



## Estimating the number of heroin users in Australia

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### Rationale

Estimating the prevalence of drug use is one of the key focal areas of alcohol and drug epidemiology. Estimation of the extent of alcohol and drug use in the Australian community has primarily been undertaken using surveys of the general population. Nevertheless, it is widely understood that prevalence estimates derived from general population surveys underestimate the true extent of drug use in the community for drugs of low use prevalence (e.g. heroin) because of issues around sampling (e.g. response rates and the extent to which crucial samples such as the homeless are missed in household surveys) and the truthfulness of responses to questions concerning illegal or hidden behaviours. In response, epidemiologists have applied specialised statistical techniques to the analysis of data sources on the extent of drug-related harm (e.g. Opioid overdose deaths) to produce estimates of the extent of problematic drug use in the Australian community.

Prevalence estimation using secondary data sources has generally been undertaken only in relation to heroin use in Australia. This work has used a variety of techniques (e.g. capture-recapture, back-projection, multiplier) in accordance with a general consensus that has emerged around the application of such techniques to the estimation of problematic drug use. In applying these methods Australian work has developed multiple estimates using available statistical estimation tools with convergence among estimates used as the source of the most parsimonious estimate (e.g. the median of the estimates derived). While this approach is appealing, the resultant 'best' estimates are derived primarily from the application of simple mortality multipliers (e.g. 1% annual mortality rate for heroin users) to the number of opioid

overdose deaths occurring in specific Australian jurisdictions (generally NSW). The problem of this multiplier approach is highlighted by the effect of the heroin shortage in Australia.

The aim of this component of the DPMP was to develop plausible estimates of the prevalence of heroin use in Melbourne with a view to informing various elements of DPMP projects. The work was also designed to provide a method for estimating the extent of injecting drug use more widely (specifically through application to amphetamines). It was funded by a Travelling Scholarship from the Victorian Premier's Drug Prevention Council awarded to Paul Dietze.

### Approach

There are few estimates of the prevalence of problematic drug use available for Victoria in which Victorian-specific data sources have been used. Indeed, recent estimates of the prevalence of problematic heroin use for Victoria derive almost exclusively from analysis of data available in New South Wales. The data chosen for this exercise were ambulance attendances at drug-related events in Melbourne as they are a unique source of information on drug-related harm available to the project team that have not been extensively used in previous prevalence estimation exercises. In this context the aim of the work was to examine their potential for use in prevalence estimation exercises. The characteristics of the database mean that they can be used for estimating the prevalence of not only heroin use but also the prevalence of the use of a variety of other drugs.

Capture-recapture estimation was undertaken using available unique identifiers for cases. Three main methods were employed, two of which involved assuming that the population under investigation was closed (i.e. that there is no migration in or out of the population) and one assuming an open population (allowing for migration). The closed population estimates were generated through truncated Poisson and Poisson regression modelling and the open population estimates were generated through the application of a Jolly-Seber type model.



### Key findings

A number of different methods and models were tested. The best estimates (for the years 2000 and 2003/04) to date derived from the project for Melbourne are displayed in the table below.

	Lower CI	Main estimate	Upper CI
<b>2000</b>			
Unstratified	37,323	50,450	68,586
15-24M	10,606	21,646	45,135
15-24F	2,528	5,009	10,367
25-64M	17,210	39,872	94,862
25-64F	3,171	7,228	17,214
Strata summed	33,516	73,755	167,577
<b>2003/04</b>			
Unstratified	7,851	11,541	17,373
15-24M	1,299	7,698	54,185
15-24F	442	2,349	16,458
25-64M	3,764	6,453	11,583
25-64F	806	1,254	2,081
Strata summed	6,311	17,754	84,307

### Implications

The results of this study have shown that ambulance data can be used to generate estimates of the prevalence of heroin use in Melbourne using closed population capture-recapture techniques. Nevertheless, there were significant problems with the estimates that were generated. Some appeared to be implausibly low, others of limited precision and the most theoretical parsimonious models provided only poor fit for the data. In all, the findings of this component of the study suggest that the techniques, as implemented, do not provide reasonable estimates of the prevalence of heroin use in Melbourne and are even more unsuited to the examination of some other drugs such as amphetamines.

One problem with the work that was undertaken was its excessive reliance on one data source.

While this approach has been used in other studies, many studies of the prevalence of heroin use examine repeated captures *across* multiple data sources rather than multiple captures within a single data source. Future work in Melbourne should concentrate on developing data sources with compatible identifiers so that capture-recapture studies can be undertaken across the large variety of data that is currently collected on heroin-related harms in Melbourne. The final report will be available December, 2005.

### Research team

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