A 3- Source Capture Recapture Study of the

Prevalence of Opiate Use in Ireland

2000 to 2001

Key Findings Summary Tables

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Summary

The results of the application of the 3-source Capture-Recapture method to determine the estimated national prevalence of opiate use are summarised for Ireland as a whole, for Dublin and for the rest of Ireland excluding Dublin for the years 2000 and 2001.

Ireland

Year	Sex	Age group	Estimate	Lower Bound	Upper Bound	Rate/1000 pop.
2000	M+F	15-64	14,158	12,884	15,883	5.6
2001	M+F	15-64	14,452	13,405	15,819	5.6

Dublin

Year	Sex	Age group	Estimate	Lower Bound	Upper Bound	Rate/1000 pop.
2000	M+F	15-64	12,268	11,204	13,725	16.1
2001	M+F	15-64	12,456	11,519	13,711	16.0

Rest of Ireland (excluding Dublin)

Year	Sex	Age group	Estimate	Lower Bound	Upper Bound	Rate/1000 pop.
2000	M+F	15-64	2,526	1,893	3,639	1.0
2001	M+F	15-64	2,225	1,934	2,625	0.9

Ireland

A summary of the results of the 3-source Capture-recapture models for Ireland for the years 2000 and 2001 stratified by age and sex.
(NB: Lower Bound = lower 95% Confidence Limit; Upper Bound = Upper 95% Confidence Limit)

Year	Sex	Age Group	Estimates	Lower Bound	Upper Bound	Rate/1000 [1]
2000	Males	15-24	3480	3298	3691	10.4
		25-34	3935	3753	4144	13.7
		35-64	2344	2013	2803	3.6
	Females	15-24	1866	1664	2142	5.8
		25-34	1729	1542	1983	6.1
		35-64	804	614	1120	1.2
Total	**M+F**	**15-64**	**14158**	**12884**	**15883**	**5.6**
2001	Males	15-24	3194	3048	3363	9.5
		25-34	4376	4206	4570	14.7
		35-64	2228	2042	2462	3.3
	Females	15-24	1999	1750	2340	6.2
		25-34	1941	1765	2178	6.6
		35-64	714	594	906	1.1
Total	**M+F**	**15-64**	**14452**	**13405**	**15819**	**5.6**

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[1] Rates for this and subsequent tables are derived from CSO population estimates: "Population and Migration Estimates April 2002, CSO 'Bulletin', 5 September 2002"

Based on a report submitted to the National Advisory Committee on Drugs (NACD).

Dublin

A summary of the results of the 3-source Capture-recapture models for Dublin for the years 2000 and 2001 stratified by age and sex.

(NB: Lower Bound = lower 95% Confidence Limit; Upper Bound = Upper 95% Confidence Limit)

Year	Sex	Age Group	Estimates	Lower Bound	Upper Bound	Rate/1000
2000	Males	15-24	3083	2915	3278	34.0
		25-34	3417	3256	3607	34.3
		35-64	1940	1678	2312	10.8
	Females	15-24	1714	1533	1958	18.9
		25-34	1497	1342	1713	14.0
		35-64	617	480	857	3.2
Total	**M+F**	**15-64**	**12268**	**11204**	**13725**	**16.1**
2001	Males	15-24	2735	2604	2888	30.1
		25-34	3740	3589	3915	36.0
		35-64	1803	1657	1992	9.9
	Females	15-24	1766	1537	2085	19.4
		25-34	1784	1621	2003	16.1
		35-64	628	511	828	3.2
Total	**M+F**	**15-64**	**12456**	**11519**	**13711**	**16.0**

Based on a report submitted to the National Advisory Committee on Drugs (NACD).

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Rest of Ireland (excluding Dublin)

A summary of the results of the 3-source Capture-recapture models for Dublin for the years 2000 and 2001 stratified by sex for 15-64 years combined.

(NB: Lower Bound = lower 95% Confidence Limit; Upper Bound = Upper 95% Confidence Limit)

Year	Sex	Age Group	Estimates	Lower Bound	Upper Bound	Rate/1000
2000	Males	15-64	1499	1266	1816	1.2
	Females	15-64	1027	627	1823	0.8
Total	**M+F**	**15-64**	**2526**	**1893**	**3639**	**1.0**
2001	Males	15-64	1688	1493	1940	1.3
	Females	15-64	537	441	685	0.4
Total	**M+F**	**15-64**	**2225**	**1934**	**2625**	**0.9**

Dublin 2001 contrasted with Dublin 1996

Source for 1996 estimates: Comiskey, C., and Barry, J. (2000) *A capture-recapture study of the prevalence and implications of opiate use in Dublin*, European Journal of Public Health.
((NB: Lower Bound = lower 95% Confidence Limit; Upper Bound = Upper 95% Confidence Limit)

As the study in 1996 included individuals aged 15 to 54 years of age, the estimates for Dublin 2001 have been recomputed to facilitate comparison.

	Dublin 1996				Dublin 2001			
	Estimate	Lower bound	Upper bound	Rate/1000 pop.	Estimate	Lower bound	Upper bound	Rate/1000 pop.
M 15-24	5405	4980	5891	56	2735	2604	2888	30.1
M 25-34	3512	3276	3778	42	3740	3589	3915	36.0
M 35-54	1427	1175	1773	11	1793	1648	1980	13.0
F 15-24	1778	1525	2108	18	1766	1537	2085	19.4
F 25-34	1039	875	1265	11	1784	1621	2003	16.1
F35-54	300	206	491	2	626	509	825	4.2
Total	**13461**	**12037**	**15306**	**21**	**12444**	**11508**	**13696**	**18.2**

Note that the confidence bounds for both point estimates overlap substantially and we conclude that there is a negligible difference in the prevalence for both years. The rate has declined due to the (approximately) 22% increase in the population 15-54 years over the 5 year period.

A Description of the Method

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Study context

This is a report of the findings of a national 3-source capture-recapture study (CRM) [2] on the prevalence of opiate drug use in the population during the period 2000 to 2001. The study was commissioned by the National Advisory Committee on Drugs (NACD) following an open tendering process. This report updates a similar Dublin-only study for the year 1996. [3] The latter study reported six prevalence estimates for Dublin (i.e. 3 age bands for males and females). In the present exercise, the scale of the task was very much greater with some 56 prevalence estimates required, i.e. 3 age bands for males and females for two years and for the following areas: the whole of Ireland, Dublin, Rest of Ireland (excluding Dublin), ERHA and the 7 Health Boards plus a comparison between Dublin 2001 versus 1996.

It is anticipated that the results will inform national and regional planning for service provision by the relevant authorities.

Methods and Data

The main parameters of the study, as determined by the National Advisory Committee on Drugs – Sub-committee on Prevalence, specified that three data sources were to be employed in the study, namely: the Central Drug Treatment List, a national Garda Study on Drugs, Crime and Related Criminal Activity and the Hospital In-patient Enquiry database. Statistically valid estimates of the prevalence of opiate drug use in the national population and by sub-region were required for the years 2000 and 2001.

In view of the sensitive nature of the data to be employed in the study, prior ethical approval was considered essential. A submission was made to the Ethics Committee of the Faculty of Public Health Medicine and also to the Data Protection Commission with suitable guarantees for the safeguarding and maintenance of data confidentiality in the study and in all reporting of findings. In due course, approval for the study was

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[2] The Capture-recapture methodology (CRM) is the principal indirect method for estimating the prevalence of some partially hidden population such as opiate users. While originally developed to determine the numbers in various wildlife populations, for example, a given bird species, CRM has gained in popularity as a useful tool to provide statistically valid estimates in epidemiological studies. It has been extensively used in population-based opiate prevalence studies, both abroad and in Ireland, and is recommended by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) in Lisbon.

obtained from these bodies. Permission was then sought and granted to access the Central Drug Treatment List and the Garda data. [4]

In relation to HIPE, a large number of hospitals throughout the country potentially held relevant data on attendances by individual patients with a history of opiate use. Consequently, 44 hospital managers were written to by the NACD requesting their co-operation and informing them that ethical approval was being sought from the relevant hospital Ethics Committee. Subsequently, we made individual applications to each hospital Ethics Committee where such existed, or, as in the case of the smaller county hospitals, to a central Ethics Committee serving several hospitals in a region.

Method

A 3-source Capture Recapture study determines a prevalence estimate based on identifying individuals who appear in one, two or all three data sets within a given year. It may be helpful to visualise this in terms of the figure below (Fig. 1). It will be evident that individuals may be found in common between any pair of sources as represented in the figure by $T \cap H$ (Treatment List and HIPE), $T \cap G$ (Treatment List and Garda data), $H \cap G$ (HIPE and Garda data) and $T \cap H \cap G$ (Treatment list, HIPE and Garda data). The remaining individuals are unique to each source: T (Treatment List), H (HIPE) and G (Garda data).

Seven numbers are needed in all for the models; these are the number of individuals common to any pair of data lists (3) and to all three data lists (1) and the numbers of individuals who are unique to specific lists (3). These numbers are now available to be modelled employing a statistical technique suited to Capture-recapture modelling and know as *Log-linear analysis*. A model is selected form a variety of candidate models and this provides an estimate of the total number (N) of individuals in our population of drug users - this is the required prevalence estimate. The fitted model also allows for the computation of a confidence interval (conventionally set to 95%) associated with the prevalence estimate to give a range of values within which - with a high degree of assurance - we believe the true prevalence value will lie.

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[3] Comiskey, C. (1998) *Estimating the prevalence of Opiate Drug Use in Dublin, Ireland.* A Report submitted to the Department of Health & Children, Dublin.
[4] One of us (AK) served on the Steering Committee for the Garda study.
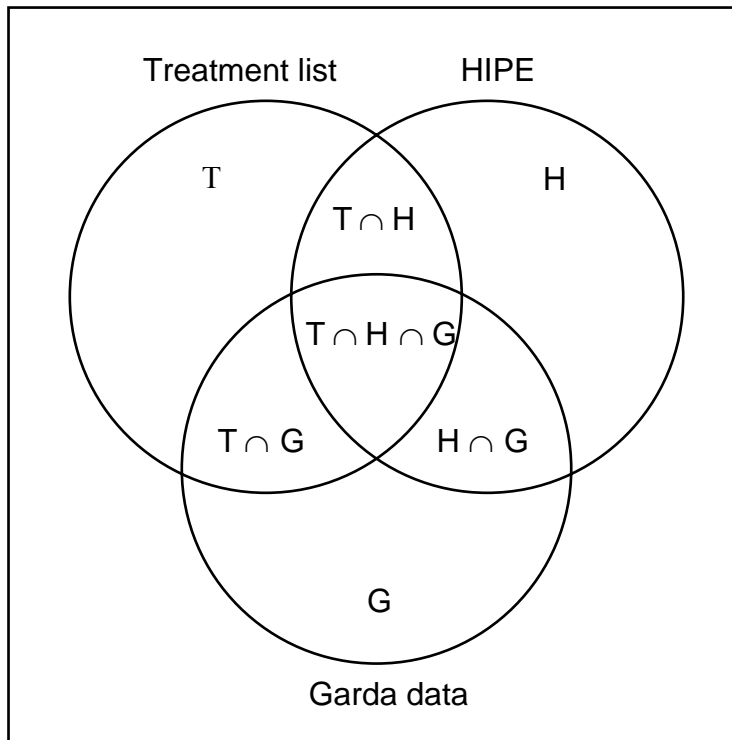
Figure 1 Illustration of both overlap and non-overlap of individuals common and unique, respectively, to the three data sources. T: Treatment List; H: HIPE; G: Garda data; T ∩ H: intersection between Treatment list and HIPE (i.e. individuals common to both the Treatment List and HIPE); T ∩ G: intersection between Treatment list and Garda data; H ∩ G: intersection between HIPE and Garda data; and T ∩ H ∩ G: intersection between all three lists.

Crucial to the success of the modelling exercise is the correct ascertainment of the 7 numbers referred to above. Determining these numbers is by no means a trivial matter. In order to accomplish this, it is important to have a reasonably unambiguous person identifier in the three data sets. In principle, it is believed that a person's initials, full date of birth and sex suffices to provide a reliable match. In practice, it must be recognised that data recording practices can and do give rise to errors in entering any or all of these details in routinely collected data intended for administrative purposes.

The Venn diagram below illustrates the distribution of numbers observed for 15-64 combined age band during 2001 in terms of the overlap as well as the unique cases for the three sources. [5]

Treatment List

HIPE

4525   386   405
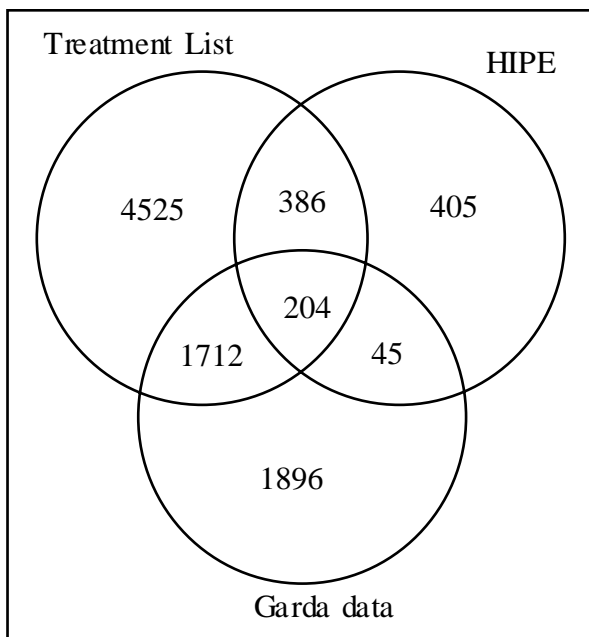
204

1712   45

1896

Garda data

Figure 2 - An illustrative example of what the Venn diagram would look like based on the 15- 64 combined ages and for both males and females for 2001.

Data - comparative analysis

A comparative analysis of the demographic characteristics across the data sets is of particular interest in highlighting certain similarities and especially certain differences in the age/sex breakdown by the three sources. This analysis follows the removal of duplicate records within individual data sets. For purposes of these analyses, two years data (2000 & 2001) have been consolidated to provide added stability in the percentages displayed.

NB: In the following, "G" = Garda data, "H" = HIPE, "T" = Treatment List

The percentage of cases by source is as follows: Garda data (32.8%), HIPE (9.2%) and Treatment list (57.9%).

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[5] These figures are for illustrative purposes only as fitting a model to the combined 15 – 64 age group would result in a poor fit due to heterogeneity. Where numbers permit, models are fitted to various age bands and for males and females separately as reported below.

Based on a report submitted to the National Advisory Committee on Drugs (NACD).