

The development of an Australian drug policy index

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Abstract

One of the challenges for drug policy research is being able to compare policy options and outcomes. Comparisons between regions or countries, within regions and over time, and across domains of policy initiative: law enforcement, treatment, harm reduction and prevention are all relevant. The development of indexes, such as the UK Drug Harm Index or the UNODC Illicit Drug Index is a way to systematically enable such comparisons. The Australian drug policy research program is also developing a comparative index.

This paper summarises the existing Indexes and then outlines the Australian Index. The method applied for the Australian Index has been to decide on the purpose, identify all the outcomes, and quantify them through the application of a social cost framework. Because each drug is different in its prevalence, consumption and most importantly harms, the Index developed by us is specific to individual drugs. In addition we distinguish between dependent and non-dependent use to manage the huge variance in harms associated with patterns of use. The feasibility of the Australian approach has been examined, and the preliminary results for the Index, by drug type and by dependent and non-dependent use will be provided. We conclude that the Index is feasible and worth further research endeavour.

Aside from the specific Index results to be presented, some important general conclusions can be drawn: the purpose of an Index is critical to the way in which it is parameterised; no one Index will be regarded as suitable and appropriate by every stakeholder; and ongoing research effort on Indexes is an important foundational research activity to advance illicit drug policy research.

Introduction

Measuring the success or otherwise of policies is fundamental to continuous social, economic and community improvement. For complex social problems, such as drug abuse, it is a difficult task. One central reason for difficulty is that there is not necessarily agreement on what the outcomes should be. The second challenge is that drug policy transects the multiple domains of law enforcement, treatment, harm reduction and prevention. Each of these policy interventions impact on different aspects of the problem, and are measured differently. Thus, any endeavour to measure the success of policy needs to include consideration of multiple domains and impacts. A summary index that can collapse multiple indicators into one is highly sought after.

Many fields now have developed a single metric which attempts to encapsulate multiple indicators. The 'ecological footprint' is one example. The ecological footprint attempts to measure the "human demand on nature" (Wikipedia), by calculating what would be needed to sustain a population and comparing this to the actual

productive land and marine area. As a simple, elegant method it has received both popular attention (one can calculate one's own ecological footprint) as well as criticism for the oversimplification that such an Index entails. Another example closer to home is the DALY (Disability Adjusted Life Year) – a composite measure of the burden of disease (morbidity and mortality combined). The DALY can be used to compare diseases, compare populations, evaluate priority policy areas and monitor changes over time (Murray, Salomon, Mathers, & Lopez, 2002).

The essence of a composite index, such as the ecological footprint or the DALY are that they combine different components and produce as single measure of impact.

Drug policy analysis would be substantially enhanced if we could develop an Index that can cover the variety of components to drug misuse and provide a summative measure of impact. A small number of Indexes for drug policy exist.

Drug Policy Indexes

There are four notable existing 'indexes': the UNODC Illicit Drug Index, the Australian Federal Police Harm Index; the UK Drug Harm Index; and the ratings of harmfulness of different drugs.

The United Nations Office on Drugs and Crime "Illicit Drug Index" (IDI) has as its primary purpose to compare countries/regions. As stated by UNODC, their aim is to establish a "single, standard and comparable measure of a country's overall drug problem" (United Nations Office on Drugs and Crime, 2005 p. 166). The UNODC Illicit Drug Index effectively measures the extent of the problem.

Production, trafficking and abuse were the three components chosen as the drug indicators for the IDI. These factors were selected due to data availability and also because these factors were assumed to be closely related to the drug problem (United Nations Office on Drugs and Crime, 2005).

To calculate the production index two methods were implemented. Firstly, plant-based drug production estimates were determined through land surveys. To derive synthetic drug production estimates, data on number of consumers and typical amounts consumed per user, seizures of end products, and seizures of precursors were used. The production estimates were then converted into typical consumption units to reflect the differing typical dose between drug type. These consumption units were then weighted by a harm/risk factor (discussed below) to take into account the fact that certain drugs have higher abuse risk and associated harms.

The trafficking sub-index resulted from two indicators: reported drug seizures and drug route indicators. Reported drug seizures were compiled from law enforcement data. Similar to the production index, the amounts were converted into typical doses and weighted by the harm factor. The drug route indicators were compiled from data collected as part of the UNODC's annual report questionnaire. Member states were asked questions related to the place of origin, transit and destination of drugs seized on their territory.

The abuse sub-index was calculated by number of users multiplied by average annual dose and then weighted by the harm/risk factor. The harm/risk factor, as mentioned above, was generated to accommodate the difference in the number and the depth of the harms and risk between drug type. The elements selected to

establish the risks and harms for each drug type were: treatment demand, injecting drug use, toxicity, and deaths.

A number of 'technical challenges' were identified by the UNODC team including how different types of drugs (with associated different harms) could be compared and summed into a common measure. This was resolved through combining all drugs and then converting them into a hypothetical reference drug, against which other drugs are then benchmarked.

The Australian Federal Police (AFP) have been developing a "Drug Harm Index" over a number of years, the latest version of which was published in 2006 (McFadden, 2006). The purpose of the AFP Index is to assess the value to the Australian community of drugs seized by the AFP. "The index represents the dollar value of harm that would have ensued had the seized drugs reached the community" (McFadden, 2006 p. 68). An economic cost per kilogram of drug consumed is estimated, through combining prevalence and consumption against social cost estimates. The areas covered by the AFP Harm Index include tangible costs: labour costs, health care, road accidents, crime, resources used in abusive consumption, and intangible costs (loss of life and pain and suffering). Because the source material for the social costs did not separately identify drug classes, various estimates and multipliers were used to divide the social costs between the different drug classes of interest for the AFP. Estimates of consumption are then divided by the social costs to produce a harm per kg.

The UK "Drug Harm Index" has a different purpose: to monitor the progress of Drug Strategy over time (MacDonald, Tinsley, Collingwood, Jamieson, & Pudney, 2005). It comprises three parts: drug-related domestic and commercial crime; community problems (community perceptions of drug dealing, drug dealing offences); and health harms (BBV, mortality, overdoses, mental health and behavioural problems, neonatal problems) that collectively cover 19 harms (MacDonald et al., 2005).

The Home Office acknowledges that the list of harms is limited, but has been pragmatic in choosing harms that are quantifiable with existing reliable data. The harms are 'weighted' through analysis of the social costs associated with each harm. The Index was set at an arbitrary value of 100 in the year 1998. Subsequent years have then seen an increase or decrease relative to the original 1998 value of 100. Interpretation of the Index is thus nuanced because a rise in some harms and a fall in others may see no change in the Index itself but clearly the policy environment has changed. In the most recent UK Drug Strategy publication, they note a 28.4% reduction in the Drug Harm Index between 2002 and 2005 (HM Government, 2008)

There have been a number of critiques of the UK Drug Harm Index, including presentations at last year's ISSDP conference by Alex Stevens and Peter Reuter. In addition Newcombe provides a comprehensive review and notes that the concept of risk is not attended to (Newcombe, 2006).

Also from the UK, a scale that assesses the harms of different drugs has been produced (Nutt, King, Saulsbury, & Blakemore, 2007). The purpose of the scale is to assess the potential harms of individual drugs, enabling them to be ranked against each other. Using Delphi techniques and consultation with experts, judgements were made on three main factors of harms: physical harm, dependence, and social harms. Within physical harm, consideration was given to acute, chronic and intravenous harms. Within dependence, consideration was given to intensity of pleasure,

psychological dependence and physical dependence. And within the social harms factor, intoxication, other social harms and health care costs were considered. The method produced a "mean harm score" for each of 20 different drugs (Nutt et al., 2007). The purpose of this scale is fundamentally different from the above three – it compares drugs not policies.

In addition to the above Indexes, there is also work being conducted in New Zealand on an "Illegal Drug Harm Index" – it appears that this will be similar to the AFP Index mentioned above. The Victoria Police in Australia are also developing a drug harm index to assist operational police to direct resources most effectively. The Index will operate at the local police command level.

Purposes of an Index

As will be apparent from this brief review, each Index has a different purpose. The purposes can be categorised as:

- performance monitoring within one country/region over time (UK DHI)
- establishing societal benefit (social costs saved) (AFP)
- comparisons between countries or regions (UNODC)
- comparison of drugs (Nutt's work)
- informing strategic policy and/or resource allocation (Victoria Police)

As discussed in the second half of this paper, the purpose of the DPMP Index is different from the above. It is an Index to compare the impact of different policy interventions across law enforcement, prevention, harm reduction and treatment. As a common metric, it can be applied in different models, and for different policy evaluations.

The purpose of an Index is highly relevant to the outcomes to be compiled/collated; and the unit of measurement. Clarity of purpose assists in understanding the chosen methods. If the purpose of an Index is performance monitoring, then the outcomes to be included/combined will be different from one where the purpose is to demonstrate returns on investment.

Different outcomes: what is successful drug policy?

What is success?

- Reduction in number of users?
- Reductions in amount of use per user?
- Reductions in harm or consequences of use?
- Reductions in availability of drug (seizures, price, purity)?

Reductions in drug use (such as the numbers of people using drugs, or the amounts consumed) are obvious measures of policy impact. However some interventions do not directly measure these outcomes. Notably the outcomes from law enforcement interventions are not measured in use reduction terms but in arrests, seizures and crop destruction. Likewise for prevention policies, the outcome measure is not reduction in prevalence or consumption but deferred use reduction in the future. In addition, a focus on use reduction (prevalence and consumption) does not accommodate reductions in the harms associated with drug use, such as reduced criminal activity, or lives saved. Drug policy has powerful effects on the harms associated with drug use and we would want to include those harms in a measure of policy outcome. An index focussed solely on use (prevalence, quantity consumed) would not enable inclusion of harms. In addition, the relationship between use

(prevalence or quantity) is not linear with harm, and varies by drug type and using context. Thus 'use' is not a proxy for 'harm'.

Instead of focussing on the use of drugs per se, another option is to focus on the consequences or harms arising from that use. In terms of community concern and financial burden, it is the harmful consequences associated with drug use that should be ameliorated. The harms from drug use can be categorised into health-related, crime-related, community-related, labour-market and productivity, and pain and suffering. There are other potential advantages to using consequences as a measure of policy outcome: for example it enables distinction between the different 'bearers' of the harm (MacCoun & Reuter, 2001). In their classic text 'Drug War Heresies', MacCoun and Reuter provide a taxonomy of drug-related harms. Using categories of harm (health, social and economic functioning, safety and public order, criminal justice), they distinguish between the bearers of the harm and the primary source of the harm. The bearers of the harm include: users, dealers, intimates, employers, neighbourhood and society. The sources of harm can be from use itself, from illegal status and/or from enforcement.

Use reduction and harm reduction are not mutually exclusive. Harms include, perforce, the number of individuals using the drug and a proxy of quantity of use. An inclusive approach would therefore cover prevalence and consumption as well as the consequences associated with use. Yet where we agree in theory as to the outcomes to be included in the measure, at a practical level we may not have data. There is a gap between what would be ideal in an Index versus what is practical.

From whose perspective?

- Government – government spending?
- Community - social costs of drugs?
- Drug user; those directly connected with drug use?

In the process of considering the outcomes or consequences that are to be combined/collated, one must also consider the perspective taken. If only the perspective of government is considered, then only those outcomes of direct concern to government would be included. That is, those outcomes that governments have control over, and can manipulate/alter. Alternately, a societal perspective could be taken resulting in the inclusion of many outcomes that reside largely outside the control of direct government action (such as private consequences for example insurance premiums). Finally, there is the perspective of the drug user – the outcomes of drug policy for a drug user are likely to include substantially different considerations from those discussed thus far. For example, an Index that does not include pleasure as one significant component of drug use would be seen to be inadequate if one were taking a user perspective.

Different metrics

Having considered the purpose, the outcomes to be included and the perspective taken, it remains to determine the metric for the Index. The outcomes need to be summed/pooled using a common metric. There are two main options: a single number or a monetary unit (there are others: the ecological footprint is global hectares; DALY is yrs of life).

A numeric value for an Index is derived by summing the outcomes. The UNODC Illicit Drug Index and the UK Drug Harm Index both use a number as the common metric. A simple count mechanism can be problematic in that it does not incorporate any

weighting of outcomes. Is one burglary the equivalent of one death? The outcomes can be weighted by the monetary value they represent, or by some community consultation process.

The number metric is likely to require some transformation, depending upon the purpose of the Index. The UK DHI, with the purpose of performance monitoring, set the number at 100 for the reference year, and then subsequent years are compared as an increase or decrease relative to 100. The UNODC dealt with the multiple drugs problem but using a hypothetical drug as the reference drug and then transforming the numbers for other drugs against this reference drug.

The alternate option is for the common metric to be dollars – the monetary value of the outcomes. The monetary value for each outcome represents the financial burden to society of drug use. There are a number of advantages to using monetary value as the common metric. Firstly, it enables the different outcomes to be combined readily when they are all converted into the same metric. The social cost data are available; at least for health and crime outcomes. Secondly, the use of monetary value as the common metric deals with the problem of assigning 'weights' to the outcomes. Taking raw numbers of outcomes is problematic. If there are 100 hospitalisations per annum for dependent heroin users and 200 burglaries for dependent heroin users how do you meaningfully combine 100 and 200 units? One way is to agree to weight the raw numbers by some measure of concern. One measure of concern is the cost associated with that harm. Thereby the 100 hospitalisations are converted into a dollar cost borne by society; likewise the burglaries are converted into a dollar cost. Then they are summed. The criticism of using social costs is that it does actually weight the harms, by an economic measure. Some people will argue that social cost is not the most important way of valuing and comparing consequences (burglary is 'worse' than hospitalisation; what value a life?). Finally, the advantage of using social costs as the common metric is that it is one that is readily 'understood' and makes intuitive sense for policy analyses: it represents the potential cost savings that could accrue under the policy scenario being examined. It has an implicit meaning, as compared to a 'number'. The primary disadvantages of using monetary value are the problematic economic assumption (as noted above), and the additional data requirements to convert all outcomes into costs.

Summary

In summary, the purpose of an Index will determine the likely methodological approach. Agreement on the outcomes to be included – use and harms – is required. Where there is agreement on the variables to be included, pragmatic constraints on available data may compromise the Index. Having determined outcomes the metric needs to be decided upon. Numeric summation of the various outcomes, especially where they cross law enforcement, treatment, prevention and harm reduction arenas, can be problematic in the absence of some form of weighting. One weight option is the application of the social costs for each outcome. The advantage of social cost as a common metric lies in its implicit meaning to both decision makers and the community alike. However, it does represent an economic perspective of the value of drug consequences.

The Australian DPMP Index

Purpose

The Drug Policy Modelling Program is concerned with evaluating drug policy. In the main, DPMP is using models or simulations, as a primary method to evaluate policy

options. It is intended that the simulations can derive reasonable and plausible effect sizes for the impacts of different drug policies. For example a model that can estimate the effect of a new compulsory treatment program for all cannabis users detected by police; or a model to compare a new treatment for methamphetamine dependence with the effect of law enforcement directed at seizing methamphetamine supplies. If we want to build models that can compare policies, we need outcome measures that can be used in the models.

It is in this context that DPMP is developing a policy outcome index. The purpose of the DPMP policy outcome index is to compare different policy options and their effects, using a common metric.

Outcomes

The outcome domains of interest for the DPMP Index are

- Health consequences
- Crime consequences
- Labour market (productivity and welfare)
- Community outcomes such as social cohesion, public amenity, fear of crime
- Pain and suffering

Unfortunately, there are limited available data covering each of these outcomes. In the first instance, health, crime and road traffic accidents were included in the work reported below. Significant foundational research is required to include the other outcomes of interest.

Metric

The DPMP has chosen monetary value (social cost) as the basis of the metric, for the reasons identified earlier: it is a unit that can be measured across diverse impacts; it gives implicit "weighting" of harms; and it is intuitive for policy makers and community.

Type of Index

The challenges for an index are its capacity to pool diverse outcomes in a meaningful way that aggregates into one metric but does not bundle disparate aspects making the index meaningless. Put differently, which components of a policy outcome measure need to be separated, and which can meaningfully be combined?

One obvious component that needs to be disaggregated is drug type. An index that pools/sums heroin, methamphetamine, cannabis and ecstasy is not likely to produce any meaningful results when used in policy analyses. Thus, we require separate indices for each drug.

A second variable that we consider sufficiently important for policy analysis to disaggregate in our index is that of type of drug use. Some people use drugs occasionally, without experiencing harm. Indeed the majority of users of cannabis fall into this category. Those that use drugs in a dependent fashion are much more likely to experience harms. Policy responses can be targeted towards dependent users or non-dependent/occasional users, producing quite diverse outcomes. Therefore, for our purposes we separately identify an index for dependent users and another for non-dependent users. These can then be accurately applied to a policy intervention that has a specific target.

Results

In Stage 1 of DPMP, Tim Moore (Moore, 2007) undertook a project to estimate the social costs associated with cannabis, cocaine, amphetamine and heroin by non-dependent and dependent drug user. The approach taken by Moore formed the foundation for the above approach to a policy outcome index, hence we have used it as a feasibility analysis for the Index. Moore completed the following six steps:

1. Estimate health, crime and road accident costs for both dependent and non-dependent users, across four drug types (cannabis, cocaine, opiates, amphetamine)
2. Estimate prevalence
3. Estimate consumption (kg, grams)
4. Calculate unit cost per user per year (1x2)
5. Calculate unit cost per kg per year (1x2x3)
6. Conduct sensitivity analyses

From this method, Moore derived annual social cost (health, crime and road accidents) per user by drug type, dependent and non-dependent users, as reproduced in the table below (Moore, 2007)

	Cannabis	Cocaine	Opiates	Amphet
Dependent drug users				
Costs – dependence (\$million)	\$ 2,796	\$ 248	\$ 4,361	\$ 3,272
Number of users	247,500	13,892	41,401	73,257
Social cost per dep. user	\$ 11,296	\$ 17,852	\$ 105,342	\$ 44,665
Non-dependent drug users				
Costs – non-dependence (\$million)	\$ 319	\$ 51	\$ 212	\$ 459
Number of users	1,662,575	162,454	107,898	495,500
Social cost per non-dep. user	\$ 192	\$ 314	\$ 1,965	\$ 926

Sensitivity analyses (95% confidence intervals) revealed that the plausible range for the estimates for dependent users of cannabis was between \$6,998 and \$17,437 social cost per annum; for cocaine between \$12,107 and \$24,548 social cost per annum; for opiates between \$55,330 and \$115,222; and for amphetamines between \$18,258 and \$48,757 (see (Moore, 2007) for details).

Annual social costs per pure kilogram and pure gram, by illicit drug type (Moore, 2007)

	Cannabis	Cocaine	Opiates	Amphets.
Total costs – all drug users (\$million)	\$ 3,115	\$ 299	\$ 4,574	\$ 3,731
Amount consumed per year (kg)	2,815,008	830	335	575
Social cost per kilogram	\$ 1,106	\$ 360,241	\$ 13,653,731	\$ 6,488,695
Social cost per gram	\$ 1.10	\$ 360	\$ 13,653	\$ 6,488

Feasibility assessment

While not explicitly intended to be used as a policy outcome Index, the work by Moore (2007) was of sufficient similarity to the DPMP Index approach, that we were able to use it as a feasibility assessment of the DPMP Index.

The feasibility assessment comprised three components:

1. assessment of how the figures could be used in policy analyses;
2. assessment of the utility, as reflected in discussions with key stakeholders
3. assessment of the methodology and any issues/difficulties associated with it

Using the Index in policy analysis

Two examples were worked through. The first example is using the Index to estimate the effect of a new cannabis treatment policy that provides compulsory treatment to all cannabis users detected by police. The effect referred to here is any reduction in social cost associated with the intervention. Given recreational users bear a social cost of \$192 p.a. and dependent users a social cost per annum of \$11,296, we can estimate the effect of such a policy under a model that assumes 100% treatment success; 80% treatment success; 50% treatment success; 20% treatment success and compare the social cost savings to the cost associated with providing the new intervention. We can also conclude that there is much greater value for police to focus on dependent users versus recreational users.

The second example compares a new treatment for methamphetamine dependence with the effect of law enforcement directed at seizing methamphetamine supplies. Moore's, (2007) working estimates provide a social cost p.a. estimate for methamphetamine dependent people of \$44,665. If we assume that half of the dependent people receive the intervention, and the success rate is 40%, we can estimate potential costs savings. This can then be compared to the law enforcement intervention, where our estimates suggest that the social cost per gram of methamphetamine is \$6,488 p.a. Thus if police seize 100 grams from a clandestine laboratory, the social cost savings would be \$64,880 p.a. How does \$64,880 compare with the treatment savings?

Based on these simple examples, it appears that the Index can be usefully applied to examine policy outcomes. However, careful assessment of what the Index includes and excludes by way of outcomes would be required for each particular analysis undertaken. This reinforced to us the importance of clear and detailed exposition in any Index.

Assessment of utility

A number of discussions have been held with various stakeholders in order to determine whether the Index makes sense, has appeal and is worth the substantial effort that will be required over a number of years to produce a meaningful Index. Moore's (2007) results have been presented in this context. In each instance, the response has been positive and we have been encouraged to continue the work. Victoria Police are using the DPMP figures in their work, as are the AFP. New Zealand's recent foray into the Index area indicates that governments are considering ways to measure policy outcome and are interested in new Indexes that can summarise outcomes.

Methodological issues

In moving from the work of Moore (2007) to an Index, there are a number of issues that need to be resolved and further research is required. Further work on the aetiological fractions for crime is required. Development of social cost elements for

the labour market are required. The prevalence and consumption estimates are particularly problematic.

The problem of how the Index will represent ongoing costs into the future has yet to be resolved. The current conceptualisation is total annual costs (health, crime etc.) divided by annual prevalence to get the unit cost per user. This method creates an issue, though, for 'future' costs. It assumes that costs are saved in any one year but does not accommodate 'fixed' or ongoing costs into the future that occur irrespective of the intervention. For example Hepatitis C costs are accrued for the lifespan irrespective of the policy intervention. The Index also assumes that interventions for non-dependent users only save the social costs of those non-dependent users within that year – it does not yet account for social costs savings from future diverted dependent use.

At present the Index does not incorporate polydrug use – which is now the norm. And one cannot simply add the social cost per cannabis to opiates if someone using both. The relationship between the use of multiple drugs and the harms are not necessarily linear or additive. The Index also needs to deal with drug substitution effects: the Index assumes that if we reduce opiate users by a set number, social costs will be saved. However, in reality, some proportions of opiate users who cease use will substitute their opiate use with amphetamine, hence the social costs saved are overestimated.

The Index is country specific in as much as it uses social costs which systematically vary between countries. So the method is replicable but the unit measure for the index is only relevant to Australia.

Finally, we are currently debating the issue of inclusion of benefits that offset the consequences in the Index.

Conclusions

The drive to develop an Index that can sum across drug domains is apparent. Various groups have developed or are working on Indexes. There is clearly interest and commitment to such an approach, although the diverse purposes should be noted. There will never be a perfect Index – and the exercise itself will be criticised by some who see that data do not exist, and what does must be squished and pulled into some sort of shape, lined up with other things most unlike each other and then stuffed together to make an "Index". Those who think about details and at a micro level will not be satisfied with the kinds of assumptions and methods that are required to develop an Index.

Despite these criticisms, we believe it is worthwhile. At a minimum such an exercise identifies information and data gaps and can then direct research resources. MacCoun, Saiger, Kahan, & Reuter, (1993) argued that "noisy data are better than anecdote". An Index that can be used to broadly compare countries or regions; monitor progress; direct resources; or compare policy options is a valuable step forward.

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