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National Advisory  
Committee on Drugs

# Prevalence of **Opiate Use in Ireland 2006**

A 3-Source Capture Recapture Study



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*influence*



# **Prevalence of Opiate Use in Ireland 2006 A 3-Source Capture Recapture Study**

**A Report to the National Advisory Committee on Drugs**

**Dr. Alan Kelly**

**Dr. Conor Teljeur**

**Ms. Marlen Carvalho**

Small Area Health Research Unit  
Department of Public Health & Primary Care  
Trinity College Dublin

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# Table of Contents

Foreword – Minister of State	4
Foreword – Chairperson NACD	5
Acknowledgements	6
Summary	7
Background	9
Data	10
Method	11
Data – A Comparative Analysis by Source	15
Results	18
Ireland	18
Dublin	19
Rest of Ireland	21
National and Regional Comparisons between 2001 and 2006	23
Concluding Remarks	26

## Foreword – Minister of State

I had hoped that this capture recapture report would give a reliable estimate of the prevalence of opiate use in Ireland in 2006. However, due to a number of technical factors, relating to the population of the survey not being “closed” and to the diminishing overlap between the 3 sources used, this has not proved possible using the capture recapture methodology. The result is an overestimate of the opiate using population.

The general consensus is that, while heroin use has been relatively stable in the Dublin area over the last number of years, its use has become more widely dispersed around the country. The use of heroin continues to be concentrated primarily in areas of urban disadvantage in Dublin and in other urban centres, particularly in Leinster and the south of the country. Among the factors that have led to this conclusion is the experience of service providers, the fact that the rate of new entrants to treatment had dropped significantly (by approximately 20% between 2001/02 and 2006/07) and the average age of those in treatment had increased from 28 to 33 in the same period.

I am satisfied that the advances in treatment provision since 2006, combined with the implementation of the National Drugs Strategy 2009-16, will address the needs of those presenting for treatment for opiate use in the coming months and years. I am working currently with the Health Services Executive and other service providers to ensure that this happens.

Irrespective of the unreliability of the outcome, which relates solely to the use of the capture-recapture methodology in the current Irish context, I would like to record my appreciation of the work of Dr. Alan Kelly and his team, as well as the NACD, in producing this report.

**John Curran T.D.**  
*Minister for Drugs*

## Foreword – Chairperson NACD

The provision of timely and comparable data on the prevalence of drug misuse in Ireland is a core function of the NACD. Through this work the NACD also contributes to the collation of data on the key indicators of the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Obtaining a reliable view of the extent of illicit drug use in the population, however, can be difficult because opiate users in particular are largely a hidden population due to the illegal nature of their activity. For this reason, it is necessary to establish an estimate that will provide us with an approximate picture of drug use.

One of the key methodologies favoured by the EMCDDA for estimating the number of opiate users is the capture recapture method. This report, which updates a similar national study for the years 2000-2001, uses the capture recapture method in order to estimate the extent of opiate use in Ireland for 2006.

Notwithstanding the fact that the methodology used is that suggested by the EMCDDA and that the researchers have conducted a rigorous high-quality scientific evaluation of the data, the NACD believes that the overall estimate in this report must be treated with a considerable degree of caution. The expansion of places on the methadone treatment programme between 2001 and 2006, which in itself is positive, has led to technical complications in the estimation of the hidden opiate user population via capture recapture methods. For the reasons given in the report, the figures for Dublin are considered likely to be inflated. The inflation in the estimate for the rest of Ireland is thought to be proportionally larger. Unfortunately, the NACD is not in a position to determine the extent of the inflation of the estimate. In light of these issues, the NACD proposes to undertake research during 2010 into other methods of estimating the prevalence of drug use.

While it is difficult to assess the overall extent of opiate drug use for 2006 because of the issues with the capture recapture method, some key findings are worth noting. For example, the percentage of young male opiate users in treatment outside Dublin (31% males 15-24 years) is consistently lower than that for Dublin (55%). This may reflect the more recent spread of opiate use outside Dublin and the ensuing but more recent development of methadone treatment services outside Dublin. The NACD recommends continued investment in existing opiate treatment services and calls for expansion of opiate treatment services outside of Dublin as a matter of urgency. The NACD also reiterates its strong endorsement of the recommendations of the Working Group on Drugs Rehabilitation for an expansion of the range of treatment options for recovering drug users, an increase in the number of residential detoxification beds and an increase in the number and geographical spread of residential and community detoxification places provided by the non-statutory, voluntary, and community sectors.

Finally, on behalf of the NACD, I would like to thank Dr. Alan Kelly and his colleagues Marlene Carvalho and Conor Teljeur for their excellent report and for their perseverance in bringing what was a particularly challenging study to a conclusion. Their report reminds us that opiate use is a chronic problem and that the population of users is ageing. This highlights an emerging issue as such older drug users are likely to have increasing levels of health problems. The report also shows how services for opiate users have evolved and expanded over the period 2001 to 2006, but at the same time illustrates the gaps in services that still exist, particularly outside of Dublin.

I would also like to thank my colleagues on the Prevalence Sub-Committee for their intensive input into the preparation of this report. In particular, Dr Jean Long has brought her considerable energy and expertise to bear during our detailed consideration of the findings and I would like to record my appreciation of her efforts.

As ever our thanks are also due to the staff of the NACD for their hard work during the preparation of the report for publication.

**Dr Des Corrigan FPSI**

*Chairperson*

*NACD*

## Acknowledgements

We would like to thank Assistant Garda Commissioner Donnellan and Superintendent Barry O'Brien for their cooperation in providing the necessary data from the Garda Study on Drugs, Crime and Related Criminal Activity. We also wish to acknowledge the assistance of Prof. Joe Barry in obtaining data from the Central Drug Treatment List. To the CEOs of the hospitals we contacted to obtain access to their HIPE records we extend our appreciation and also to the many members of the various Hospital Ethics Committees for their understanding of the study requirements and without whose approval the HIPE data could not have been released.

Finally, our thanks to the members of the NACD Sub-Committee on Prevalence, who provided advice and encouragement as the study progressed, in particular, to Dr Jean Long for her considerable input to the text of the final document.



## Summary

This study estimates the prevalence of problem opiate use in Ireland in 2006 using a 3-source capture-recapture method. The three population sources employed to calculate the estimate were the Central (methadone) Treatment List (CTL), the Hospital In-Patient Enquiry Scheme (HIPE) and the Garda list of opiate users.

Table 1 provides a summary of the findings of this study. It presents the estimated prevalence of opiate use as numbers of individuals (males & females combined), and the corresponding rates per 1,000 population, for the year 2006 for:

- i) Ireland;
- ii) Dublin; and
- iii) the rest of Ireland excluding Dublin.

**Table 1:** Number of opiate users known, estimated number hidden, prevalence estimate and population rate in Dublin and in the Rest of Ireland, 2006

Region	Age Group	Known Number	Estimated Hidden Number	Estimated Prevalence (95% CIs)	Rate/1,000 population
Ireland	15-64	11,807*	8,983	20,790 (18,136 – 23,576)	7.2
Dublin	15-64	9,442	5,462	14,904 (13,737 – 16,450)	17.6
Rest of Ireland	15-64	2,365	3,521	5,886 (4,399 – 7,126)	2.9

\* This number is the sum of the unique numbers for Dublin and the Rest of Ireland and, as such, it excludes 116 individuals of no fixed abode, the vast majority of whom were in treatment.

The 3-source Capture Recapture estimates indicate that 11,807 opiate users aged 15-64 years were known to services in Ireland in 2006 and an estimated 8,983 users were not known to the services (hidden population). The estimate suggests that there were between 18,136 and 23,576 problem opiate users in Ireland in 2006; the point estimate was 20,790.

The estimates are likely to be inflated because the population was not closed, that is, it continued to recruit significant numbers of people into treatment (in Dublin and outside Dublin) and police custody (outside Dublin) in 2006. In addition, because of the large numbers on the Central (methadone) Treatment List, the overlap between the three population sources was small. These two factors are known to inflate estimates obtained through the capture-recapture method

Twenty eight per cent (5,886) of the estimated number resided outside Dublin and 72% (14,904) resided in Dublin. The respective population rates for Dublin and the Rest of Ireland are 17.6 per 1,000 and 2.9 per 1,000.

Seventy one per cent of the estimated number of opiate users was male. One in five (21%) was between 15 and 24 years old and half (51%) were between 25 and 34 years old.

The point estimate for Ireland has increased by 42%, from 14,681 in 2001 to 20,790 in 2006. The point estimate for Dublin increased by 20% while the point estimate for the rest of Ireland (excluding Dublin) increased by 165%; of note, the estimate of opiate users living outside Dublin was relatively small in 2001.

In Dublin, the rate of opiate use per 1,000 of the 15-24 year old female population decreased by 62%, from 18.7 in 2001 to 7.2 in 2006 and this indicates that the number of younger women commencing opiate use has decreased. A lower (32%) but considerable decrease in the rate of opiate use was also noted for men aged 15-24 years.

The rate of opiate use per 1,000 of the 15-64 year old population residing outside Dublin increased from 1.2 in 2001 to 2.9 in 2006 and this indicates that opiate use has increased outside Dublin.

In an unpublished study, Kelly and colleagues report that retaining opiate users in treatment reduces their likelihood of being in contact with the Gardaí (Dr A. Kelly, personal communication, 2009). For example, only 12% of males aged 25-34 years who were attending treatment services between 2001 and 2006 and known to the Gardaí in 2001 continued committing crime in 2006. This is in line with findings from the ROSIE Study<sup>1</sup> (Prof CM Comiskey et al, 2009) and indicates that methadone treatment reduces the incidence of crime.

The detailed results of the study are presented in the main body of this report.

1 Comiskey, C.M., Kelly, P., Leckey, Y., McCullough, L., O'Dhuill, B., Stapleton, R.D., White, E. (2009) The Rosie Study: Drug Treatment Outcomes in Ireland. National Advisory Committee on Drugs, Stationery Office, Dublin.

# Background

This is a report of the findings of a national 3-source capture-recapture study to estimate the number of problem opiate users in the Irish population for the year 2006. The capture-recapture methodology is the principal indirect method for estimating the prevalence of a partially hidden population such as opiate users. Given the nature of this population, a simple head-count is not feasible, as some opiate users have no contact with any service provider – hence the need to rely on a statistical model based on what we do know about this population.

While originally developed to determine the numbers in various wildlife populations, for example, a given bird species, this method has gained in popularity as a useful tool to provide statistical estimates in epidemiological studies. It has been extensively used in population-based opiate prevalence studies, both abroad and in Ireland, and is a recommended method of the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) in Lisbon.

The study was commissioned by the National Advisory Committee on Drugs (NACD) following an open tendering process. The study updates a similar national study for the years 2000 and 2001.<sup>2</sup>

In order to calculate prevalence, the numbers are expressed as a rate per 1,000 of the 15-64 year population. This report details the results of the 3-source capture-recapture study for 2006 and provides a detailed comparison between the prevalence of problem opiate users in 2001 and in 2006.

It is anticipated that the results will inform national and regional planning for service provision

<sup>2</sup> Kelly, A. , Carvalho, M, Teljeur, C. (2003) Prevalence of Opiate Use in Ireland 2000 – 2001: A 3-Source Capture Recapture Study. National Advisory Committee on Drugs, Stationery Office, Dublin.

## Data

The main parameters of the study, as determined by the National Advisory Committee on Drugs, specified that three data sources were to be employed in the study, namely:

- i) the Central (methadone) Treatment List (CTL),
- ii) the relevant national Garda data on known opiate users and
- iii) the Hospital In-Patient Enquiry Scheme (HIPE).

The HIPE data does not include emergency department attendees who are not admitted to hospital.

The Committee requested valid estimates of the prevalence of opiate use in the national population for the year 2006.

The advice of the Data Protection Commissioner had been sought and received in preparation for the earlier capture-recapture study<sup>3</sup> in relation to accessing relevant details from the three sources in order to be able to reliably identify individuals appearing in a single source or in more than one source. For the purpose of the present study, the Data Protection Commissioner was again contacted and it was confirmed that the advice previously received still applied. Individual confidentiality is guaranteed and is safeguarded in the study and in the reporting of findings.

Permission was sought and granted to access the Central (methadone) Treatment List and the Garda data.

In relation to the hospital data (HIPE), 44 of the 56 acute hospitals throughout the country held relevant data on attendances by individual patients with a diagnosis of harmful or dependent opiate use. Forty four hospital managers were contacted requesting their co-operation and informing them that ethical approval was being sought from the relevant hospital or regional Ethics Committee. On receipt of ethical approval, the hospital managers were again contacted and release of the HIPE records was requested.

3 Kelly, A. , Carvalho, M, Teljeur, C. (2003) Prevalence of Opiate Use in Ireland 2000 – 2001: A 3-Source Capture Recapture Study. National Advisory Committee on Drugs, Stationery Office, Dublin.

# Method

## Capture-recapture

A 3-source capture-recapture study determines a prevalence estimate based on identifying individuals who appear in one, two or all three datasets (usually referred to as lists in this context) within a given year. It may be helpful to visualise this in terms of the figure below (Figure. 1). It is evident that individuals may be found in common between any pair of sources as represented in the figure by:

$T \cap H$  (individuals common to both the Treatment List and HIPE list),

$T \cap G$  (individuals common to both the Treatment List and Garda list),

$H \cap G$  (individuals common to both the HIPE and Garda list)

and individuals found in all three lists are represented by:

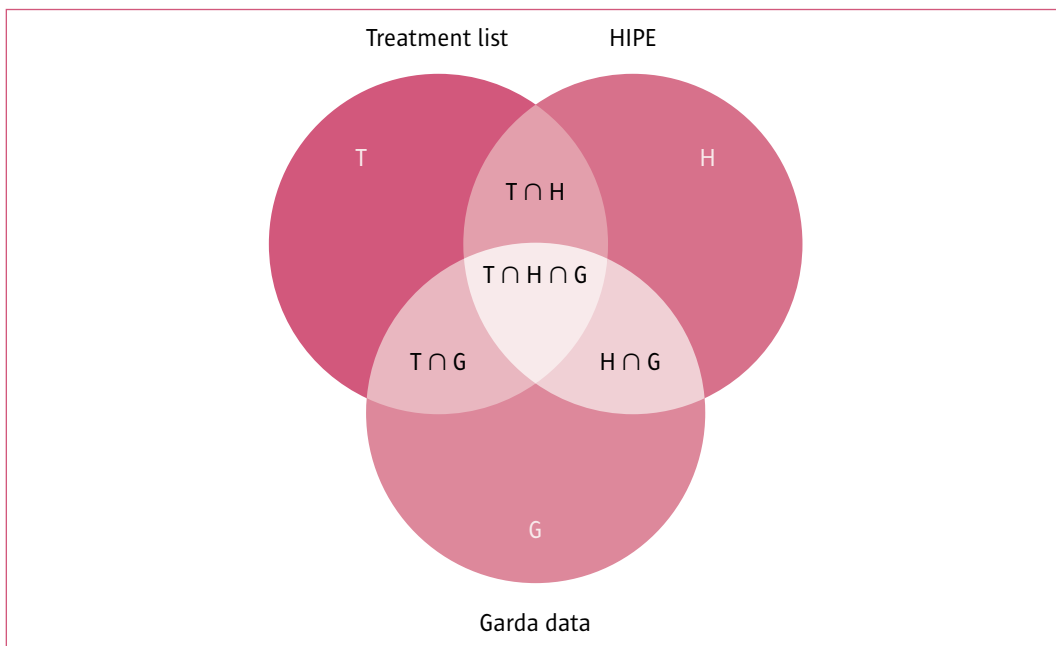
$T \cap H \cap G$  (individuals common to the Treatment list, the HIPE list and the Garda list).

The remaining individuals are unique to each source, i.e. they appear only in one or other of the lists as:

$T$  (appearing only in the Treatment list),

$H$  (appearing only in the HIPE list) and

$G$  (appearing only in the Garda list).



**Figure 1:** Illustration of both overlap and non-overlap of individuals common and unique, respectively, to the three data sources.

4 The  $\cap$  symbol is shorthand for intersection or overlap of subjects between the two sources

When three sources are used seven numbers are needed in all for the models as displayed in Figure 1. These are the three numbers of individuals common to any pair of data lists, one number common to all three data lists and the three numbers of individuals who are unique to a specific list. These numbers are analysed employing a statistical technique suited to capture-recapture modelling and known as *Log-linear modelling*. A model is selected from a variety of candidate models and this provides an estimate of the total number (N) of individuals in our population of opiate users - this is the 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 there is 95% assurance that the true prevalence value lies.

Crucial to the success of the modelling exercise is the correct ascertainment of the seven numbers referred to above. In order to determine these, 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 suffice 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 or surveillance purposes.

## Matching

The records from all three databases were cleaned – this entailed checking dates of birth and person initials for any obvious errors and ensuring county of residence was spelled correctly. Once cleaned, duplicates between and within sources were removed and the data were put into a common format with the following fields:

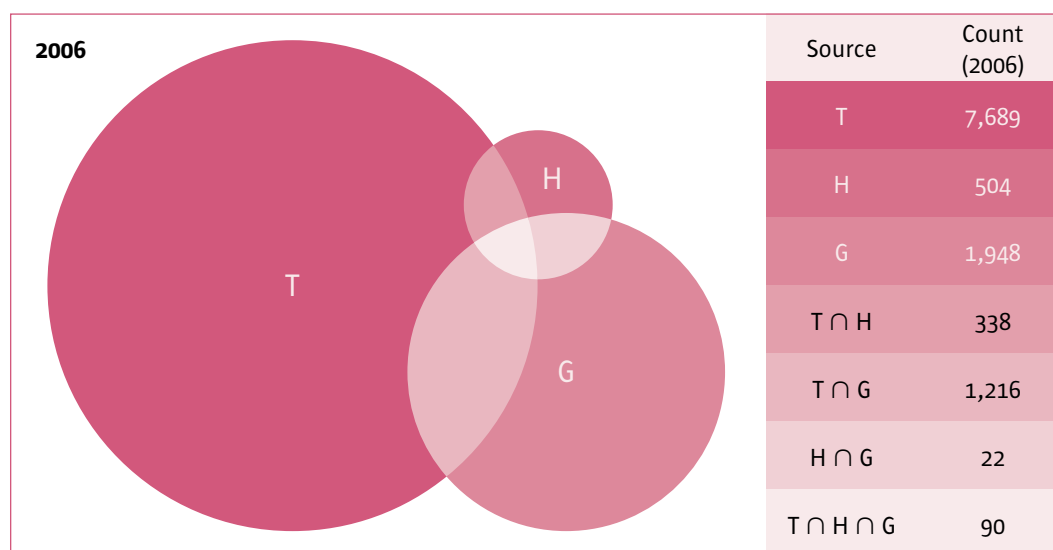
1. Sex
2. Day of birth
3. Month of birth
4. Year of birth
5. County of residence
6. Forename initial
7. Surname initial(s)

The next step was to define the conditions for two records to be matched. For two records to be considered an exact match all seven elements had to match. For two records to be considered an inexact or fuzzy match there could be one element of the seven that did not match exactly. Based on our research, for the day, month and year of birth fields one of the values could be either  $\pm 1$  or  $\pm 10$  to be counted as a fuzzy match.

For each record the exact and fuzzy matches were determined and recorded. Determining the list of individuals for analysis purposes was achieved in three phases. The first phase was to fix the exact matches as these were known with certainty. The second phase was to fix records with no exact or fuzzy matches as these were also known with certainty. The final phase was to allocate fuzzy matches.

The output from this exercise was a list of individuals, each with gender, date of birth, county of residence and the databases they appear in recorded. The listing was then used to produce the summary statistics of counts by age, sex and area of residence appearing in each source and the overlaps between the sources.

Figure 2 and Table 2 present the results of this exercise by data source. The circles are proportional to the number of opiate users. The three sources of data indicated that there were 11,807 opiate users aged 15-64 years known to services in Ireland in 2006. The data analysis excludes the 116 people who had no fixed abode, the vast majority of whom were in treatment.



**Figure 2:** Venn diagram illustrating the distribution of the numbers (11,807) of known opiate users aged 15-64 years in Ireland by source, 2006

Following data cleaning and matching across the three sources, the unique numbers of individuals by source for the Dublin region and the Rest of Ireland were determined. The vast majority of cases were on the treatment list and lived in Dublin. Table 2 presents a breakdown of the numbers.

**Table 2:** Numbers of known opiate users aged 15-64 years by data source and place of residence, 2006

Source	Ireland	Number	
		Dublin	Rest of Ireland
T	7,689	6,702	987
H	504	415	89
G	1,948	956	992
$T \cap H$	338	320	18
$T \cap G$	1,216	957	259
$H \cap G$	22	12	10
$T \cap H \cap G$	90	80	10
Total number of known opiate users	11,807	9,442*	2,365

## Technical limitations of the Capture-Recapture Method

In contrast to our analyses of the data for 2000/01, difficulties arose in the calculation - via *Log Linear statistical models* - of the prevalence estimates in 2006. These difficulties arose for three distinct reasons:

1. The first requires that the population in question (opiate users) forms a closed population for the period under study (calendar year 2006). This was certainly not the case in 2006, with a major expansion of the places available on the national methadone treatment programme (both inside and outside of Dublin) between 2001 and 2006 and the substantial number of new entrants (during 2006) to treatment. There was also a considerable increase in Garda activity outside of Dublin.
2. The second condition assumes “equal catchability” across the three sources, that is, that all individuals have an equal opportunity to be captured by each source. This is also affected by the expansion of the national methadone treatment programme and the increased level of Garda activity. As individuals become stable following a period on methadone treatment, they are less likely to appear on the Garda list. Similarly, when there is increased Garda activity, individuals coming to the attention of the Garda are less likely to present for treatment – at least initially. This requirement of “equal catchability” is managed to a degree using 3-source capture-recapture so it is less problematic in practice.
3. Where there is proportionally poorer overlap between sources (in some instances with zero overlap) in 2006 as compared to 2001, we find that estimates generally have lower precision – especially for the small sub-groups outside Dublin. Additionally, reduced overlap and increased numbers within sources result in higher prevalence estimates.

The consequences of violations of any of these conditions will tend to result in inflated national prevalence estimates though the over estimate for outside Dublin is thought to be proportionally larger. Alternative approaches (to log-linear models) are available and have been implemented in this study, however, similar issues arise with similar consequences for estimates.

The socially desirable expansion in the places available on the national methadone treatment programme between 2001 and 2006, has introduced, as a side effect, technical complications in the estimation of the hidden opiate user population via capture-recapture methods. This will have less effect on the estimate for Dublin. However, the extent to which the estimates are inflated is unknown.



# Data - A Comparative Analysis by Source

## Distribution by Source

A comparative analysis of the demographic characteristics across the data sets is of particular interest in highlighting similarities and differences by data source. Table 3 presents the numbers of unique individuals across the three sources.

**Table 3:** Numbers of known opiate users aged 15-64 years within and between data sources in Ireland, 2006

Source	Number (%)	Numbers within and between sources		
		Treatment	Garda	HIPE
T	7,689 (65.1)	7,689		
H	504 (4.3)			504
G	1,948 (16.5)		1,948	
$T \cap H$	338 (2.9)	338		338
$T \cap G$	1,216 (10.3)	1,216	1,216	
$H \cap G$	22 (0.2)		22	22
$T \cap H \cap G$	90 (0.8)	90	90	90
Total	11,807 (100)	9,333	3,276	954

## Distribution by Age Band and Sex

There were 11,807 individual opiate users aged 15-64 years identified in the three sources (Table 4). Fifty six per cent were aged 25-34 years. Almost three quarters of the opiate users were male. Female opiate users tended to be younger.

**Table 4:** Number (%) of known opiate users in Ireland, by age and sex, 2006

Sex	Number (%)			
	15-24	25-34	35-64	Total
Female	562 (29)	2,085 (31)	716 (22)	3,363 (28)
Male	1,359 (71)	4,537 (69)	2,548 (78)	8,444 (72)
Total	1,921 (100)	6,622 (100)	3,264 (100)	11,807 (100)

When the data were examined by source, the highest proportion of opiate users were aged 25-34 years (Table 5). The individuals in the Garda data were younger than the people in treatment or hospital; the latter were broadly similar. There was a higher proportion of males in the Garda data than the proportion of males in the other two data sources. In HIPE, the male to female ratio was broadly similar. The distribution of gender in the Central (methadone) Treatment List fell somewhere between that for HIPE and Garda.

**Table 5:** Percentage of known opiate users aged 15-64 years in Ireland, by age, sex and data source, 2006

Age band	Average%	% within Source		
		Garda	HIPE	Treatment
15-24	16.3	33.0	14.3	10.5
25-34	56.1	51.0	55.3	59.1
35-64	27.6	16.0	30.4	30.4
Sex				
Female	28.5	15.8	48.1	29.7
Male	71.5	84.2	51.9	70.3

The mean or average age of those known only to the Garda was significantly lower than those appearing uniquely in either the treatment or HIPE lists for both males and females (Table 6). Females tended to be younger than males in each source with the exception of females known uniquely to the Garda. Considering the overlap between any pair of sources, again it was seen that those intersections in which the Garda list was one of the pair the mean age tended to be lower on average. The mean age for those persons appearing in the three-way intersection (males: 30.4; females: 28.4) was midway between the mean ages from each of the three sources.

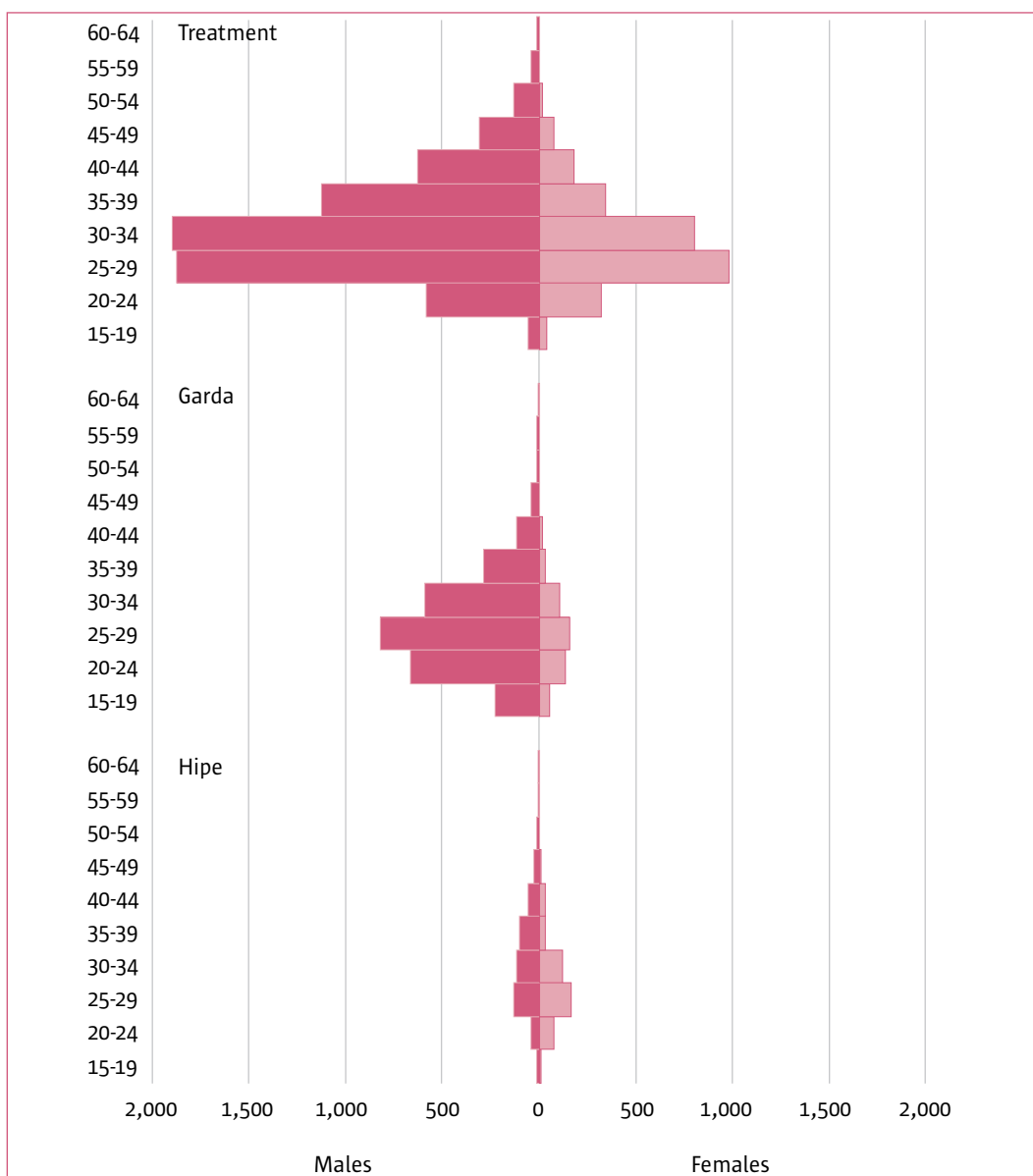
**Table 6:** Mean age with standard deviation of opiate users aged 15-64 years in Ireland, by source and sex, 2006

Source	Number	Males		Females		
		Mean	Std Dev	Number	Mean	Std Dev
G	1,664	27.1	7.3	284	26.6	7.2
H	197	34.3	9.6	307	29.7	7.6
T	5,283	33.2	7.3	2,406	31.0	6.5
Intersections						
T ∩ H	19	29.9	5.2	3	24.7	1.5
T ∩ G	207	34.4	7.5	131	31.5	6.4
H ∩ G	1,002	29.9	5.9	214	28.0	5.6
T ∩ H ∩ G	72	30.4	5.5	18	28.4	5.5

Table 7 presents percentages by the person's sex within source for each of the three age groups for 2006 and these are displayed visually in Figure 3. The percentage of males was higher in each category with two exceptions, namely, HIPE for the two age groups 15-24 and 24-34.

**Table 7:** Percentages of opiate users aged 15-64 years in Ireland, by sex ,age and source

Sex	Percentage								
	Age 15-24 years			Age 25-34 years			Age 35-64 years		
	G	H	T	G	H	T	G	H	T
Female	17.9	63.2	36.7	15.8	54.2	32.3	11.7	30.0	22.1
Male	82.1	36.8	63.3	84.2	45.8	67.7	88.3	70.0	77.9



**Figure 3:** A scaled population pyramid showing the age distribution for male and female opiate users aged 15-64 years in Ireland, by source, 2006.

# Results

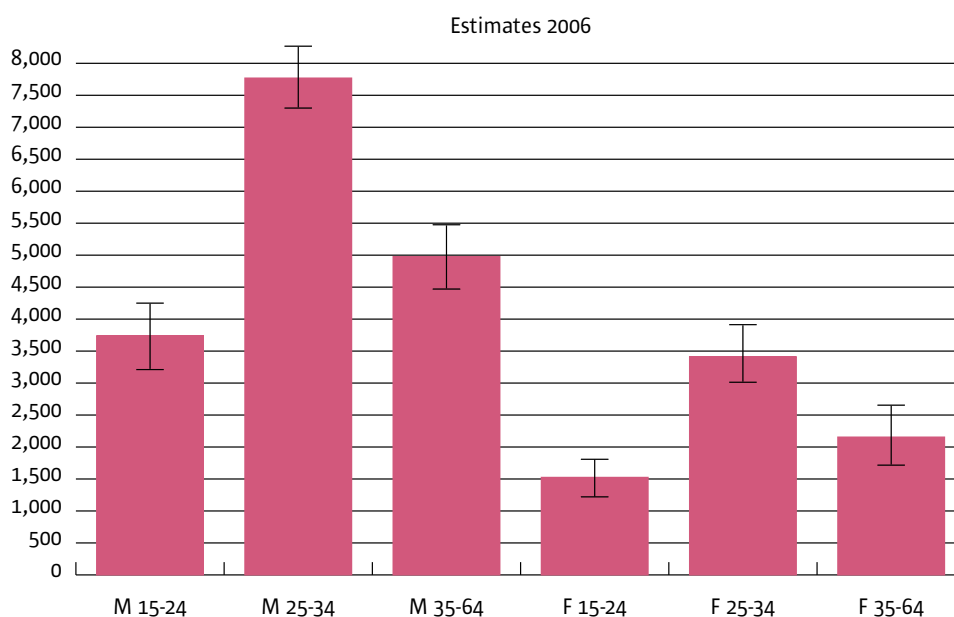
## 1) Ireland

Table 8 presents a summary of the prevalence estimates of opiate users with 95% confidence intervals by sex and age in Ireland in 2006. Estimates are based on a summation of the Dublin and rest of Ireland estimates within each age and/or sex combination. Figure 4 presents a visual representation of these estimates (with 95% Confidence Intervals). The unique number of individuals identified across the three sources was 11,807. This indicates that 57% of opiate users aged 15-64 years were known to the three sources in 2006.

**Table 8:** Prevalence estimates of opiate users with 95% confidence intervals for males and females in Ireland, by age, 2006

Year	Sex	Age Group	Prevalence Estimates	Lower Bound*	Upper Bound*	Rate/ 1000 population
2006	Males	15-24	3,150	2,709	3,739	9.8
		25-34	7,238	6,799	7,769	19.7
		35-64	4,399	3,969	4,977	5.6
	Females	15-24	1,159	933	1,525	3.7
		25-34	3,298	2,511	3,411	9.3
		35-64	1,546	1,215	2,155	2.0
<b>Total</b>	<b>Male+Female</b>	<b>15-64</b>	<b>20,790</b>	<b>18,136</b>	<b>23,576</b>	<b>7.2</b>

\* Lower Bound = lower 95% Confidence Interval; Upper Bound = upper 95% Confidence Interval



**Figure 4:** Prevalence estimates of opiate users with 95% confidence intervals for males and females in Ireland, by age, 2006.

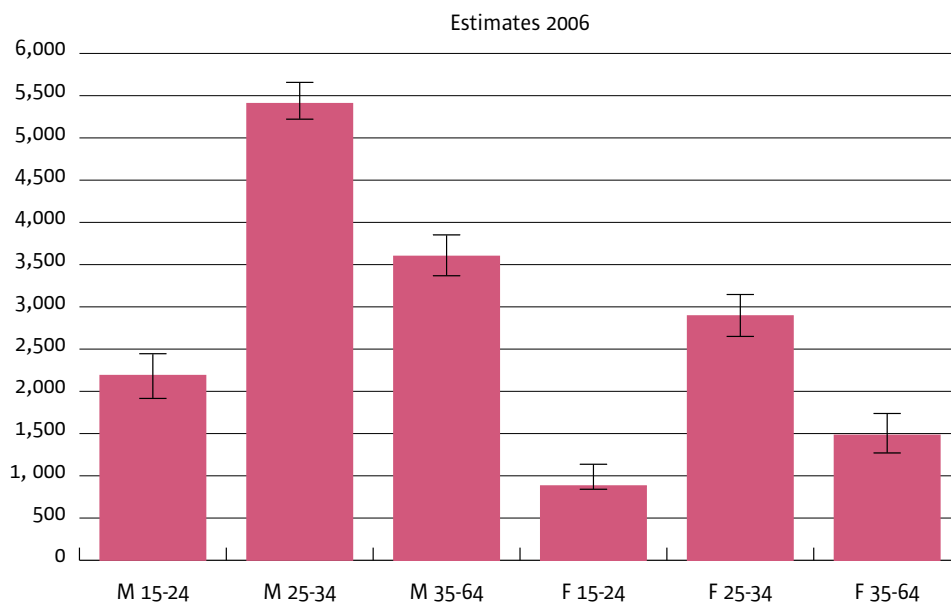
## 2) Dublin

Results of the 3-source capture-recapture models for Dublin for 2006 stratified by age and sex are presented in Table 9. Figure 5 presents a visual representation of these estimates (with 95% Confidence Intervals). The unique number of individuals living in Dublin identified across the three sources was 9,442. This indicates that 63% of opiate users aged 15-64 years were known to the three sources in 2006.

**Table 9:** Prevalence estimates of opiate users with 95% confidence intervals for males and females in Dublin, by age, 2006

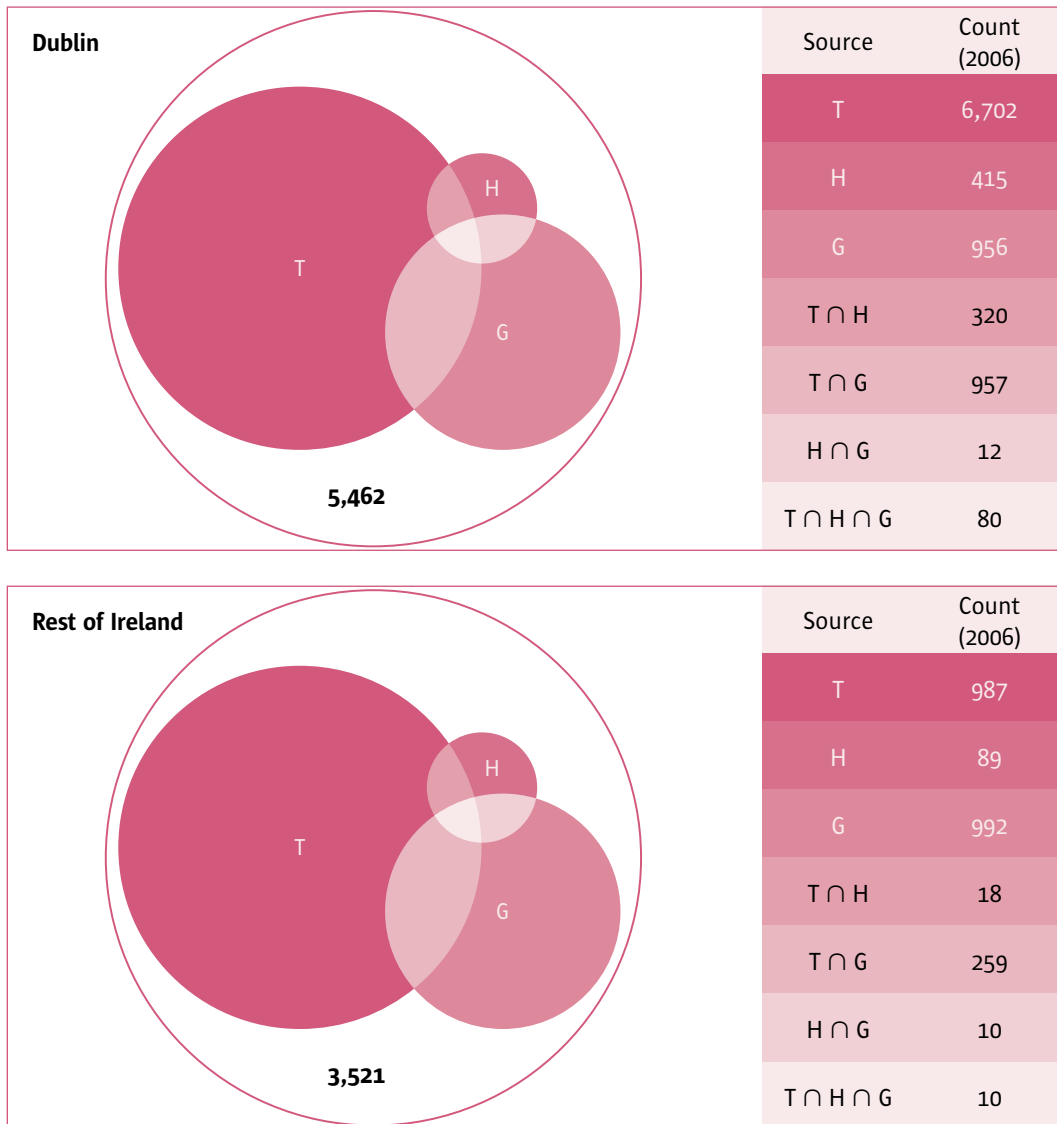
Year	Sex	Age Group	Prevalence Estimates	Lower Bound*	Upper Bound*	Rate/ 1000 population
2006	Males	15-24	1,892	1,661	2,188	19.9
		25-34	5,172	4,967	5,407	43.0
		35-64	3,331	3,113	3,599	16.3
	Females	15-24	701	586	881	7.2
		25-34	2,605	2,395	2,894	21.9
		35-64	1,203	1,015	1,481	5.7
<b>Total</b>	<b>Male+Female</b>	<b>15-64</b>	<b>14,904</b>	<b>13,737</b>	<b>16,450</b>	<b>17.6</b>

\* Lower Bound = lower 95% Confidence Interval; Upper Bound = upper 95% Confidence Interval



**Figure 5:** Prevalence estimates of opiate users with 95% confidence intervals for males and females in Dublin, by age, 2006

Figure 6 presents visually the number of known and hidden opiate users in Dublin and the rest of Ireland in 2006. The circles are proportional to the number of opiate users. The numbers, 5,462 and 3,521, represents the estimates of the hidden population of opiate users for Dublin and the Rest of Ireland, respectively



**Figure 6:** Venn diagrams illustrating the distribution of numbers of known and hidden opiate users in Dublin and the Rest of Ireland, 2006

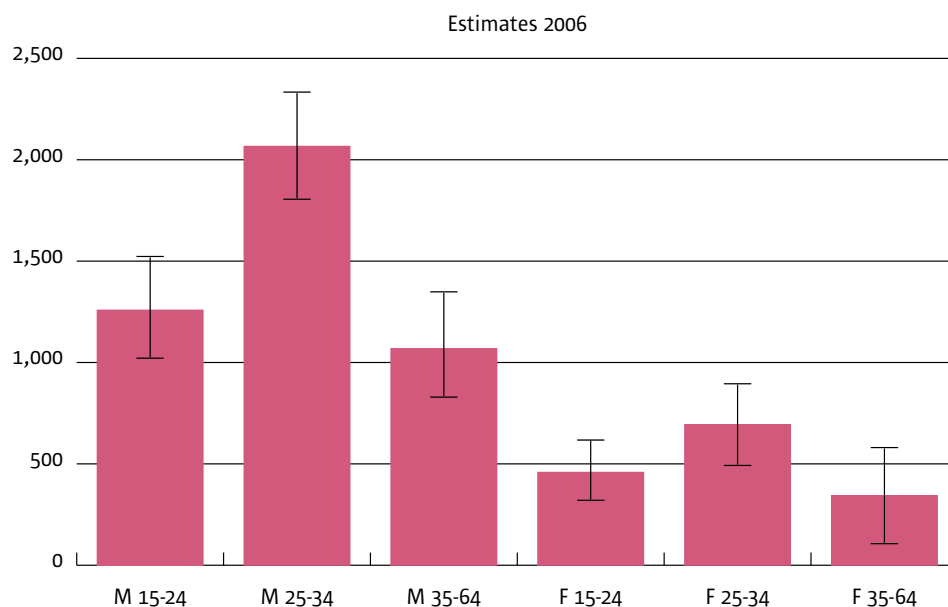
### 3) Rest of Ireland (excluding Dublin)

Results of the 3-source capture-recapture models for the Rest of Ireland (excluding Dublin) for 2006 stratified by age and sex are presented in Table 10. Figure 7 presents a visual representation of these estimates (with 95% Confidence Intervals). The unique number of individuals living outside Dublin identified across the three sources was 2,365. This indicates that 40% of opiate users aged 15-64 years were known to the three sources in 2006.

**Table 10:** Prevalence estimates of opiate users with 95% confidence intervals for males and females outside Dublin, by age, 2006

Year	Sex	Age Group	Prevalence Estimates	Lower Bound*	Upper Bound*	Rate/ 1000 population
2006	Males	15-24	1,258	1,048	1,551	5.6
		25-34	2,066	1,832	2,362	8.4
		35-64	1,068	856	1,378	1.8
	Females	15-24	458	347	644	2.1
		25-34	693	116	517	2.9
		35-64	343	200	674	0.6
<b>Total</b>	<b>Male+Female</b>	<b>15-64</b>	<b>5,886</b>	<b>4,399</b>	<b>7,126</b>	<b>2.9</b>

\* Lower Bound = lower 95% Confidence Interval; Upper Bound = upper 95% Confidence Interval



**Figure 7:** Prevalence estimates of opiate users with 95% confidence intervals for males and females outside Dublin, by age, 2006

## Percentage of Known Numbers in Treatment by Age, Sex and Region

The percentages of the unique and known individuals in treatment across the three data sources are presented in Table 11 for each region.

**Table 11:** Percentages of known opiate users receiving methadone treatment, by age, sex and place of residence, 2006

Sex	Age band	% of unique or known numbers in Treatment		
		Dublin	Rest of Ireland	Ireland
Male	15-24	55	31	42
	25-34	85	57	82
	35-64	91	63	87
Female	15-24	70	52	64
	25-34	87	72	85
	35-64	91	67	88

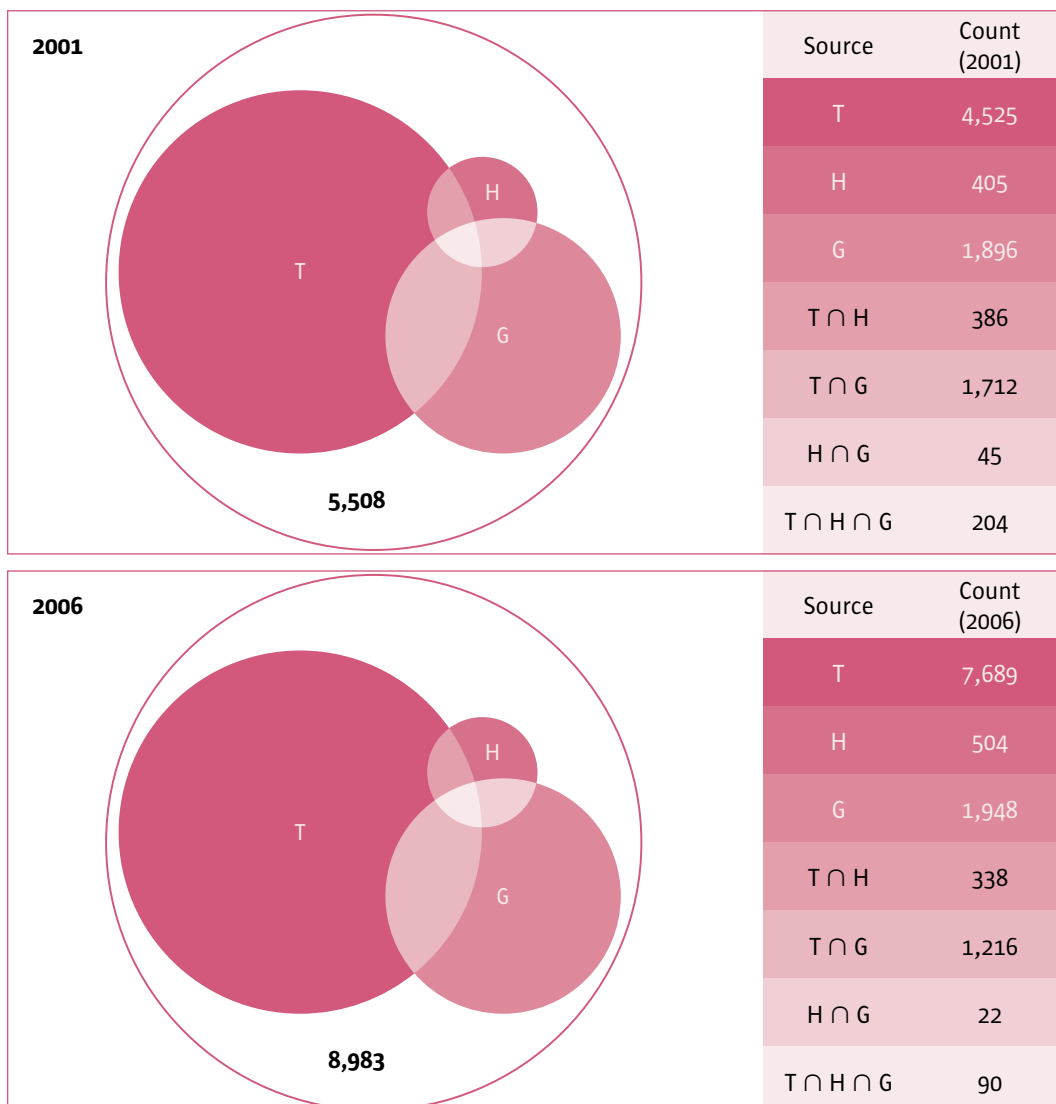
The lowest percentage in treatment was for young males outside Dublin (31% - males 15-24 years). The percentages were consistently lower than those for Dublin. This reflected the more recent spread of opiate use outside Dublin and the ensuing but more recent development of (and continuing need to expand) methadone treatment services outside of Dublin. Additionally, the percentages in treatment increased with age. Within each age group, females tended to have higher proportions in treatment compared to males, particularly so for the younger age bands. In Dublin, the numbers in treatment were just over four times higher than those known to the Gardaí. The ratio of treatment to Garda numbers outside Dublin is close to 1:1. This ratio of those in treatment and those known to the Garda outside Dublin will evolve in time to resemble the situation in Dublin as the methadone treatment services expand in the coming years. Nationally, of those who were in treatment prior to 2006, only 10% were also known to the Gardaí. By comparison, for those entering methadone treatment for the first time in 2006, about 20% were known to the Gardaí.



#### 4) National and Regional Comparisons between 2001 and 2006

**Table 12:** Numbers of opiate users aged 15-64 years in Ireland unique to each source and overlaps between sources, 2001 and 2006.

Source	2001	2006
	Number	
T	4,525	7,689
H	405	504
G	1,896	1,948
$T \cap H$	386	338
$T \cap G$	1,712	1,216
$H \cap G$	45	22
$T \cap H \cap G$	204	90
<b>Total</b>	<b>9,173</b>	<b>11,807</b>



**Figure 8:** Venn diagrams illustrating the distribution of numbers of known and hidden opiate users in Ireland, 2001 and 2006

Table 12 and Figure 8 depict the national numbers for each source and source intersection for both 2001 and 2006. The number in treatment was significantly higher in 2006 compared to 2001. The intersection or overlap between sources tended to be smaller in 2006 than in 2001. The most marked change in overlaps was in terms of the numbers in methadone treatment, for example:

- The unique number in T has risen by 3,164
- The unique number in H has risen by 99
- The unique number in G has risen by a small amount of 52
- The overlap between Treatment and HIPE ( $T \cap H$ ) has decreased by 48
- The overlap between Treatment and Garda ( $T \cap G$ ) has decreased by 496
- The overlap between HIPE and Garda ( $H \cap G$ ) has more than halved.
- The three-way overlap has dropped very substantially by 114

Overall, the unique numbers increased for all sources (in particular for T) while the individual overlaps have actually decreased. A reduction in any overlap has the effect of increasing the prevalence estimate. The increase in numbers coupled with the decrease in overlap in 2006 led to an increase in the estimate of the unknown or hidden population by age and gender. The results are summarised for males and females separately in Tables 13 and 14, respectively. Males and females combined are presented in Table 15.

**Table 13:** Prevalence estimates of male opiate users, by age and place of residence, 2001 and 2006

Region	Age Band	Prevalence estimates		Rate / 1000 population	
		2001	2006	2001	2006
Dublin	15-24	2,735	1,892	29.3	19.9
	25-34	3,740	5,172	36.3	43.0
	35-64	1,803	3,331	9.9	16.3
Rest of Ireland	15-24		1,258		5.6
	25-34		2,066		8.4
	35-64		1,068		1.8
	15-64	1,688	4,392	1.8	4.2

**Table 14:** Prevalence estimates of female opiate users, by age and place of residence, 2001 and 2006

Region	Age Band	Prevalence estimates		Rate / 1000 population	
		2001	2006	2001	2006
Dublin	15-24	1,766	701	18.7	7.2
	25-34	1,784	2,605	16.2	21.9
	35-64	628	1,203	3.2	5.7
Rest of Ireland	15-24		458		2.1
	25-34		693		2.9
	35-64		343		0.6
	15-64	537	1,494	0.6	1.5

**Table 15:** Prevalence estimates of opiate users aged 15-64 years, by place of residence, 2001 and 2006.

Region	Sex/Age Band	Prevalence estimates		Rate / 1000 population	
		2001	2006	2001	2006
Dublin	Male+Female 15-64	12,456	14,904	15.9	17.6
Rest of Ireland	Male+Female 15-64	2,225	5,886	1.2	2.9
Ireland	Male+Female 15-64	14,681	20,790	5.6	7.2

The only group to experience a reduction in prevalence is the 15-24 age band with a drop of 31% for males in Dublin and 60% for females in Dublin (Tables 13 & 14).

Within Dublin the cohort effect is very noticeable, with individuals ageing by 5 years since the 2001 study and (for the most part, staying in treatment) so the “bulge” in prevalence estimates shifted to the middle age band in 2006. This is not evident for Ireland as a whole, due to the large increase in numbers identified outside Dublin.

For males and females combined and across all age bands, both prevalence estimates and population rates have risen between 2001 and 2006. Inter alia, this was inevitable given the substantially increased numbers on methadone treatment over the five years.

## Concluding Remarks

### Prevalence Estimates

The 3-source capture-recapture results for Ireland suggest a figure of 20,790 (95% CI: 18,136 to 23,576). This would imply a rise of just under 6,000 between 2001 and 2006. However, we have already expressed concerns that the 2006 estimate is likely to be somewhat inflated due to technical reasons.

In interpreting this rise, consideration must also be given to the substantial increase in the number of individuals in treatment between 2001 and 2006 (rising from 6,827 to 9,435). The population rate for 2001 was 5.6 per 1,000 persons aged 15-64 and for 2006 it was 7.2 per 1,000 persons aged 15-64.

The estimates for Dublin were 14,904 (95% CI: 13,737 to 16,450) for 2006 giving a population rate of 17.6. The corresponding figure for 2001 was 12,456 (95% CI: 11,519 to 13,711) with a population rate of 15.9 per 1,000. Note that the 95% confidence intervals almost overlap so the difference in estimates was just statistically significant.

The prevalence for the Rest of Ireland (excluding Dublin) was estimated as 5,886 (95% CI: 4,399 to 7,126) in 2006. This indicates that the estimate more than doubled when compared to 2001 (2,225; 95% CI: 1,934 to 2,625). The corresponding rate per 1,000 population for 2006 is 2.9 as compared to 1.2 for 2001.









1st Floor  
Dún Aimhirgin  
43-49 Mespil Road  
Dublin 4

Tel: 01 647 3240  
Web: [www.nacd.ie](http://www.nacd.ie)  
email: [info@nacd.ie](mailto:info@nacd.ie)