A multi criteria decision analysis (MCDA) for evaluating and appraising government policy responses to non medical heroin use

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Abstract

Background
Globally, non-medical heroin use is generating significant public health and social harms, and drug policy about heroin is a controversial field that encompasses many complex issues. Policy responses to illegal heroin markets have varied from

militarized eradication of the opium poppy and harsh punishment of users, to more tolerant harm reduction approaches with decriminalized possession and use.

Methods
This paper reports the outcomes of a multi-criteria decision analysis (MCDA) on four generic regulatory regimes of heroin: prohibition, decriminalisation, state control and free market. Invited experts on drug harms, addiction, criminology and drug policy developed a comprehensive set of 27 policy outcome criteria against which these drug policy regimes were assessed.

Results
State control of heroin was identified as the preferred policy option although other policy regimes scored better on specific outcome criteria. The free market model scored better than decriminalisation, with absolute prohibition scoring worst on every criterium. The ranking of the regimes was robust to variations in the criterion-specific weights.

Conclusion
The implications of these findings for the development of future policy responses to heroin and opioids generally are discussed in detail. Despite increasing overdose deaths and an opioid epidemic in the US, prohibition remains the predominant policy approach to heroin regulation at present. It is hoped that the current paper adds to the discussion of finding a valid regulatory alternative.

Key words: Heroin, Drug Policy, Regulatory Regimes, Regulation, legalization, decriminalization, prohibition, Multi-Criteria Decision Analysis.

Introduction

Heroin, also known as diacetylmorphine, occupies a unique space in the drug policy debate as arguably the most feared and demonized of all drugs (Kohn, 1987). Yet its powerful cultural associations with addiction, depravity and death, to a significant extent belie its pharmacology. It can be powerfully addictive, and its low ratio of toxic to recreational dose (Gable, 2004) creates a high overdose risk, but when used in controlled medical environments it is relatively safe, hence its enduring place as an analgesic in the United Kingdom's legal pharmacopeia; still used in post-operative and palliative care, and pediatric emergency analgesia.

Opium based tinctures and medicines were legally available in countries such as the United Kingdom in the 19th century, and from 1895 to 1910 Bayer marketed "heroin" as a non-addictive alternative to morphine-based cough-suppressants Berridge and Edwards, 1981). For most of the 20th century, however, non-medical opioid use has been subject to prohibitions. Indeed, it was a desire to control opium and its various derivatives that fueled the emergence of the first international drug control treaties, the Hague International Opium Convention of 1912 implemented globally through the Treaty of Versailles in 1919. These policy models went on to shape the wider global drug prohibition regime under the 1961 UN Single Convention on Drugs (United Nations, 1972). Policy responses to illegal non-medical heroin markets have subsequently varied from militarized eradication of the opium poppy and harsh punitive user-level enforcement, through to more tolerant harm reduction approaches with decriminalized possession and use, and pharmaceutical heroin available via medical prescription for supervised consumption as part of a treatment programme.

Non-medical heroin use is widely seen as generating significant public health and social harms. Since the 1990s the illegal non-medical use of opioids, including prescription pain medication, heroin and fentanyl, has been associated with ever growing health harms, most prominently in the US, where it is estimated that more than 130 people a day die from opioid related overdose (CDC, 2018). In the UK, over three quarters of drug-related deaths are opiate-related (ONS, 2019).

In an unregulated illegal heroin market, increasingly contaminated by fentanyls, the risks of use have risen still further. Among the more than 70,200 US drug-related overdose deaths estimated in 2017, the sharpest increase occurred among deaths related to fentanyl and fentanyl analogs, with more than 28,400 overdose deaths (CDC, 2018).

Consequently, substantial public resources are expended to prevent use, interdict supply and treat people with opioid dependence. While a comparative evaluation of how different policy models would affect these harms would be useful, such an analysis is complicated by the large number of social and health outcomes impacted by the intertwining of non-medical heroin use with the policies implemented to address these.

Different policy approaches are also likely to have a mix of positively and negatively valued consequences, making trade-offs between different social goods unavoidable. This is a challenge for drug policy in general. For example, while raising taxes on cigarettes and alcohol increase government revenues and dissuades some users, the increased legal prices also increase the potential profit opportunities from smuggling, grey market sales, counterfeiting and shop theft. Conversely, the legalisation of cannabis might reduce criminal justice costs and disproportionate criminalisation of people who use cannabis, but lax regulation could lead to an increase in commercial promotion, heavy use and associated health harms (Caulkins et al., 2016).

Trade-offs can only be made using some normative criterion, and this, in turn, raises the question of how different interest groups and stakeholders may prioritise different outcomes and how such prioritisation may in turn influence policy views. For example; the police may prioritise crime reduction; the finance ministry may prioritise spending efficiencies and tax revenue generation; parents may prioritise child protection; health professionals may prioritise prevention, treatment, and reducing overdose risks, and so on. The intrinsic complexity of thinking about impacts on multiple, often conflicting sets of indicators; the challenge of integrating an evidence base spanning multiple research disciplines and policy areas; the differences in normative judgments regarding the relative importance of outcomes; and the human tendency to be swayed by cognitive biases both as individuals and as members of groups, all contribute to making rational and deliberate decision making highly challenging.

We here report on the outcomes of a decision conference that developed a structured choice analysis of drug policy regimes. The conference invited experts on drug harms, addiction, criminology and drug policy to develop a comprehensive set of policy outcome criteria against which different generic drug policy regimes could be assessed, using a facilitated Multi-Criteria Decision Analysis (MCDA). The policy regimes were ranked separately for three different drugs: alcohol, cannabis and heroin. The results for alcohol and cannabis have been reported elsewhere (Rogeberg et al., 2018). We here report on the results for heroin.

Methods

The development of an MCDA for appraising different policy models took place during a 'decision conference' of invited experts, facilitated by an impartial specialist in group processes and decision analysis, Professor Lawrence Phillips. A diverse group of experts on drug-related harms, addiction, criminology, and drug policy was assembled *(Panel 1)*. A detailed description and explanation of the MCDA process has already been made available in a previous published paper (Rogeberg et al., 2018). We here provide a brief summary.

Panel 1: Participants

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Over two, two-day meetings, the participants first collectively defined four policy regimes: absolute **prohibition**; **decriminalisation** (prohibition of supply with decriminalisation of personal possession and use e.g. as in Portugal); legal supply via strict **state control** and regulation, and legal supply via a commercial/**free market** *(Panel 2)*.

Panel 2: Policy Models

Absolute prohibition: Production, distribution, possession and use are illegal under criminal law, and the laws are actively enforced. Policies within this class may differ as to the strictness of penalties, the relative emphasis of enforcement efforts, as well as the type of police procedures used in investigation (e.g., entrapment, surveillance, interception of personal communications, requirements for "probable cause" before demanding house searches or drug tests).

Decriminalisation: Production and distribution remain illegal. Use and possession are a civil offence, but may be subject to fines, or result in recommendations to voluntarily enter treatment (without threat of criminal sanctions for non-compliance), e.g. Portugal. Policies within this class may differ as to the strictness and enforcement of remaining penalties, in the degree of enforcement of supply-side control efforts, or in the particular groups targeted by enforcement (e.g., adolescents, minorities). 'Decriminalisation' is not a strictly defined legal term, but its common usage in drug policy (and the definition used here) refers to the removal of criminal sanctions for possession of small quantities of currently illegal drugs for personal use, with optional use of civil or administrative sanctions. Under this definition of 'decriminalisation', possession of drugs remains unlawful and a punishable offence (albeit not one that results in a criminal record).

State control: There are legal options available for users to access the substance, possess and use it, but a variety of regulatory interventions may be applied to structure the market and shape the levels and type of use: Age limits, state controlled production and sales, legal non commercial home production, regulations on where, when and by whom consumption is legal, taxation, advertising and marketing restrictions, etc. Policies within this class may differ as to which regulatory instruments they employ and in what way, but a substantial share of users are able to access and use the substance without involving either themselves or others in illegal activity.

Free market: Production, distribution, possession and use are not subject to any specific regulatory policies beyond those that apply in general to consumer goods within a modern market economy (e.g., accurate content declarations, absence of fraud, payment of taxes). No additional taxes or restrictions apply beyond those that apply to all goods (e.g., VAT) beyond age limits.

Participants then identified and defined twenty-seven key outcome criteria reflecting a range of ethical and normative concerns, organised within seven broad thematic policy-impact clusters *(Panel 3)*.

Panel 3: Outcome criterion

Cluster	Criterion	Definition
Health	Harm to user	Prevents medical harms to a user resulting from consumption of intended substance; includes blood-borne viruses (BBV)
	Harm to others	Prevents health harms (including BBVs) to third parties due to either indirect exposure (e.g., second hand smoking) and behavioural responses to consumption (e.g., injury due to alcohol induced violence)
	More harmful substances	Decreases consumption of more harmful substances or increases consumption of less harmful substances (e.g., cannabis prohibition leading to synthetic cannabinoids)
	Encourages treatment	Encourages treatment of substance-use problems
	Product quality	Assures the quality of products due to mislabelled or counterfeit/adulterated product, unknown dose/purity
Social	Education	Improves education about drugs
	Medical use	Policy does not impede medical use

	Research	Policy does not impede research
	Human rights	Policy does not interfere with human rights as distinct from the individual's right to use.
	Individual liberty	Policy does not interfere with individual liberty (individual's right to use)
	Community cohesion	Policy does not undermine social cohesion in communities
	Family cohesion	Policy does not undermine family cohesion
Political	International development & security	Policy does not undermine international development and security
	Industry influence on governments	Impedes drug industry influence on governments (less lobbying is preferable)
Public	Promotes well-being	Promotes social and personal well-being
	Children and young	Protects children and young people
	Protects vulnerable	Protects vulnerable groups other than children and young people
	Religious/cultural value	Respects religious or cultural values
Crime	Criminalises users	Does not criminalise users
	Reduces acquisitive crime	Reduces acquisitive crime to finance use
	Reduces violent crime	Reduces violent crime due to illegal markets
	Prevents corporate crime	Prevents corporate crime, e.g. money-laundering, tax evasion
	Prevents criminal industry	Extent to which the policy discourages illegal market activity
Economic	Generates state revenue	Generates state revenue
	Reduces economic costs	Reduces public financial costs not directly related to the enforcement policy (e.g., spillover effects on health policy budgets)
Cost	Introduction	Financial costs of introducing the policy
	Maintenance	Financial costs of enforcing the policy

Each of the four policy options was evaluated on each of the twenty-seven criteria, which were subsequently weighted to a common utility scale prior to summing scores across criteria to identify the overall relative value of outcomes under different policy regimes. The weightings of each criterion scale summarized both the relative importance of the outcome and the policy-induced variation in the outcome under the best and worst option. The weighting was a two-stage process; firstly, criteria were weighted against each other within thematic clusters, and then the thematic clusters were weighted against each other. This scoring and weighting procedure was done separately for each of the drugs assessed.

A sensitivity analysis was undertaken to see how much variation in any one criteria would be needed to swing the balance in favour of one policy option from another –

this also allowed for differences of opinion on rankings or weightings within the decision conference to be noted and then tested to see what impact they would have on the final scores.

Results

An overview of the main results is provided in Figure 1, which shows the cumulative weighted sums for each of the four policy options, broken down into scores on the 7 criteria clusters. State Control was identified as the preferred policy regime overall, though other policy regimes scored better on specific outcome areas. For instance, the Free Market model, ranked second of the regimes, scored better than State Regulation on political impacts and impact on crime. This reflected the negative impacts of the remaining illegal trade expected under a State Control model. This benefit of the Free Market model, however, was outweighed by its poorer expected performance on health, social and public outcomes. The Free Market model scored better than Decriminalisation, with absolute Prohibition scoring worst on every criteria.
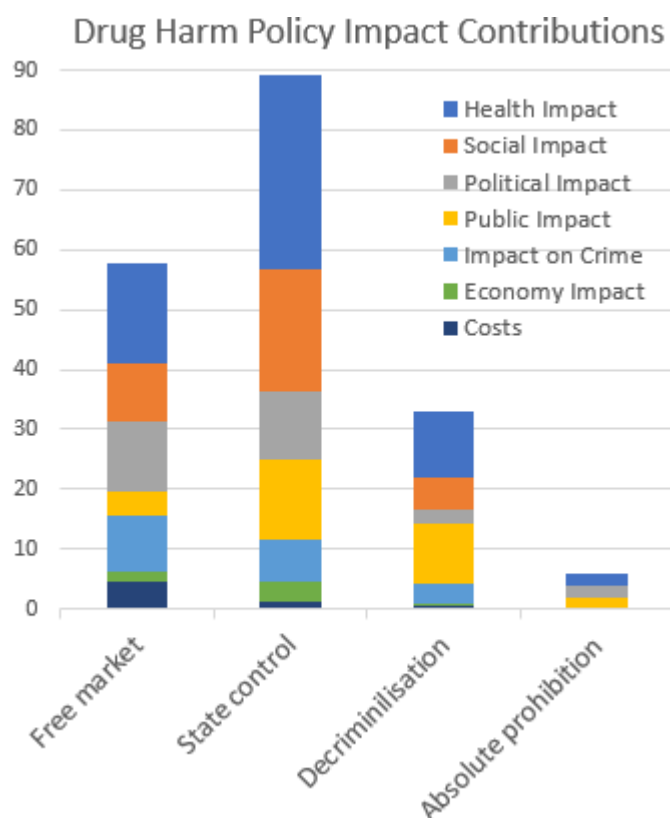

Fig 1. Heroin- Overall preference values across regimes. Displays weighted advantages.

To better understand these overall judgments, we compared two policy regimes and identified the specific criteria that made a difference. As shown in Fig 1, there was a 93-point difference between the total scores for absolute prohibition and state control. This overall difference in scores can be broken down into the differences on each of the criteria – expressed in terms of the weighted preference units.

These scores are shown in Fig 2, which orders the 27 criteria by the extent to which they tilt the overall judgment for heroin policy towards state control relative to

absolute prohibition: the four strongest factors are the support for international development/security, the reduction of user harms, the shift in use to lower-harm products and the improvement of product quality. These four contribute over one third (35 points) to the difference favouring state control over prohibition. In terms of the public policy impact (including the promotion of family and community cohesion, and the protection of the young and vulnerable), state control was also valued as particularly preferred in comparison to absolute prohibition. In almost all other categories, apart from a reduction in industry influence, state control was regarded as advantageous over absolute prohibition.

Fig 2.
Heroin–Comparison of state control to absolute prohibition. The criteria (as defined in Panel 3) sorted for heroin in order of the advantages of State control over absolute prohibition, as given by the weighted difference between their input scores. The green bars show the magnitude of the impacts favouring State control, while the red bars favour prohibition.

Discussion

This policy MCDA exercise extends the earlier work of Nutt et al (2007; 2010) which used the MCDA approach to rank the harms of a broad range of drugs. In a 2011 critique, Rolles and Measham noted how the comparative harm ranking model in Nutt et al (2010) was unable to fully capture and express how drug related social and health harms are significantly shaped by the legal/policy environment (for example, it somewhat inconsistently ranked illegal street heroin against pharmaceutical prescribed methadone). Rolles et al further noted that heroin provided perhaps the starkest example of the need to disaggregate harms related to pharmacology, and wider harms related to the legal/policy environment:

"Consider, for example, two injecting heroin users; the first is committing high volumes of crime to fund their illicit habit, using 'street' heroin (of unknown strength and purity) with dirty, possibly shared needles in unsupervised and unsanitary environments. Their supplies are purchased from a criminal dealing/trafficking infrastructure that can be traced back to illicit production in Afghanistan. They have HIV, Hepatitis C and a long, and growing, criminal record. The second uses legally manufactured and prescribed pharmaceutical diamorphine of known strength and purity in a supervised, clinical setting, with clean injecting paraphernalia. There is no link to failing drug producer states; no criminality, profiteering or violence involved at any stage of the drug's production, supply or use; no blood borne disease transmission risk; a near zero risk of overdose death; and no offending to fund use."

This MCDA of alternative policy regimes reflects an evolution with regards to the detail and sophistication of the outcome criteria assessed. Whereas the Nutt et al (2007) paper considered 9 broadly medical outcomes, the Nutt et al (2010) paper identified 16 outcomes relating to the harmful consequences of drug use. This more recent workshop identified 27 outcome criteria covering both positive and negative outcomes of drug use as well as the costs and consequences of policies on broader outcomes (political processes, illegal markets, community well-being, and the economic and tax revenue benefits of drug markets). The analysis of benefits/pleasures alongside costs/harms is a vital element of any comprehensive policy analysis but has often been considered taboo in the debate on currently illegal drugs (even if less so for alcohol and tobacco) and has only recently been considered by academics (Duff, 2008). This has arguably led to historically skewed policy making towards a narrow focus on prevalence of use and drug-related deaths as the dominant metrics, and reductions in these as the dominant policy goals.
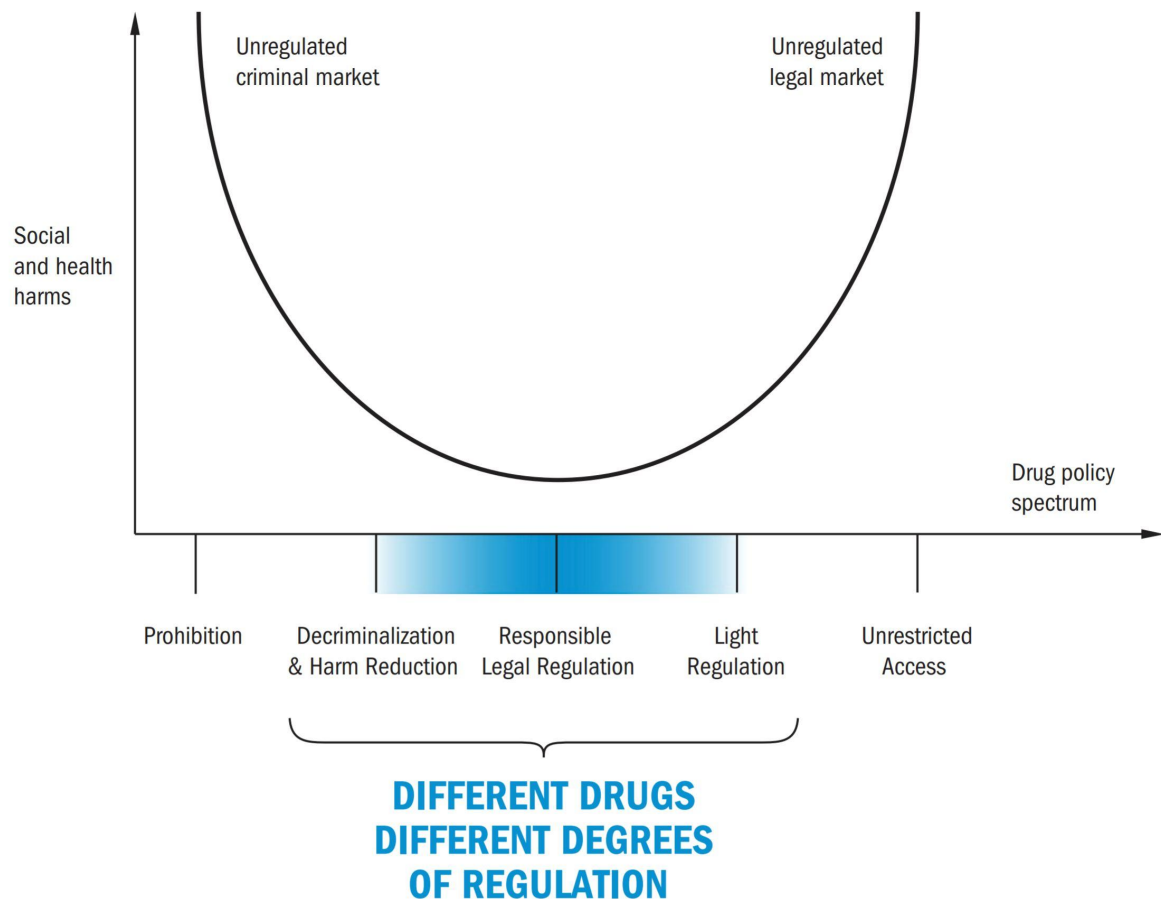
The MCDA is a useful tool but its limitations (as well as the limits of the decision conference expertise) need to be acknowledged when considering the results. The process allowed the participants to deconstruct complex drug policy issues into a set of simpler judgements that led to consensus about the results but there is inevitably more complexity and nuance to policy and decision making than the MCDA model can incorporate. It is important to be clear about the generalisations implicit in both the chosen policy models and outcome criteria and note how these generalizations may overlook some important questions (many of these points were noted during the four day conference itself). Different drug policies operate within wider health and social policy environments that have profound impacts on drug using behaviours, drug markets, society's responses to them, and their impacts. Variables relating to social deprivation, unemployment, inequality, as well as the quality of mental health and social care systems for vulnerable and marginalized populations all significantly impact on patterns of drug use and related harms. Effective responses to these wider challenges are crucial to addressing drug related harms in the longer term. More directly, the extent of investment in targeted, evidence-based drug prevention, treatment, and harm reduction will also be an important variable under any legal regime, as will be the nature of enforcement and sentencing responses to illegal markets and use. Whilst these more granular questions are not tackled directly, and they could lead to considerable variation within any one of the four proposed policy models, they are at least implicit in the MCDA model's outcome criteria, in so far as the criteria broadly ask which policy models are likely to facilitate better or worse outcomes in areas such as treatment access, social and family cohesion, and international security and development.

Illustrating this, the decision conference participants vigorously discussed what a

"State Control" policy for heroin would entail. The policy regimes were defined in generic terms, and largely defined in terms of the type of regulatory tools available, while the specific choice of which of these tools to employ and how they would differ by the type of drug considered and the challenges it raised. For example, Heroin Assisted Therapy (HAT) has been successfully used in multiple jurisdictions, notably Switzerland (Csete, 2013), and is supported by a growing evidence base of controlled studies (Strang et al., 2015). While it was acknowledged that HAT represents a form of state-regulated supply of heroin, the fact that it takes place within a medical treatment model with strict access criteria (long term users who have failed in other forms of treatment) marks it out as distinct from the forms of existing state controlled supply considered for the parallel exercises regarding alcohol and cannabis. Because HAT is categorized as a medical intervention (permitted under domestic and international laws that only prohibit non-medical drug possession/use and supply), this supply model is often viewed as outside of and distinct from the wider legalisation/regulation debate. For a person using heroin, however, moving from an illegal supply to a prescribed supply means that their access and use has effectively been 'legalised'. It has been estimated that if 10% of the heaviest problematic users could be supplied via HAT this could account for 50% of total heroin consumption (Killias and Aebi, 2000), so it is not difficult to envisage a scenario in which a majority of the formerly illegal non-medical market would be "legally regulated" under such a model.

There has only been one limited experiment with lower threshold access to medically prescribed heroin (Haasen et al., 2010). Other models of prescribing heroin in safer non-injectable forms to facilitate so-called 'route transitions', moving from injecting to safer methods of use such as powder for smoking or snorting, oral pill forms, or smokable heroin 'reefers' , have received little attention from researchers, but would be expected to reduce the risks facing individual users and may warrant further exploration. Similarly, a legal market could potentially shift demand towards lower risk opioids by providing licensed retailing of slow release oral pill form opioids or licensing a modern form of the 'opium den' where members could consume in supervised, non-commercial premises (Rolles, 2009). The goal of such regulation would be to shift opioid use away from higher risk products and use formats (e.g. injection of heroin), reducing overall social harms and negative health impacts. The potential for policy models to more substantially re-shape risk behaviours over time, and the possibilities of a tiered market of opioids with different levels of risk and corresponding regulatory models, currently remain speculative given the lack of policy experimentation in this area, but the MCDA process indicates that there may be scope for policy innovation with beneficial consequences in the short, medium and long term, if there is the political will.

The overall results for heroin are similar to those for the parallel processes undertaken for cannabis and alcohol (Rogeberg et al., 2018) in that all three favoured state regulation, though the type of regulation involved would differ substantially by substance. Heroin prohibition scored particularly badly, due to the profoundly increased risks of illegal heroin injection (relative to supervised legal use), and the acute harms associated with the international illegal opium/heroin market (relative to the legal one). These particularly acute harms associated with heroin use and heroin markets under prohibition explain why the free market option may appear somewhat disproportionately favoured (something that raised some initial unease amongst conference participants); its score significantly reflects relative weighting against worse prohibition options, rather than favorability *per se.*

Unregulated
criminal market

Unregulated
legal market

Social
and health
harms

Drug policy
spectrum

Prohibition

Decriminalization
& Harm Reduction

Responsible
Legal Regulation

Light
Regulation

Unrestricted
Access

**DIFFERENT DRUGS
DIFFERENT DEGREES
OF REGULATION**

Fig 3 caption: The paradox of prohibition (GCDP 2016)

Our results echo the 'paradox of prohibition' graphic, albeit inverted, originally devised by Dr John Marks (a pioneer of HAT in the UK in the 1980s), adapted by Transform Drug Policy Foundation (Rolles and Murkin, 2013), then subsequently utilised by, amongst others, the European Union ALICERAP project (Apfel, 2014), The Global Commission on Drug Policy (2014) *(see fig 3)*, and the Canadian Government Task Force on Cannabis Regulation (2016). The graphic aims to conceptually illustrate the broad narrative underlying reform efforts, that unregulated markets – whether illegal under prohibition or corporate under a free market model – are associated with avoidable health and social harms; and that optimum outcomes are achieved at some point between these two extremes where responsible government agencies can intervene in and regulate drug use and drug markets in the public interest.

The MCDA process provides some empirical support for this core idea – albeit from an expert-led delphic process, rather than specific data. This approach can be applied equally to un-regulated illegal drug markets, or over-commercialized and under regulated legal markets such as for alcohol and tobacco in some countries. The results stress the need to move beyond polarized and binary 'prohibition versus legalisation' debates, and to refocus on the different harms imposed by both excessively liberal and excessively restrictive policy approaches to identify a balanced overall outcome in line with wider interests of individual and social health and wellbeing.

The unfolding opioid crisis in the US can be seen to reflect the dynamics of inadequate regulation at both ends of this curve. A key factor in the emergence of the crisis was the growing misuse and diversion of prescribed opioid analgesics that were actively and aggressively promoted, in the pursuit of profit, by an underregulated pharmaceutical industry

With heightened costs of prescription opioids and restrictions in their prescriptions, people with opioid dependencies increasingly turned to heroin as a cheaper alternative. When prescribing was curtailed, some of the residual demand for non medical use was displaced to the illegal heroin market, with injected illegal heroin use, and its attendant risks, both rising sharply, a situation worsened further by the encroachment of fentanyl as an adulterant in the illegal heroin supply chain.

This analysis potentially leaves the workopen to the criticism that it is a reflection of the experiences, political persuasions, and policy perspectives of the group –which may have been nearer the centrist position than either the free market or prohibitionist ends of the policy spectrum. While the MCDA process encourages participants to consider and promote different viewpoints, and while participants strived to balance the discussion in line with this and promote a fair hearing of evidence favouring different policy models, participants also stressed that the exercise should be repeated with groups including an even wider spectrum of views, political leanings, and particular concerns. Participants did, however, frequently note how the exercise was forcing them to challenge many of their own views, often expressing a disconnect between the more rationally derived conclusions and their 'gut' or 'instinctual' leanings. Indeed, the way in which the structured MCDA process can challenge such instinctive biases is arguably one of its great strengths. It suggests this or similar MCDA processes could usefully be deployed to inform, moderate or shift more entrenched or polarized positions amongst policy makers and opinion formers.

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