

**An integrated, comprehensive approach to illicit drug policy – results from the first stage of
the Drug Policy Modelling Program**

Presenter

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Abstract

The Drug Policy Modelling Program (DPMP) is a large scale research program that aims to develop better understanding of drug policy responses, across law enforcement, treatment, prevention, and harm reduction interventions. We know little about the relative contributions of each of these or about optimal mixes in specific situations. The DPMP combines evidence from systematic reviews, epidemiological data and the use of interdisciplinary modelling approaches (such as system dynamics and agent-based modelling) to advance evidence-based policy development. We also recognise the complexities of translating evidence into action (policy change), so that another aspect of our Program involves improving understanding of policy processes

The results from the first stage of DPMP will be reported: systematic reviews of the evidence-base for drug interventions; use of multiple modelling methods, including system dynamics and agent-based modelling; examination of economic aspects of drug policy (including government spending and price fluctuations); and studying policy making will be touched upon. While each of these elements in themselves represent significant research, it is in the combination of the elements and integration across methodologies that we see the greatest potential for advancement of policy.

The approach described has the potential to facilitate new drug policy that would not have been possible or apparent through the sole study of one aspect of drug policy, such as the evidence-base or the political context or the economics of drug markets. We believe this approach may be more likely to produce strategic drug policy because it reflects the richness and complexity of the real world of drug use, and drug policy. The purpose of employing an integrative methodology is to create the potential for new drug policy insights, ideas and interventions – not restricted to one body of evidence, nor to accidental or fortuitous policy-making processes.

Introduction

The development and evaluation of effective policies to respond to illicit drugs is complex. Evidence-based health policy suggests that the systematic collation and analysis of evidence should provide governments with the information they require to make effective policy decisions. However there is limited evidence in some areas of drug policy, notably law enforcement responses; and where the evidence does exist, it is not necessarily adopted . Furthermore, the assumption that evidence of effectiveness is the only criterion for policy is both naive and untrue . We need to advance the evidence-base but also appreciate that this is one component of complex policy-making processes.

A second reason for complication is in the nature of the problem and the multi-dimensional responses. Responses to drug problems need to consider the full array: law enforcement (including policing, criminal justice system, interdiction, law making and international treaties), treatment, prevention (preventing the commencement of drug use) and harm reduction, rather than operate in silos . Each response is delivered by different systems and personnel, and has its own goals and assumptions. Most importantly, responses can impact upon one another, in synergistic or opposing ways. Isolated study of one treatment, law enforcement or harm reduction policy option, without consideration of the dynamic interactions *in situ* with other drug, health and social welfare policies is liable to result in myopic analyses and sometimes an unanticipated net increase in harm.

There are other multi-dimensional aspects for consideration. The level of policy: local, state, national and global will influence the range of policy options and their interactions. Similarly the stage of drug use in terms of the cycle within an epidemic warrants different types of responses. Winkler et al. demonstrate this in relation to the relative effectiveness of prevention at different stages of a drug epidemic . The use of multiple drugs is now, and probably has always been, the norm. However quantitative policy analysis has tended to focus on one drug, for example the work on cocaine . Any comprehensive consideration of drug policy and associated evidence needs to accommodate multiple drugs and drug use behaviours in the analyses.

A final complication is that drug policy is not value-neutral. As pointed out, all policy is value-driven and this is very evident in the drugs arena. Psychoactive substances (drugs) are potent as they influence mood, thinking and behaviour. They have thus always attracted a mix of religious, philosophical and scientific interest and sometimes strong attitudes or “stances” in communities

across time and across the globe. This is the stuff of politics and is a reason why drug policy has a high media profile and why drug policy is, in part, influenced by strong symbolic and value driven opinions.

Comprehensive study of drug policy therefore needs to consider the nature of the evidence, the use of evidence, the ways in which policy decision-making actually occurs, the multi-dimensional nature of the responses and their dynamic interactions, the level of government decision-making and the underlying conditions, and consideration of real, *in situ*, drug using behaviours and drug market conditions.

The ISSDP presentation outlines a new methodology for the study of drug policy. This methodology, represented in the Drug Policy Modelling Program, endeavours to accommodate the above-noted complexity and take a multi-faceted focus. The underlying framework for the method is integration . The multiple methods and levels of integration include integration across evidence bases, between researchers and policy-makers, within and across intervention types, across disciplines and epistemologies, and through participatory and dialogic methods.

The purpose of employing an integrative methodology is to create the potential for new drug policy insights, ideas and interventions – not restricted to one body of evidence, nor to accidental or fortuitous policy-making processes and without consideration of the multiple dynamic interactions in our field.

The presentation at the 2007 ISSDP conference will outline the key aspects to our approach, including the areas of study and the methods. Selected results are provided with the purpose of highlighting the approach.

Reviews of the evidence

In order to improve drug policy, the efficacy and effectiveness of interventions is a critical element. The Cochrane and Campbell Collaboration models for systematic review of the evidence-base provide an internationally recognised standard (www.cochrane.org; and www.campbellcollaboration.org). The objectives of the collaborations are to prepare, maintain and disseminate systematic reviews of studies of interventions and to promote the search for evidence in the form of clinical trials and other studies of interventions.

One crucial component for developing evidence-based drug policy is the conduct of systematic reviews. As part of our program of research, we conducted a series of systematic reviews covering topics such as needle syringe programs, drug law enforcement, school-based prevention and harm reduction . Illustrated here, by way of example, is the review of police drug law enforcement. The key finding of the review suggests that the creation of partnerships between police and non-police entities is the single most important component of successful drug law enforcement efforts . In particular, the review found that the most effective police-led interventions involved the police forging partnerships with individuals, business owners, state, local and national government agencies (liquor licensing, education, child safety, transportation etc). Through these strategic partnerships the police are able to use civil and regulatory laws to leverage external support for their efforts to control drug problems. The second most important component was to focus these partnership interventions at “drug hotspots” which are small geographic areas that generate large proportions of drug problems. Conversely, the review suggests that responses confined to policing alone (ie without partnerships) are likely to fail to reduce drug problems in hotspots.

Policy making processes

Systematic reviews contribute to the evidence-base, and can be regarded as the one of the most important ways in which evidence is brought to bear on policy decision-making. The implicit assumption is that improving the evidence-base will lead to improved policy, notwithstanding the challenges of the different worlds of research and policy . Much has been written about bridging the gap between research evidence and policy, largely ascribing to a view of the problem as a communication failure . However the problem may be more fundamental and studying the policy-making process is essential. Lack of appreciation of how policies are made is a major barrier to providing good decision support resources and processes. Thus, in this integrated approach to illicit drug policy, understanding policy processes is required. We have reviewed a number of policy processes, including the technical/rational model, incrementalism, power and pressure group models, advocacy coalition framework, punctuated equilibrium, and multiple streams framework. Future work will include case studies to examine the ways in which evidence and policy processes combine to produce new policy decisions.

Modelling approaches as decision-support tools

Law enforcement, treatment, prevention and harm reduction research and policy endeavours currently exist in silos – models that explore dynamic interactions between these areas can

advance our appreciation of both the evidence-base and policy impact of interventions. Dynamic models that integrate and synthesise multiple dimensions of drug policy can serve as decision-support tools. We have explored a number of different modelling approaches that might assist: these approaches include agent-based modelling from complex systems science, stocks and flows modelling and economic cost-effectiveness modelling.

The models differ in approach, style and underlying assumptions. They lend themselves to different aspects of the drug policy problem: thus, some models are best suited to modelling the dynamic relationship between drug policy interventions and numbers of users (eg Markov chain 'stocks and flows' models). Other models are best suited to modelling the effect of interventions on the behaviour of users in local drug markets (agent-based models, ABM). Models provide for the possibility of exploring dynamic interactions between drug policy responses and in this sense operate as tools to be used for scenario assessment.

Economic evaluation research is now becoming the benchmark for policy decision-making. Modelling different interventions and their relative costs and benefits has the potential to provide policy-makers with a decision-support tool. We conducted a cost-effectiveness comparison of three policy options: pharmacotherapy maintenance, therapeutic community and prison. We estimated the cost-effectiveness of the three interventions, taking into consideration reduction in heroin use during the intervention; the length of intervention; and post-intervention effects measured by abstinence rates. If we assume that the abstinence rates achieved at one year are sustained for 2 years, then for an average heroin user the cost per drug use year averted appears to be about AUD \$5,000 for pharmacotherapy maintenance, AUD \$11,000 for residential rehabilitation and AUD \$52,000 for prison. Sensitivity analyses were conducted on a number of variables, including the duration of treatment effects and the range of possible treatment effects. Varying the abstinence rates post-intervention (from 0% to 100%) does not change the order of cost-effectiveness of the different interventions indicating a robust finding. Cost-effectiveness does not cover all aspects relevant to making policy decisions. The next model focuses on prevalence of drug use and the potential impact of policy responses.

A stocks and flows model has been developed with a view to understanding the dynamics of Australian drug use prevalence over time as well as to project the effects of plausible changes in these dynamics (through, for example, enhanced intervention effectiveness). This work is being presented at this conference by Prof Caulkins.

Policy-makers are also concerned with the size and mix of policy costs and the potential savings through more effective interventions (as noted in the cost-effectiveness model). The stocks and flows model can also incorporate cost estimates (costs and cost savings). In order to fully maximise the potential cost information for these models, comprehensive economic analyses of spending and social costs are required. Our work estimated that illicit drug-related spending in Australia in 2002-2003 totalled \$3.2 billion . Proactive expenditure (that is, direct spending on drug interventions) was \$1.3 billion, and represents 41% of total spending, while \$1.9 billion was spent by governments on the consequences of illicit drug use. In the proactive expenditure, law enforcement and interdiction accounted for 56% of all expenditure. Prevention (22%) and treatment (19%) account for approximately one-fifth of expenditures, while harm reduction (2%) and expenditure not elsewhere included (1%) are negligible components . Cost information such as this can be used in the models to estimate the impact of shifts in investment and cost savings.

To turn to a different modelling approach, agent-based models are used in complex systems science . Complex adaptive systems consist of different actors in different sub-systems, all in continual change over time as they evolve with their environment. While the individual components – agents – display autonomy of action, the evolution of the whole system reveals emergent properties, not predictive from individual agent behaviour. In the context of illicit drugs, such a model can reveal and manage a level and extent of interactivity that goes beyond any currently available tool to juggle and hold together the dynamic inter-connected threads that influence who will inject what drug, where, when and with what consequence. The DPMP agent-based model focussed on local heroin drug markets and hotspots. In order to develop the model multiple and diverse data sources are required, for example data about the heroin trade in Australia, including importation, wholesale operations, the dealers and local street markets. Ethnographic research informs the ‘behaviour’, rules allocated to actors in the model. Finally, data on the effect sizes of different interventions, generated from systematic reviews can then be used to generate plausible alternate scenarios within the model.

Our agent-based model comprised users, dealers, wholesalers, outreach workers and police . The time span for the model was 4 years. The model, called *SimDrug*, has demonstrated the plausibility of using a multi-agent system model to describe the relationships between heroin users, dealers, their surroundings and the two interventions modelled (outreach workers and police). To date, the model has been used to examine the impact of changing police and outreach

resources. The model has the potential to assist in policy decision-making regarding increasing policing resources and the potential impact on drug use, dealing, treatment uptake and displacement. For example, our model demonstrates the emergence of drug hotspots over time and predicts that increasing police numbers beyond a threshold level has no additional impact on dealers' profit margins .

In summary, we have explored three different modelling approaches – cost-effectiveness, stocks and flows and agent based models – with a view to using them as policy decision-support tools. Rather than seeing the models as passive research products, we envisage using them *in situ* with policy-makers. In a dialogic environment, policy-makers can explore the impacts of their preferred policy option through examination of the modelling results. We do not view the models as definitive, predictive tools, rather they generate plausible scenarios for policy-makers to consider. In this sense, models are tools to aid thinking and facilitate thoughtful policy debate.

There are a number of potential limitations and risks associated with the modelling approach: the models may lack verisimilitude because of poor data quality; the models may convey a level of “scientific credibility” that belies the uncertainties within them; the policy-makers may not have sufficient time or interest to engage with a dialogic process to explore scenarios; and, as noted earlier, “evidence” is but one input into policy-making and the models are merely more complex, dynamic portrayals of the “evidence”.

Conclusions

This paper has outlined a comprehensive and strategic approach to studying illicit drug policy. Considerations include systematic review of the evidence, the policy-making processes, and the use of dynamic models as decision-support tools. Of note is the endeavour to integrate different models and types of evidence and overcome the silos. We seek to directly apply models to the policy-making process through the development of decision-support tools. We also integrate the political science and policy-making research with the content-specific drug research. We hypothesise that this level of integration has the capacity to advance drug policy, and this will be tested in our ongoing work.

One of the challenges for all aspects of the research outlined here is dealing with gaps in the data and unknown information. Uncertainty surrounds us. It is tempting to assume that with time and rigorous effort, uncertainty can be eliminated. However there is growing recognition that

uncertainty is inevitable and in some instances irreducible . Drug policy analysis needs to consider the types of uncertainty, whether they are statistical, value-driven, empirical and so on and develop ways of articulating uncertainty. A good example is in relation to the models detailed earlier. All the models contain assumptions and use best available data – which in many cases is severely limited. Some may argue that given the level of uncertainty, the modelling work is flawed. However if the models can portray plausible possibilities to policy-makers, with transparent assumptions and explicit uncertainties, they may enhance decision-making.

The approach outlined in this paper requires the capacity to focus on multiple domains simultaneously and to integrate a multi-disciplinary team. The DPMP currently spans Complex Systems Science, Criminology, Economics, Epidemiology, Integration and Implementation Sciences, Public Health and Medicine, Public Policy and Political Science, Sociology and Systems Thinking. As has been noted by others, this breadth of disciplines is required if a comprehensive and strategic approach offering new insights is to be achieved . Such disciplinary integration, however, does not come without challenges .

The approach described herein aims to create the potential for drug policy insights, ideas and interventions that would not have been possible or apparent through the sole study of the evidence-base or the political context or the economics of drug markets. We believe this approach may produce strategic drug policy because it reflects the richness and complexity of the real world of drug use, and drug policy.

References