this uncertainty, the public health risks of this radical option would be high. This suggests the desirability of a more cautious approach to policy reform that would involve trialling and evaluating the effects of incrementally more liberal drug policies. This approach will be easier to implement for some illicit drugs than others.

Cannabis is the strongest candidate for national policy experiments on different ways of regulating its sale and use. This is happening by default with the decision of eight US states, Uruguay and Canada. The US states which are most advanced in implementing this policy have adopted a liberal for-profit regulatory regime based on that for alcohol. There are concerns that this will create an industry that, like the alcohol industry, has an economic interest in promoting regular use and increasing the number of users. Rigorous evaluations of the impacts of US cannabis policies may not be available before cannabis legalization becomes national policy in the United States. Uruguay is implementing a more public health-orientated approach to cannabis regulation and Canada proposes to do the same. The evaluation of these approaches may be useful for other countries considering legalizing cannabis for adult recreational use.

A less compelling case can be made for experimenting with different methods of regulating party drugs, such as MDMA and LSD, and NPS. The regulatory challenge for these drugs is designing policies to ensure that their manufacture and sale meets reasonable standards of consumer safety. If any country legalizes use of any of these drugs, it will be important to evaluate the effects on aggregate harm from any increases in the number of users or in the prevalence of harmful patterns of use among current users.

A mitigated form of prohibition is the most defensible way of dealing with opioid use and opioid-related harm. The opioids can cause serious harms to users, as shown by the adverse effects of liberal opioid prescription policies in Australia, Canada and the United States. A mitigated form of prohibition differs from a 'war on drugs' in including policies to mitigate the adverse effects that prohibition has on people who use opioids. It does so by expanding treatment for opioid dependence, reducing some of its serious medical complications (such as fatal overdose and BBV infection) and reducing the number of opioid users who are imprisoned.

Amphetamine-type stimulants and cocaine comprise the most challenging class of illicit drugs to regulate. Regulation via a modified prescription system seems unlikely to reduce their harmful use. Prohibition may be necessary to minimize stimulant use but it is not sufficient, because stimulants are very easy to produce illicitly. Stimulant policy needs to develop better ways of reducing the demand for stimulants and more effective treatments for problem stimulant users.

Declaration of interests

W.H. was a WHO-nominated member of the International Narcotics Control Board (INCB) from May 2012 until May 2014. His experiences on the INCB informed the

preparation of this paper but the views expressed in it do not reflect the views of INCB or any other UN agency.

Acknowledgements

I would like to thank Sarah Yeates for her invaluable assistance in researching and preparing this paper for publication.

References

- Kaplan J. *Marijuana: The New Prohibition*. New York: World; 1970.
- Nadelmann E. A. Drug prohibition in the United States: costs, consequences and alternatives. *Science* 1989; **245**: 939–47.
- Bewley-Taylor D. R., Blickman T., Jelsma M. *The Rise and Decline of Cannabis Prohibition. The History of Cannabis in the UN Drug Control System and Options for Reform*. Global Drug Policy Observatory/Transnational Institute: Amsterdam/Swansea; 2014. Available at: http://www.tni.org/sites/www.tni.org/files/download/rise_and_decline_web.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGV6sFqO>).
- Babor T., Caulkins J. P., Edwards G., Fischer B., Foxcroft D., Humphreys K. *et al. Drug Policy and the Public Good*. Oxford: Oxford University Press; 2010.
- Csete J., Kamarulzaman A., Kazatchkine M., Altice F., Balicki M., Buxton J. *et al.* Public health and international drug policy. *Lancet* 2016; **387**: 1427–80.
- Room R., Reuter P. How well do international drug conventions protect public health? *Lancet* 2012; **379**: 84–91.
- Rolles S. *After the War on Drugs: Blueprint for Regulation*. Transform Drug Policy Foundation: Bristol; 2009. Available at: <http://www.tdpf.org.uk/sites/default/files/Blueprint.pdf> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGXILF4Y>).
- Costa A. M. *Making Drug Control 'Fit for Purpose': Building on the UNGASS Decade*. Vienna: Commission on Narcotic Drugs, United Nations Office on Drugs and Crime; 2008. Available at: https://www.unodc.org/documents/commissions/CND/CND_Sessions/CND_51/1_CRPs/E-CN7-2008-CRP17_E.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGTDd53f>).
- United Nations Office on Drugs and Crime (UNODC). *World Drug Report 2008. Volume 1: Analysis*. Vienna: UNODC; 2008, p. 2008.
- Bewley-Taylor D., Jelsma M. Regime change: re-visiting the 1961 single convention on narcotic drugs. *Int J Drug Policy* 2012; **23**: 72–81.
- Ghodse H. *International Drug Control into the Twenty First Century*. London: Ashgate; 2008.
- McAllister W. B. Reflections on a century of international drug control. In: Collins J., Kitchen N., editors. *Governing the Global Drug Wars*. London: London School of Economics and Political Science; 2012, pp. 6–7.
- Bruun K., Pan L., Rexed I. *The Gentlemen's Club: International Control of Drugs And Alcohol*. Chicago: University of Chicago Press; 1975.
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 1997*. New York: United Nations; 1998. Available at: http://www.incb.org/documents/Publications/AnnualReports/AR1997/AR_1997_E.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGSVUnGg>).
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 1999*. New York: United Nations; 2000. Available at: http://www.incb.org/documents/Publications/AnnualReports/AR1999/AR_1999_E.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGSeQ1NO>).
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 2000*. New York: United Nations; 2001. Available at: http://www.incb.org/documents/Publications/AnnualReports/AR2000/AR_2000_Chapter_III_Europe.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGStk6px>).
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 2001*. New York: United Nations; 2002. Available at: http://www.incb.org/documents/Publications/AnnualReports/AR2001/AR_01_Chapter_III_Oceania.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGSzLJw3>).
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 2013*. New York: United Nations; 2014. Available at: http://www.incb.org/documents/Publications/AnnualReports/AR2013/English/AR_2013_E.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGVpJP5r>).
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 2012*. New York: United Nations; 2013. Available at: http://www.incb.org/documents/Publications/AnnualReports/AR2012/AR_2012_E_Chapter_II.pdf (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGUt7TOR>).
- International Narcotics Control Board (INCB). *Report of the International Narcotics Control Board for 2016*. New York: United Nations; 2017. Available at: <https://www.incb.org/incb/en/publications/annual-reports/annual-report-2016.html> (accessed 23 June 2017) (Archived at <http://www.webcitation.org/6rQUvSV8B>).
- Liberman J., O'Brien M., Hall W. D., Hill D. Ending inequities in access to effective pain relief? *Lancet* 2010; **376**: 856–7.
- Collins J. Executive summary. In: Collins J., editor. *Ending the Drug Wars: Report of the LSE Expert Group on the Economics of Drug Policy*. London: London School of Economics and Political Science; 2014, pp. 6–7.
- Global Commission on Drug Policy. War on drugs: report of the global commission on drug policy. Geneva: Global Commission on Drug Policy; 2011. Available at: <http://www.globalcommissionondrugs.org/reports/war-on-drugs/> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGUFp8YQ>).
- Sturdee, S. UN drugs board slams killings in Philippines. *Agence France Presse* 2017; 2 March.
- International Narcotics Control Board (INCB). INCB expresses concern about reports of violence against persons suspected of drug-related crime and drug use in the Philippines: Release. Vienna: INCB; 2016; 3 August. Available at: https://www.incb.org/incb/en/news/press-releases/2016/press_release030816.html (accessed 23 June 2017) (Archived at <http://www.webcitation.org/6rQSDzZKM>).
- Rogeberg O. Drug policy, values and the public health approach—four lessons from drug policy reform movements. *Nordic Stud Alcohol Drugs* 2015; **32**: 347.
- Collins J., editor. *Ending the Drug Wars: Report of the LSE Expert Group on the Economics of Drug Policy*. London: London School of Economics and Political Science; 2014.

28. Briones A., Henao A., Pardo P., Cumsille F. *The Drug Problem in the Americas*. Washington, DC: Organization of American States; 2013 Available at: <http://www.pharmacon.net/politik/oas/01.pdf> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGULpZJv>).
29. Caulkins J. P. Effects of prohibition, enforcement and interdiction on drug use. In: Collins J., editor. *Ending the Drug Wars: Report of the LSE Expert Group on the Economics of Drug Policy*. London: London School of Economics and Political Science; 2014, pp. 16–25.
30. MacCoun R. J., Reuter P. Assessing drug prohibition and its alternatives: a guide for agnostics. *Ann Rev Law Soc Science* 2011; 7: 61–78.
31. Babor T., Caetano R., Casswell S., Edwards G., Giesbrecht N., Graham K. *et al. Alcohol: No Ordinary Commodity: Research and Public Policy*. 2nd edn. Oxford: Oxford University Press; 2010.
32. Mills J. H. Science, diplomacy and cannabis: the evidence base and the international drugs regulatory system, 1924–1961. In: Collins J., Kitchen N., editors. *Governing the Global Drug Wars*. London: London School of Economics and Political Science; 2012, pp. 25–30.
33. Room R., MacKay S. *Roadmaps to Reforming the UN Drug Conventions*. Oxford: Beckley Foundation; 2012.
34. Collins J. Rethinking ‘flexibilities’ in the international drug control system—potential, precedents and models for reforms. *Int J Drug Policy* 2016; <https://doi.org/10.1016/j.drugpo.2016.12.014>.
35. Bewley-Taylor D., Jelsma M. UNGASS 2016: A broken or broken consensus? *Drug Policy Briefing* 2016; 45: 1–12.
36. Room R. Reform by subtraction: the path of denunciation of international drug treaties and reaccession with reservations. *Int J Drug Policy* 2012; 23: 401–6.
37. Room R., Fischer B., Hall W. D., Lenton S., Reuter P. *Cannabis Policy: Moving Beyond Stalemate*. Oxford: Oxford University Press; 2010.
38. Degenhardt L., Bucello C., Calabria B., Nelson P., Roberts A., Hall W. D. *et al.* What data are available on the extent of illicit drug use and dependence globally? Results of four systematic reviews. *Drug Alcohol Depend* 2011; 117: 85–101.
39. Degenhardt L., Hall W. D. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *Lancet* 2012; 379: 55–70.
40. Degenhardt L., Whiteford H. A., Ferrari A. J., Baxter A. J., Charlson F. J., Hall W. D. *et al.* Global burden of disease attributable to illicit drug use and dependence: findings from the global burden of disease study 2010. *Lancet* 2013; 382: 1564–74.
41. United Nations Office on Drugs and Crime (UNODC). *World Drug Report 2016*. New York: United Nations; 2016. Available at: <http://www.unodc.org/wdr2016/> (accessed 23 June 2017) (Archived at <http://www.webcitation.org/6rQUFYOOT>).
42. Degenhardt L., Baxter A. J., Lee Y. Y., Hall W. D., Sara G. E., Johns N. *et al.* The global epidemiology and burden of psychostimulant dependence: findings from the Global Burden of Disease study 2010. *Drug Alcohol Depend* 2014; 137: 36–47.
43. Calabria B., Degenhardt L., Hall W. D., Lynskey M. Does cannabis use increase the risk of death? Systematic review of epidemiological evidence on adverse effects of cannabis use. *Drug Alcohol Rev* 2010; 29: 318–30.
44. Hall W. D., Renström M., Poznyak V., editors. *The Health and Social Effects of Nonmedical Cannabis Use*. Geneva: World Health Organization; 2016.
45. Hall W. D. What has research over the past two decades revealed about the adverse health effects of recreational cannabis use? *Addiction* 2015; 110: 19–35.
46. Lim S. S., Vos T., Flaxman A. D., Danaei G., Shibuya K., Adair-Rohani H. *et al.* A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the global burden of disease study 2010. *Lancet* 2012; 380: 2224–60.
47. Kleiman M. A. *Against Excess: Drug Policy for Results*. New York: Basic Books; 1992.
48. Kalant H. A critique of cannabis legalization proposals in Canada. *Int J Drug Policy* 2016; 34: 5–10.
49. Hall W. D. What are the policy lessons of National Alcohol Prohibition in the United States, 1920–1933? *Addiction* 2010; 105: 1164–73.
50. Blocker J. S. Jr. Did prohibition really work? Alcohol prohibition as a public health innovation. *Am J Public Health* 2006; 96: 233–43.
51. Tyrrell I. The US prohibition experiment: myths, history and implications. *Addiction* 1997; 92: 1405–9.
52. Substance Abuse and Mental Health Services Administration (SAMHSA). *Results from the 2015 National Survey on Drug Use and Health: Detailed Tables. Prevalence Estimates, Standard Errors, P Values, and Sample Sizes*. Rockville, MD: SAMHSA Center for Behavioral Health Statistics and Quality; 2016.
53. Heyman G. M. Addiction and choice: theory and new data. *Front Psychiatry* 2013; 4: 31.
54. Robins L. N. Vietnam veterans’ rapid recovery from heroin addiction: a fluke or normal expectation? *Addiction* 1993; 88: 1041–54.
55. Robins L. N., Helzer J. E., Hesselbrock M., Wish E. Vietnam veterans three years after Vietnam: how our study changed our view of heroin. *Am J Addict* 2010; 19: 203–11.
56. Hall W. D., Weier M. Lee Robin’s studies of heroin use among US Vietnam veterans (Addiction Classics). *Addiction* 2016; 112: 176–80.
57. Courtwright D. T. *Forces of Habit: Drugs and the Making of the Modern World*. Cambridge, MA: Harvard University Press; 2001.
58. Trocki C., Opium A. *Empire and the Global Political Economy: A Study of the Asian Opium Trade 1750–1950*. London: Routledge; 1999.
59. United Nations International Drug Control Programme. *World Drug Report*. Oxford, UK: Oxford University Press; 1997.
60. Dikötter F., Laamann L. P., Xun Z. *Narcotic Culture: A History of Drugs in China*. Hong Kong: Hong Kong University Press; 2004.
61. Courtwright D. T. The opium problem: a review essay. *J Hist Med Allied Sci* 2013; 68: 688–94.
62. Lovell J. *The Opium War: Drugs, Dreams and the Making of China*. London: Pan; 2012.
63. Degenhardt L., Ferrari A. J., Calabria B., Hall W. D., Norman R. E., McGrath J. *et al.* The global epidemiology and contribution of cannabis use and dependence to the global burden of disease: results from the GBD 2010 study. *PLOS ONE* 2013; 8: e76635.
64. United Nations Office on Drugs and Crime (UNODC) *World Drug Report 2006. Volume 1: Analysis*. Vienna: United Nations Office on Drugs and Crime, p. 2006.
65. Hall W. D., Room R., Bondy S. Comparing the health and psychological risks of alcohol, cannabis, nicotine and opiate

- use. In: Kalant H., Corrigal W., Hall W. D., Smart R., editors. *The Health Effects of Cannabis*. Toronto: Centre for Addiction and Mental Health; 1999, pp. 475–506.
66. Hall W. D. Alcohol and cannabis: comparing their adverse health effects and regulatory regimes. *Int J Drug Policy* 2017; **42**: 57–62.
 67. Mitchell O., Caudy M. S. Race differences in drug offending and drug distribution arrests. *Crime Delinquency* 2015; **63**: 91–112.
 68. Hall W. D., Fischer B. Harm reduction policies for cannabis. In: Rhodes T., Hedrich D., editors. *Harm Reduction: Evidence, Impacts and Challenges EMCDDA Scientific Monograph*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction; 2010, pp. 235–51.
 69. Sipp W. *Statement of the President of the International Narcotics Control Board, Mr Werner Sipp, 'The Portuguese Approach and the International Drug Control Conventions'*. Vienna: INCB; 2015. Available at: https://www.incb.org/documents/Speeches/Speeches2015/statement_reconvened_CND_side_event_portugal.pdf (accessed 22 June 2017) (Archived at <http://www.webcitation.org/6rP240Crz>).
 70. Pardo B. Cannabis policy reforms in the Americas: a comparative analysis of Colorado, Washington, and Uruguay. *Int J Drug Policy* 2014; **25**: 727–35.
 71. Room R. Legalizing a market for cannabis for pleasure: Colorado, Washington. *Uruguay and beyond Addiction* 2014; **109**: 345–51.
 72. Hall W. D., Lynskey M. Evaluating the public health impacts of legalizing recreational cannabis use in the United States. *Addiction* 2016; **111**: 1764–73.
 73. Hall W. D., Lynskey M. Why it is probably too soon to assess the public health effects of legalisation of recreational cannabis use in the USA. *Lancet Psychiatry* 2016; **3**: 900–6.
 74. Carlini B. H., Garrett S. B., Harwick R. M. Beyond joints and brownies: marijuana concentrates in the legal landscape of Washington state. *Int J Drug Policy* 2017; **42**: 26–9.
 75. Cowan R. How the narcs created crack: a war against ourselves. *Nat Rev* 1986; **38**: 26–34.
 76. Thornton M. *The Economics of Prohibition*. Salt Lake City, UT: University of Utah Press; 1991.
 77. Thornton M. The potency of illegal drugs. *J Drug Issues* 1998; **28**: 725–40.
 78. Thornton M., Benson B., Bowmaker S. Economics of drug liberalization. In: Bowmaker S., editor. *Economics Uncut: A Complete Guide to Life, Death and Misadventure*. Cheltenham: Edward Elgar; 2005, pp. 68–98.
 79. Kleiman M. A. *Legal Commercial Cannabis Sales in Colorado and Washington: What Can We Learn?* Washington, DC: Brookings Institution; 2015. Available at: <https://www.brookings.edu/wp-content/uploads/2016/07/Kleiman-Wash-and-Co-final.pdf> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGW9avax>).
 80. Health Canada. *A Framework for the Legalization and Regulation of Cannabis in Canada: The Final Report of the Task Force on Cannabis Legalization and Regulation*. Government of Canada: Ottawa, Ontario; 2016. Available at: <http://www.healthycanadians.gc.ca/task-force-marijuana-groupe-etude/framework-cadre/alt/framework-cadre-eng.pdf> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGWFGSKU>).
 81. Health Canada. *Legalizing and Strictly Regulating Cannabis: The Facts*. Government of Canada: Ottawa, Ontario; 2017. Available at: <https://www.canada.ca/content/dam/hc-sc/documents/services/campaigns/27-16-1808-Factsheet-The-Facts-eng-03.pdf> (accessed 23 June 2017) (Archived at <http://www.webcitation.org/6rQU2bYci>).
 82. Crepault J. F., Rehm J., Fischer B. The cannabis policy framework by the Centre for Addiction and Mental Health: a proposal for a public health approach to cannabis policy in Canada. *Int J Drug Policy* 2016; **34**: 1–4.
 83. Donnelly J. The case for MDMA (ecstasy) regulation. *J Law Med* 2015; **22**: 823–45.
 84. Haden M. Controlling illegal stimulants: a regulated market model. *Harm Reduct J* 2008; **5**: 1.
 85. Haden M., Emerson B., Tupper K. W. A public-health-based vision for the management and regulation of psychedelics. *J Psychoact Drugs* 2016; **48**: 243–52.
 86. Walsh C. Psychedelics and cognitive liberty: reimagining drug policy through the prism of human rights. *Int J Drug Policy* 2016; **29**: 80–7.
 87. Degenhardt L., Bruno R., Topp L. Is ecstasy a drug of dependence? *Drug Alcohol Depend* 2010; **107**: 1–10.
 88. Advisory Council on the Misuse of Drugs. *A Review of MDMA ('Ecstasy'), its Harms and Classification Under The Misuse of Drugs Act 1971*. London: Home Office; 2009. Available at: <https://www.gov.uk/government/publications/mdma-ecstasy-review> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGTL18gg>).
 89. Degenhardt L., Hall W. D. The health and psychological effects of 'ecstasy' (MDMA) use. NDARC monograph 62. Sydney: National Drug and Alcohol Research Centre, UNSW; 2010. Available at: <https://ndarc.med.unsw.edu.au/publication/health-and-psychological-effects-ecstasy-mdma-use-1> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGTzQc1X>).
 90. Cole J. C. MDMA and the 'ecstasy paradigm'. *J Psychoact Drugs* 2014; **46**: 44–56.
 91. Johansen P. O., Krebs T. S. Psychedelics not linked to mental health problems or suicidal behavior: a population study. *J Psychopharmacol* 2015; **29**: 270–9.
 92. Hondebrink L., Nugteren-van Lonkhuyzen J. J., Van Der Gouwe D., Brunt T. M. Monitoring new psychoactive substances (NPS) in the Netherlands: data from the drug market and the poisons information Centre. *Drug Alcohol Depend* 2015; **147**: 109–15.
 93. Wilkins C. A critical first assessment of the new pre-market approval regime for new psychoactive substances (NPS) in New Zealand. *Addiction* 2014; **109**: 1580–6.
 94. Wilkins C., Sheridan J., Adams P., Russell B., Ram S., Newcombe D. The new psychoactive substances regime in New Zealand: a different approach to regulation. *J Psychopharmacol* 2013; **27**: 584–9.
 95. Courtwright D. T. Drug legalization, the drug war, and drug treatment in historical perspective. *J Policy History* 1991; **3**: 42–63.
 96. Global Commission on Drug Policy. *Taking control: pathways towards drug policies that work*. Geneva: Global Commission on Drug Policy; 2014. Available at: <http://www.globalcommissionondrugs.org/reports/taking-control-pathways-to-drug-policies-that-work/> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGVCZuTx>).
 97. Reynaud M., Luquiens A., Aubin H. J., Talon C., Bourgain C. Quantitative damage-benefit evaluation of drug effects: major discrepancies between the general population, users and experts. *J Psychopharmacol* 2013; **27**: 590–9.

98. Johnston L. D., O'Malley P. M., Miech R. A., Bachman J. G., Schulenberg J. E. *Monitoring the Future National Survey Results on Drug Use, 1975–2016: Overview, Key Findings on Adolescent Drug Use*. Ann Arbor, MI: Institute for Social Research, The University of Michigan; 2017.
99. Kolodny A., Courtwright D. T., Hwang C. S., Kreiner P., Eadie J. L., Clark T. W. *et al.* The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction. *Annu Rev Public Health* 2015; **36**: 559–74.
100. Volkow N. D., McLellan A. T. Opioid abuse in chronic pain—misconceptions and mitigation strategies. *N Engl J Med* 2016; **374**: 1253–63.
101. Darke S., Hall W. D. Heroin overdose: research and evidence-based intervention. *J Urban Health* 2003; **80**: 189–200.
102. Compton W. M., Volkow N. Major increases in opioid analgesic abuse in the United States: concerns and strategies. *Drug Alcohol Depend* 2006; **81**: 103–7.
103. Fischer B., Rehm J. Illicit opioid use in the 21st century: witnessing a paradigm shift? *Addiction* 2007; **102**: 499–501.
104. Okie S. A flood of opioids, a rising tide of deaths. *N Engl J Med* 2010; **363**: 1981–5.
105. Paulozzi L. J., Weisler R. H., Patkar A. A national epidemic of unintentional prescription opioid overdose deaths: how physicians can help control it. *J Clin Psychiatry* 2011; **72**: 589–92.
106. Darke S., Farrell M. Would legalizing illicit opioids reduce overdose fatalities? Implications from a natural experiment. *Addiction* 2014; **109**: 1237–42.
107. Mathers B. M., Degenhardt L., Phillips B., Wiessing L., Hickman M., Strathdee S. A. *et al.* Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *Lancet* 2008; **372**: 1733–45.
108. Degenhardt L., Mathers B., Vickerman P., Rhodes T., Latkin C., Hickman M. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *Lancet* 2010; **376**: 285–301.
109. Rasmussen N. *On Speed: The Many Lives of Amphetamine*. New York, NY: New York University Press; 2008.
110. Vearrier D., Greenberg M. I., Miller S. N., Okaneku J. T., Haggerty D. A. Methamphetamine: history, pathophysiology, adverse health effects, current trends, and hazards associated with the clandestine manufacture of methamphetamine. *Dis Mon* 2012; **58**: 38–89.
111. Radfar S. R., Rawson R. A. Current research on methamphetamine: epidemiology, medical and psychiatric effects, treatment, and harm reduction efforts. *Addict Health* 2014; **6**: 146–54.
112. Darke S., Kaye S., McKetin R., Dufrou J. Major physical and psychological harms of methamphetamine use. *Drug Alcohol Rev* 2008; **27**: 253–62.
113. McKetin R., Lubman D. I., Najman J. M., Dawe S., Butterworth P., Baker A. L. Does methamphetamine use increase violent behaviour? Evidence from a prospective longitudinal study. *Addiction* 2014; **109**: 798–806.
114. Hall W. D., Hando J., Darke S., Ross J. Psychological morbidity and route of administration among amphetamine users in Sydney, Australia. *Addiction* 1996; **91**: 81–7.
115. McKetin R., Lubman D. I., Baker A. L., Dawe S., Ali R. L. Dose-related psychotic symptoms in chronic methamphetamine users: evidence from a prospective longitudinal study. *JAMA Psychiatry* 2013; **70**: 319–24.
116. Kaye S., Darke S., Dufrou J., McKetin R. Methamphetamine-related fatalities in Australia: demographics, circumstances, toxicology and major organ pathology. *Addiction* 2008; **103**: 1353–60.
117. McKetin R., Sutherland R., Bright D. A., Norberg M. M. A systematic review of methamphetamine precursor regulations. *Addiction* 2011; **106**: 1911–24.
118. Perez-Mana C., Castells X., Torrens M., Capella D., Farre M. Efficacy of psychostimulant drugs for amphetamine abuse or dependence. *Cochrane Database Syst Rev* 2013; Issue **9**. Art. No.: CD009695. <https://doi.org/10.1002/14651858.CD009695.pub2>.
119. McKetin R., Najman J. M., Baker A. L., Lubman D. I., Dawe S., Ali R. *et al.* Evaluating the impact of community-based treatment options on methamphetamine use: findings from the methamphetamine treatment evaluation study (MATES). *Addiction* 2012; **107**: 1998–2008.
120. Beharry S., Gibbons S. An overview of emerging and new psychoactive substances in the United Kingdom. *Forensic Sci Int* 2016; **267**: 25–34.
121. EMCDDA. *New Psychoactive Substances in Europe. An Update from the EU Early Warning System*. Luxembourg: Publications Office of the European Union; 2015. Available at: <http://www.emcdda.europa.eu/publications/2015/new-psychoactive-substances> (accessed 14 February 2017) (Archived at <http://www.webcitation.org/6oGVvWFy1>).
122. Mounteney J., Griffiths P., Sedefov R., Noor A., Vicente J., Simon R. The drug situation in Europe: an overview of data available on illicit drugs and new psychoactive substances from European monitoring in 2015. *Addiction* 2016; **111**: 34–48.
123. Schifano F., Orsolini L., Papanti D., Corkery J. NPS: medical consequences associated with their intake. *Curr Top Behav Neurosci* 2016; **32**: 351–80.
124. Reuter P., Pardo B. Can new psychoactive substances be regulated effectively? An assessment of the British psychoactive substances bill. *Addiction* 2016; **112**: 25–31.
125. Nutt D. Illegal drugs laws: Clearing a 50-year-old obstacle to research. *PLOS Biol* 2015; **13**: e1002047.
126. Miliano C., Serpelloni G., Rimondo C., Mereu M., Marti M., De Luca M. A. Neuropharmacology of new psychoactive substances (NPS): focus on the rewarding and reinforcing properties of cannabimimetics and amphetamine-like stimulants. *Front Neurosci* 2016; **10**: 153.