Economic modelling: Cost-effectiveness of three policy options

Tim Moore, Alison Ritter & Jonathan Caulkins

Rationale
We sought to inform the following stylized policy choice. A dependent heroin user has come to the attention of authorities in a form that allows a one-year prison term, a course of pharmacotherapy maintenance or a stay in a residential rehabilitation to be pursued (e.g. The individual has been arrested). How would each perform in terms of both program cost and reduction in drug use?

Approach
Using existing Australian data, we calculated the cost-effectiveness of the three interventions, taking into consideration: drug use reductions during the intervention; the length of intervention; and the post-intervention effects (abstinence rates). Sensitivity analyses were conducted on a number of variables, including the length of the treatment effects, the range of possible treatment effects, and only ascribing positive outcomes to treatment completers. We also tested a hybrid model that combined pharmacotherapy maintenance with a prison term for non-completers. Data was derived from Australian sources wherever possible and the common metric was drug use years averted.
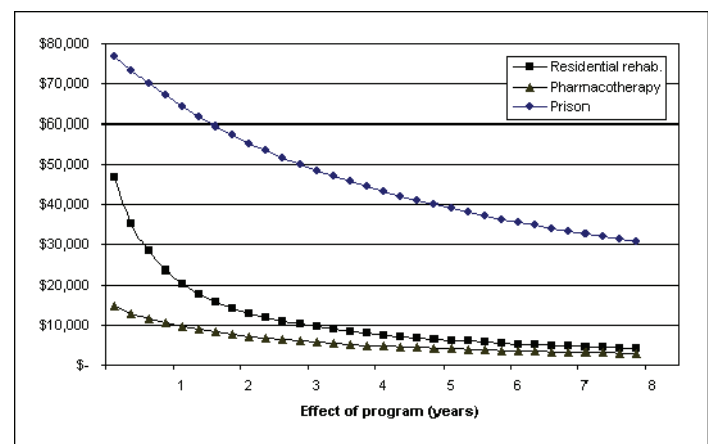
Key findings
The post-program effects are the abstinence rates at the end of one year (64% for residential rehabilitation; 57% for pharmacotherapy maintenance; 44.9% for prison) less those achieved by a no-treatment control group (25%). The cost-effectiveness given these post-program effects if we assume the effects last two years are: $7,700 for pharmacotherapy maintenance, $14,000 for residential rehabilitation and $57,000 for prison. There is insufficient information to know with any

certainty how long post-program effects would last for.

The lower value on the y-axis, the more cost-effective the program. As would be expected, the most cost-effective outcomes occur when the treatment effects are their largest. Within reason, the size of the post-program abstinence effect does not matter. Given this, we have chosen to plot the cost-effectiveness as a function of all the possible lengths of these abstinence effects up to the duration of drug use that occurs in the absence of intervention. The results are displayed in Figure 1.
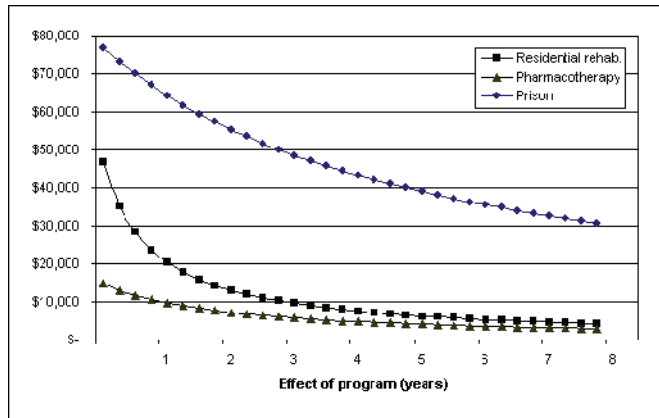
Figure 1: Cost per drug use years for varying post-program effects

The results are quite robust to the magnitude of the treatment effect. Figure 2 shows the cost of averting a year of drug use for all possible post-program effects, assuming these effects last two years. The lower value on the y-axis, the more cost-effective the program. As would be expected, the most cost-effective outcomes occur when the treatment effects are their largest. Within reason, the size of the post-program abstinence effect does not matter. Treatment programs are preferred to prison at all possible combinations of intervention effects.

Figure 2: Cost per drug use year averted for all intervention effects

If we assume that the abstinence rates achieved at one year for each intervention are sustained to 5 years, the cost-effectiveness per drug use year averted is $4,226 for pharmacotherapy maintenance, $6,517 for residential rehabilitation and $39,939 for prison. Varying the abstinence rates post-program (from 0% to 100%) does not change the order of the cost-effectiveness. The hybrid model revealed that if the completion rate in pharmacotherapy maintenance was raised to 95% (by the threat of prison), the combined model of treatment plus prison would be most cost-effective.

Implications

If cost-effectiveness is the criteria used to judge best investment, we can say with a reasonable degree of certainty that treatment programs are the more cost-effective interventions and they are preferable to doing nothing.

Some of the gaps in the analysis are not easy to address. Even if a commitment were made to develop a comprehensive study of the long-term behaviours and treatment outcomes of Australian heroin users, it would be several years before a better value for post-program effects would become available. Further research is still warranted. However, for policy makers who must make decisions now, the practical implications are clear and more robust than may initially be expected.

The least certain aspect of the analysis is whether a pharmacotherapy-prison option is preferable to pharmacotherapy by itself. More research into what role the threat of prison may have on the outcomes achieved would be desirable. Better understanding of the deterrence effects would also be useful for analysing this choice. With many unknowns around illicit drug use and illicit drug markets, quantitative policy analysis of the kind conducted here could prove useful for assessing policy options. In addition, understanding the role of different variables provides insights that should improve priority-setting in illicit drug research in Australia.

A copy of the technical report is available.

Research Team

Tim Moore, Turning Point Alcohol & Drug Centre
Alison Ritter, Turning Point Alcohol & Drug Centre
Jonathon Caulkins, H John Heinz III School of Public Policy and Management, Carnegie Mellon University