

# Publication Report



## **Estimating the National and Local Prevalence of Problem Drug Use in Scotland 2009/10**

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## About ISD

Scotland has some of the best health service data in the world combining high quality, consistency, national coverage and the ability to link data to allow patient based analysis and follow up.

Information Services Division (ISD) is a business operating unit of NHS National Services Scotland and has been in existence for over 40 years. We are an essential support service to NHSScotland and the Scottish Government and others, responsive to the needs of NHSScotland as the delivery of health and social care evolves.

**Purpose:** To deliver effective national and specialist intelligence services to improve the health and wellbeing of people in Scotland.

**Mission:** Better Information, Better Decisions, Better Health.

**Vision:** To be a valued partner in improving health and wellbeing in Scotland by providing a world class intelligence service.

## Official Statistics

Information Services Division (ISD) is the principal and authoritative source of statistics on health and care services in Scotland. ISD is designated by legislation as a producer of 'Official Statistics'. Our official statistics publications are produced to a high professional standard and comply with the Code of Practice for Official Statistics. The Code of Practice is produced and monitored by the UK Statistics Authority which is independent of Government. Under the Code of Practice, the format, content and timing of statistics publications are the responsibility of professional staff working within ISD.

ISD's statistical publications are currently classified as one of the following:

- National Statistics (ie assessed by the UK Statistics Authority as complying with the Code of Practice)
- National Statistics (ie legacy, still to be assessed by the UK Statistics Authority)
- Official Statistics (ie still to be assessed by the UK Statistics Authority)
- Other (not Official Statistics)

Further information on ISD's statistics, including compliance with the Code of Practice for Official Statistics, and on the UK Statistics Authority, is available on the [ISD website](#).

## Introduction

This report provides estimates of the national and local prevalence of problem drug use in Scotland in 2009/10 (1 April 2009 to 31 March 2010).

These estimates provide an update on the previous estimates produced by the University of Glasgow for calendar years 2000, 2003 and 2006. Although previous studies have provided estimates based on calendar year, it was decided to move to financial year in order to bring these estimates in line with other available data sources (eg. Scottish Drug Misuse Database, Scottish Crime and Justice Survey) and to align with the reporting of problem drug use estimates in other UK administrations.

In the context of these estimates, problem drug use is defined as the problematic use of opiates (including illicit and prescribed methadone use) and/or the illicit use of benzodiazepines and implies routine and prolonged use as opposed to recreational and occasional drug use. The definition used for the 2009/10 estimates is consistent with the definition used by the University of Glasgow in all the previous studies. As much of the problem drug using population is hidden, prevalence figures can only ever be estimates, combining data about the known population (for example, those in contact with treatment services) and an estimate of the unknown population.

The technique used in this study for estimating the size of the hidden population is called capture-recapture. It relies upon re-sampling a population of unknown size to estimate its size from the number of individuals who appear in more than one sample. Essentially, the more often the same individuals appear in successive samples the smaller the unknown population is likely to be.

The prevalence study uses data from four distinct data sources:

- clients registering with specialist drug treatment services
- drug-related hospital admissions
- police reports to the Procurator Fiscal under the Misuse of Drugs Act (opiates and/or benzodiazepines)
- social enquiry reports mentioning opiates and/or benzodiazepines

Estimates were obtained for each Council area using capture-recapture and then summed to provide a national estimate. The Council estimates were also generally the main 'building blocks' for estimates at other levels (e.g. Health Board, Police Force Area).

## Acknowledgements

**ISD Scotland acknowledges the contributions made by the following:**

- The Scottish Government's Drugs Policy Unit and Justice Analytical Services Division.
- Criminal Justice Social Work Departments who made available the Social Enquiry Report data.
- Alcohol and Drug Partnerships and drug treatment services who assisted in the collection of treatment data.
- Scottish Police Forces and ACPO(S) who provided arrest data.
- Health Protection Scotland colleagues who provided data .
- ISD Scotland data analysts who extracted the data on problem drug use for Social Enquiry Reports.
- ISD Scotland colleagues who extracted data from the Scottish Drug Misuse Database and hospital episode data.
- The Drug Prevalence Project Advisory Group (see Appendix 2 for membership) who provided invaluable advice and assistance.
- Gordon Hay, Sharon Hutchinson, Matthew Hickman and Colin Taylor who provided extremely valuable technical input and expertise.
- Hayley Jones and Tim Millar who peer reviewed the report.

## Key Points

The prevalence figures presented here are **estimates**. 95% confidence intervals are shown alongside the estimates to give an indication of the likely margins of error in the estimate<sup>1</sup>.

- The estimated number of individuals with problem drug use in Scotland in 2009/10, aged 15 to 64 years old, was 59,600 (95% CI = 58,300 - 61,000). This represents an increase in estimated numbers of over 4,000 (in 2006 there were estimated to be 55,300 individuals with problem drug use (95% CI = 54,500 – 57,200)) since 2006 (Table 1 and Table 7).
- The prevalence rate of problem drug use in Scotland in 2009/10 amongst individuals aged between 15 and 64 years was estimated to be 1.71% (95% CI = 1.67% – 1.75%). This figure was estimated to be 1.62% (95% CI 1.59% - 1.67%) in 2006 (Table 1 and Table 7). Although the estimate of problem drug use prevalence was higher in 2009/10 compared to 2006, it cannot be said conclusively that actual prevalence has increased. However, we can be reasonably sure that actual problem drug use prevalence has not declined since 2006.
- Around 71% of individuals aged between 15 and 64 years old with problem drug use in mainland Scotland in 2009/10 were male. The estimated prevalence rate of problem drug use for males was 2.49% compared to 1.00% for females (Table 2).
- There are apparent decreases in the estimated prevalence rate in both the 15 to 24 and 25 to 34 year old age groups (from 1.75% in 2006 to 1.63% in 2009/10 for 15 to 24 year olds and from 3.90% in 2006 to 3.60% in 2009/10 for 25 to 34 year olds. However, for the 35 to 64 years old age group the estimated prevalence rate appears to have increased from 0.89% in 2006 to 1.18% in 2009/10 (Table 8).
- Forty-three percent of males with problem drug use in 2009/10 were aged between 35 and 64 years old (estimated 18,200 individuals from a total of 42,000 males aged 15 to 64 years old in mainland Scotland). Thirty-eight percent (estimated 16,000 individuals) of males with problem drug use were aged 25 to 34 years old and 19% (estimated 7,900 individuals) were 15 to 24 years old. It is not possible to provide a breakdown by age for females with problem drug use due to the smaller numbers involved (Table 3).
- The areas with the highest prevalence of problem drug use were Glasgow City (3.41%, 95% CI = 3.28% - 3.57%) and Dundee City (3.29%, 95% CI = 3.06% - 3.55%). The areas with the lowest prevalence were Orkney (0.04%, 95% CI not available due to use of multiplier method to produce small area estimates) and Moray (0.64%, 95% CI = 0.55% – 0.75%) (Table 1).

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<sup>1</sup> . These confidence intervals indicate the range within which the true prevalence figure should lie- e.g. '100 (95% CI = 80 -120)' indicates that the estimate is 100 and we are 95% certain that the actual prevalence lies between 80 and 120.

## Results and Commentary

Presented here are the national and local estimates of the prevalence of problem drug use in Scotland. An overall national figure is presented first followed by estimates for each Council, Alcohol and Drug Partnership, NHS Board and Police Force Area.

The prevalence figures presented here are **estimates** and ISD Scotland is reporting the number of prevalent cases from these estimates rounded to the nearest hundred, or nearest 10 for smaller numbers. Previously estimates of problem drug use in Scotland reported figures to single cases which could give data users the impression of greater accuracy than is truly the case. 95% confidence intervals are shown alongside the estimates to give an indication of the likely margins of error in the estimate<sup>2</sup>.

### Opiates and Benzodiazepine Use

This section reports on the estimated prevalence of problem drug use in Scotland. In the context of these estimates, problem drug use is defined as the problematic use of opiates (including illicit and prescribed methadone use) and/or the illicit use of benzodiazepines and implies routine and prolonged use as opposed to recreational and occasional drug use.

#### National Prevalence

- The estimated number of individuals with problem drug use in Scotland in 2009/10, aged 15 to 64 years old, was 59,600 (95% CI = 58,300 - 61,000). This represents an increase in estimated numbers of over 4,000 (in 2006 there were estimated to be 55,300 individuals with problem drug use (95% CI = 54,500 – 57,200)<sup>3</sup>) since 2006 (Table 1). See p18 for more detailed information on comparisons between the 2006 and 2009/10 estimates.
- The prevalence rate of problem drug use in Scotland in 2009/10 amongst individuals aged between 15 and 64 years was estimated to be 1.71% (95% CI = 1.67% – 1.75%). This figure was estimated to be 1.62% (95% CI 1.59% - 1.67%) in 2006 (Table 1 and Table 7). Although the estimate of problem drug use prevalence was higher in 2009/10 compared to 2006, it cannot be said conclusively that actual prevalence has increased. However, we can be reasonably sure that actual problem drug use prevalence has not declined since 2006.

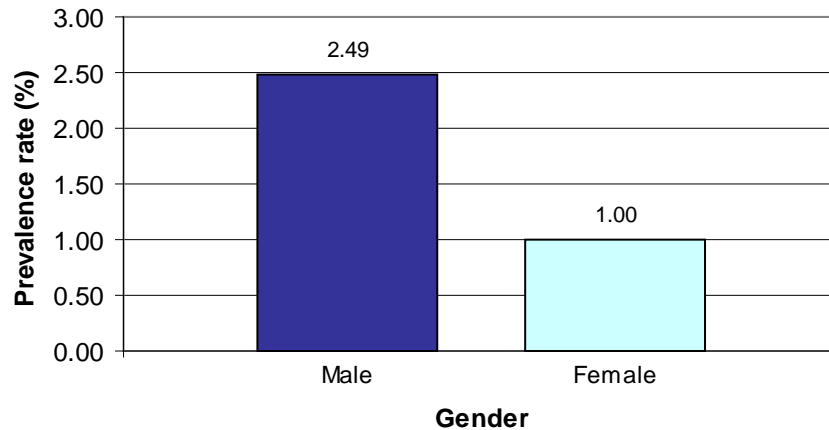
The figures below by gender and age group do not have confidence intervals presented but will still have a margin of error. This should be taken into consideration when making comparisons between the figures.

- Around 71% of individuals with problem drug use in mainland Scotland in 2009/10 were male. The estimated prevalence rate of problem drug use for males was 2.49% compared to 1.00% for females (Table 2).

<sup>2</sup> . These confidence intervals indicate the range within which the true prevalence figure should lie- e.g. '100 (95% CI = 80 -120)' indicates that the estimate is 100 and we are 95% certain that the actual prevalence lies between 80 and 120.

<sup>3</sup> Hay et al (2009).

**Figure 1: Estimated prevalence rate of problem drug use by gender, ages 15 to 64 years old (Scotland excluding Islands); 2009/10**

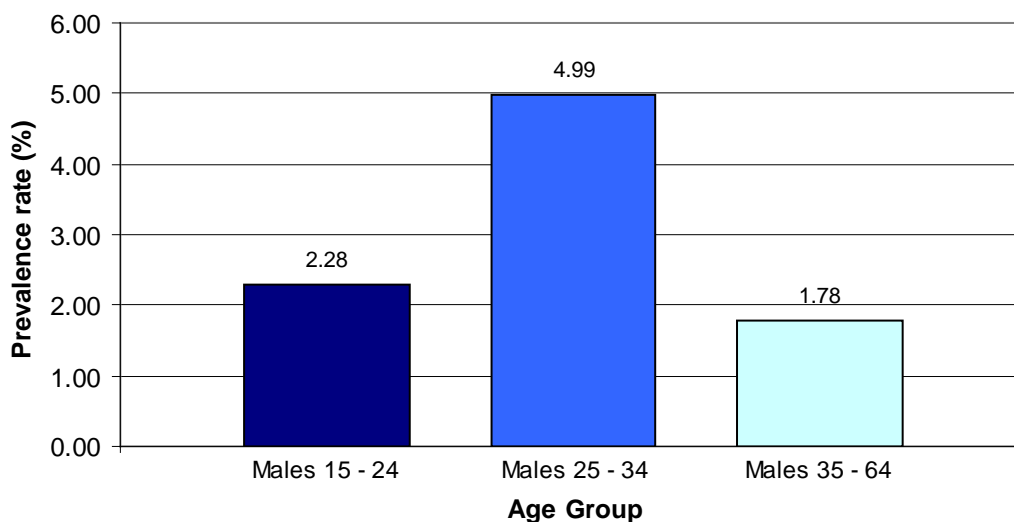


**Notes:**

This estimate does not have error bars attached to it, but is subject to error.

- Forty-three percent of males with problem drug use in 2009/10 were aged between 35 and 64 years old (estimated 18,200 individuals from a total of 42,000 males aged 15 to 64 years old in mainland Scotland). Thirty-eight percent (estimated 16,000 individuals) of males with problem drug use were aged 25 to 34 years old and 19% (estimated 7,900 individuals) were 15 to 24 years old. It is not possible to provide a breakdown by age for females with problem drug use due to the smaller numbers involved (Table 3).
- However, the rate of problem drug use was highest in the age group 25 to 34 years old, at 4.99% compared to 2.28% for 15 to 24 year olds and 1.78% for 35 to 64 year olds (Table 3).

**Figure 2: Estimated prevalence rate of problem drug use by age group (males only), ages 15 to 64 years old (Scotland excluding Islands); 2009/10**



**Notes:**

This estimate does not have error bars attached to it, but is subject to error.

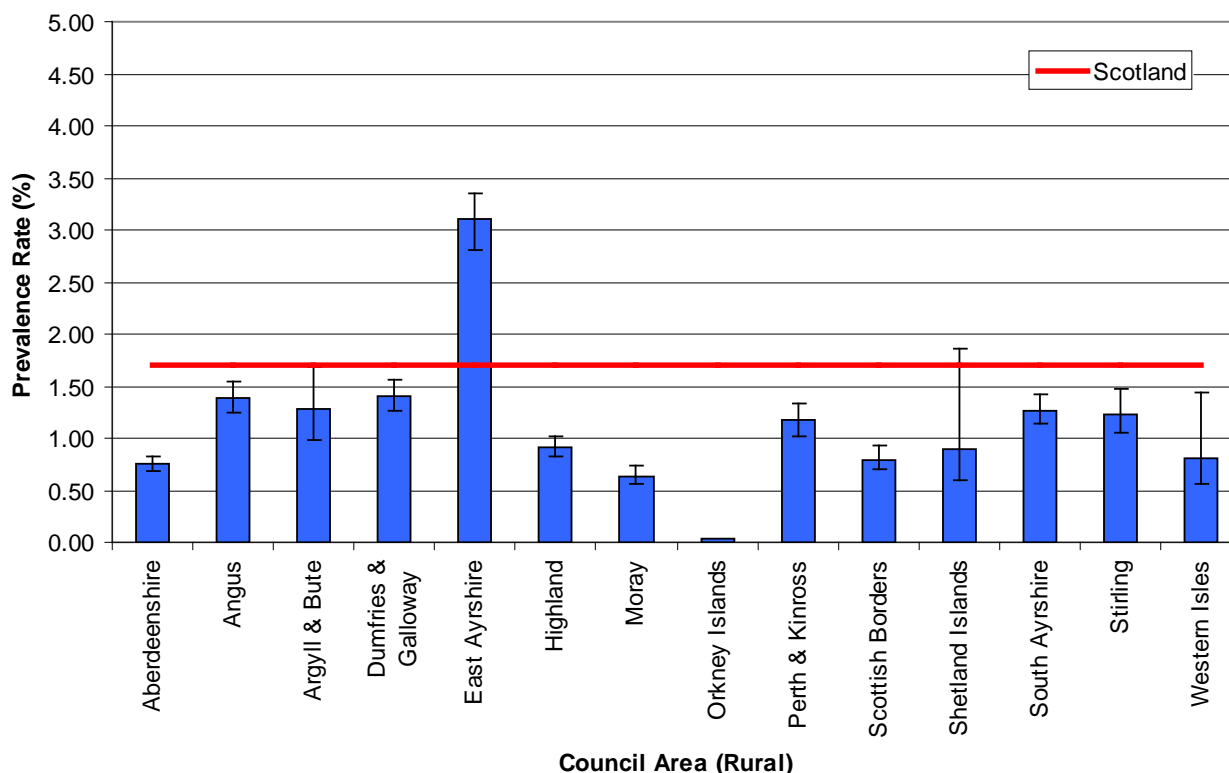


## Council Areas

Table 1 shows the estimated number of individuals with problem drug use and the prevalence rate by Council area.

- The Council areas with the highest prevalence of problem drug use were Glasgow City (3.41%, 95% CI = 3.28% - 3.57%) and Dundee City (3.29%, 95% CI = 3.06% - 3.55%). The areas with the lowest prevalence were Orkney (0.04%, 95% CI not available due to use of multiplier method to produce small area estimates) and Moray (0.64%, 95% CI = 0.55% – 0.75%) (Table 1).
- Glasgow City Council area had the highest number of individuals with problem drug use with an estimated 13,900, (95% CI = 13,400 – 14,600). City of Edinburgh Council area had the next highest number with an estimated 5,300 (95% CI = 4,900 – 5,900) (Table 1).
- Prevalence rates for males in all Council areas were highest in the 25 to 34 year old age group. In Glasgow it is notable that the prevalence rate of problem drug use for 35 to 64 year old males was very close to that for 25 to 34 year olds (5.18% for the older age group compared to 5.62% for the 25 to 34 year old age group). Glasgow City was the only Council area in Scotland where the number of individuals with problem drug use aged 35 to 64 was greater than the number in the other two age groups (15 to 24 years old and 25 to 34 years old) combined, with an estimated 5,600 males aged 35 to 64 years old compared to 4,500 males aged 15 to 34 years old (Table 3).
- Prevalence rates of problem drug use were generally lower in rural Council areas. However, East Ayrshire Council area with an estimated prevalence rate of 3.11% (95% CI = 2.81% - 3.36%) had an unusually high prevalence of problem drug use in comparison to other rural Council areas (Table 1 and Figure 3).

**Figure 3: Estimated prevalence rate of problem drug use by Council Area (rural), ages 15 to 64 years old; 2009/10**



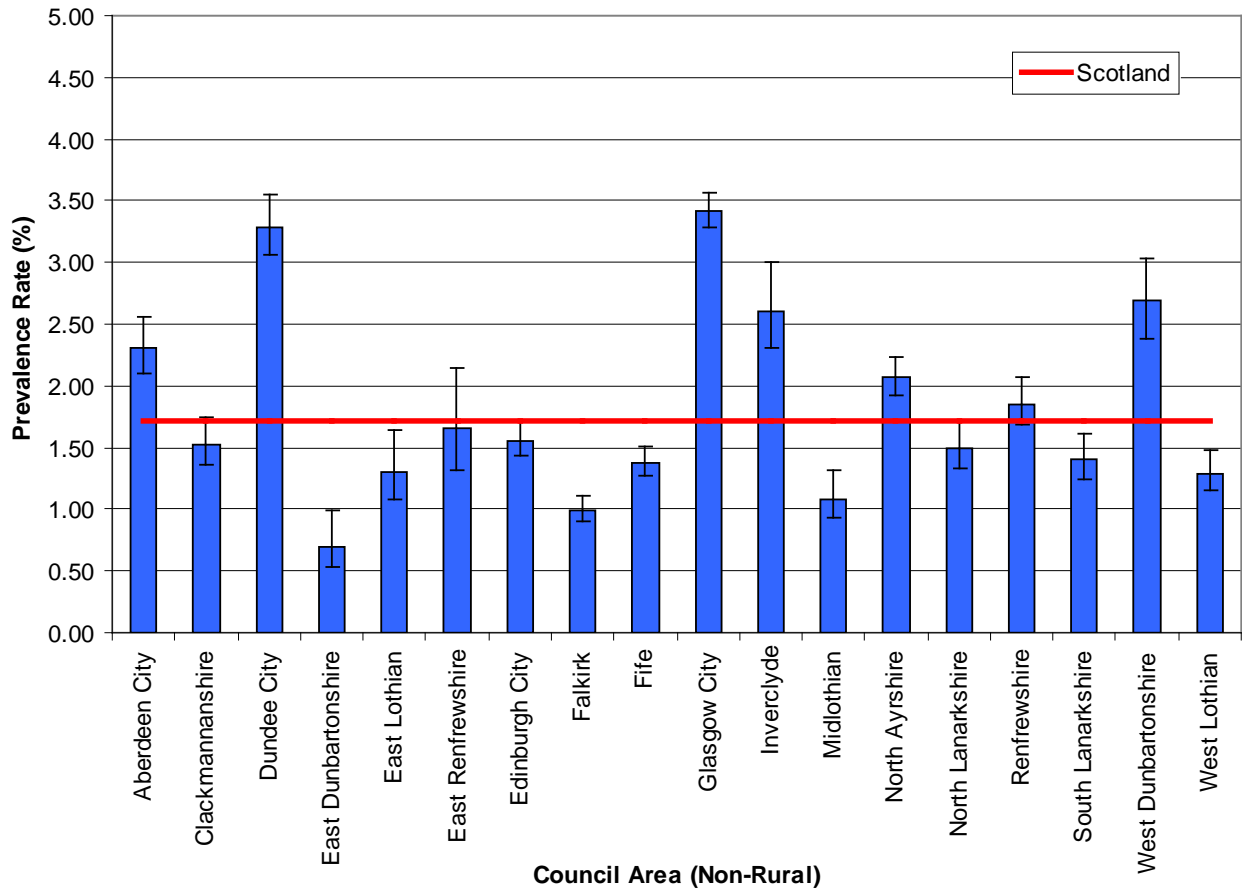
**Notes:**

Error bars are shown to indicate the range of the 95% confidence intervals.

The estimate for Orkney was produced using a multiplier method. This estimate does not have error bars attached to it, but is subject to error.

- In contrast, prevalence rates for problem drug use are generally higher in urban areas. This was observed to be the case for the major cities (Glasgow City (3.41%, 95% CI = 3.28% - 3.57%), Dundee City (3.29%, 95% CI = 3.06% - 3.55%) and Aberdeen City (2.31%, 95% CI = 2.10% - 2.56%). The City of Edinburgh is a notable exception with a prevalence rate lower than the Scottish national average (1.55%, 95% CI = 1.43% - 1.72% compared to 1.71%, 95% CI 1.67% - 1.75% for Scotland). Inverclyde (2.61%, 95% CI = 2.30% - 3.00%) and West Dunbartonshire (2.69%, 95% CI = 2.38% - 3.03%) also have relatively high rates compared to other urban areas. (Table 1 and Figure 4).

**Figure 4: Estimated prevalence rate of problem drug use by Council Area (non-rural), ages 15 to 64 years old; 2009/10**



Notes:  
 Error bars are shown to indicate the range of the 95% confidence intervals.

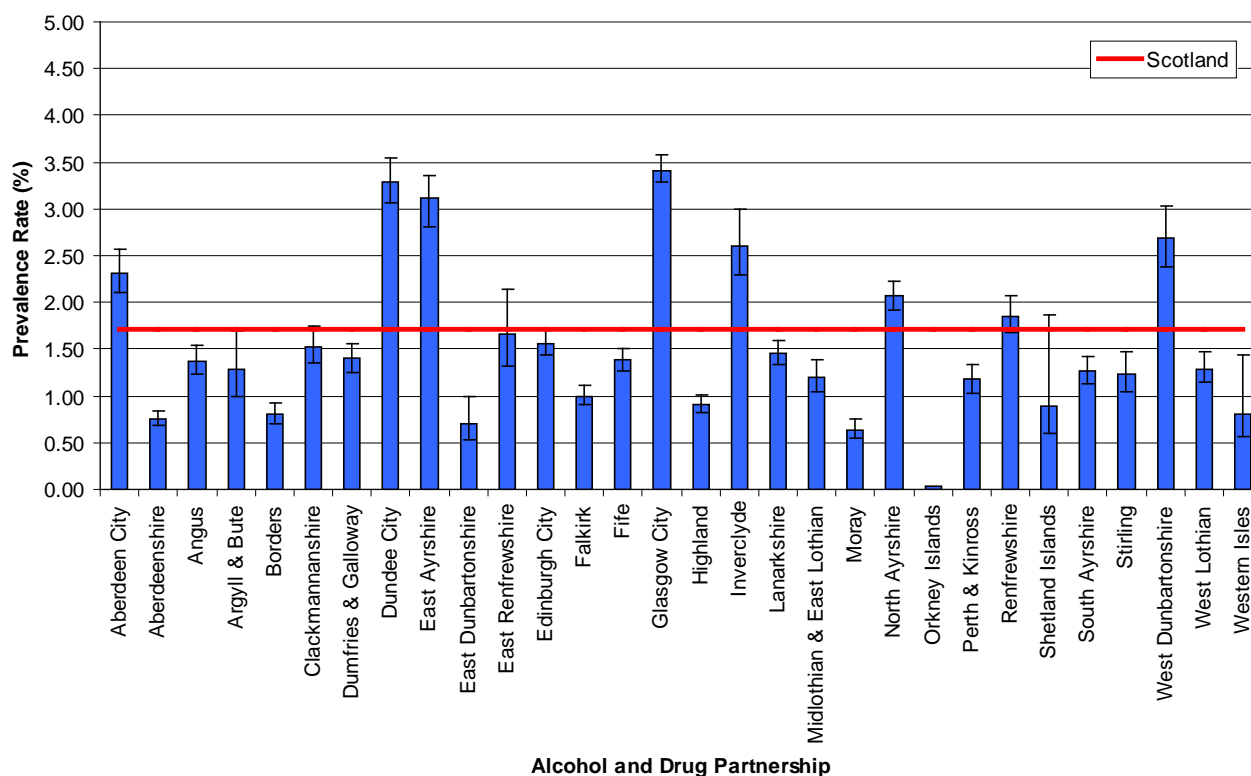


## Alcohol and Drug Partnerships

Table 4 shows the estimated number of problem drug users and the prevalence rate by Alcohol and Drug Partnership (ADP) area. As ADP areas are in the majority of cases the same as Council areas the results reported in this section are in most ADP areas the same as those reported in the previous section for Council areas. The exceptions are Midlothian and East Lothian ADP and Lanarkshire ADP where the figures have been combined from those produced for the Council areas.

- As with the Council areas, the ADP areas with the highest prevalence of problem drug use were Glasgow City ADP with 3.41% (95% CI = 3.28% – 3.57%) and Dundee City ADP with 3.29% (95% CI = 3.06% – 3.55%) (Table 4).
- The ADP areas with the lowest prevalence were Orkney ADP with 0.04% (95% CI not available due to use of multiplier method to produce small area estimates) and Moray ADP with 0.64% (95% CI = 0.55% – 0.75%) (Table 4 and Figure 6).

**Figure 6: Estimated prevalence rate of problem drug use by Alcohol and Drug Partnership area, ages 15 to 64 years old; 2009/10**

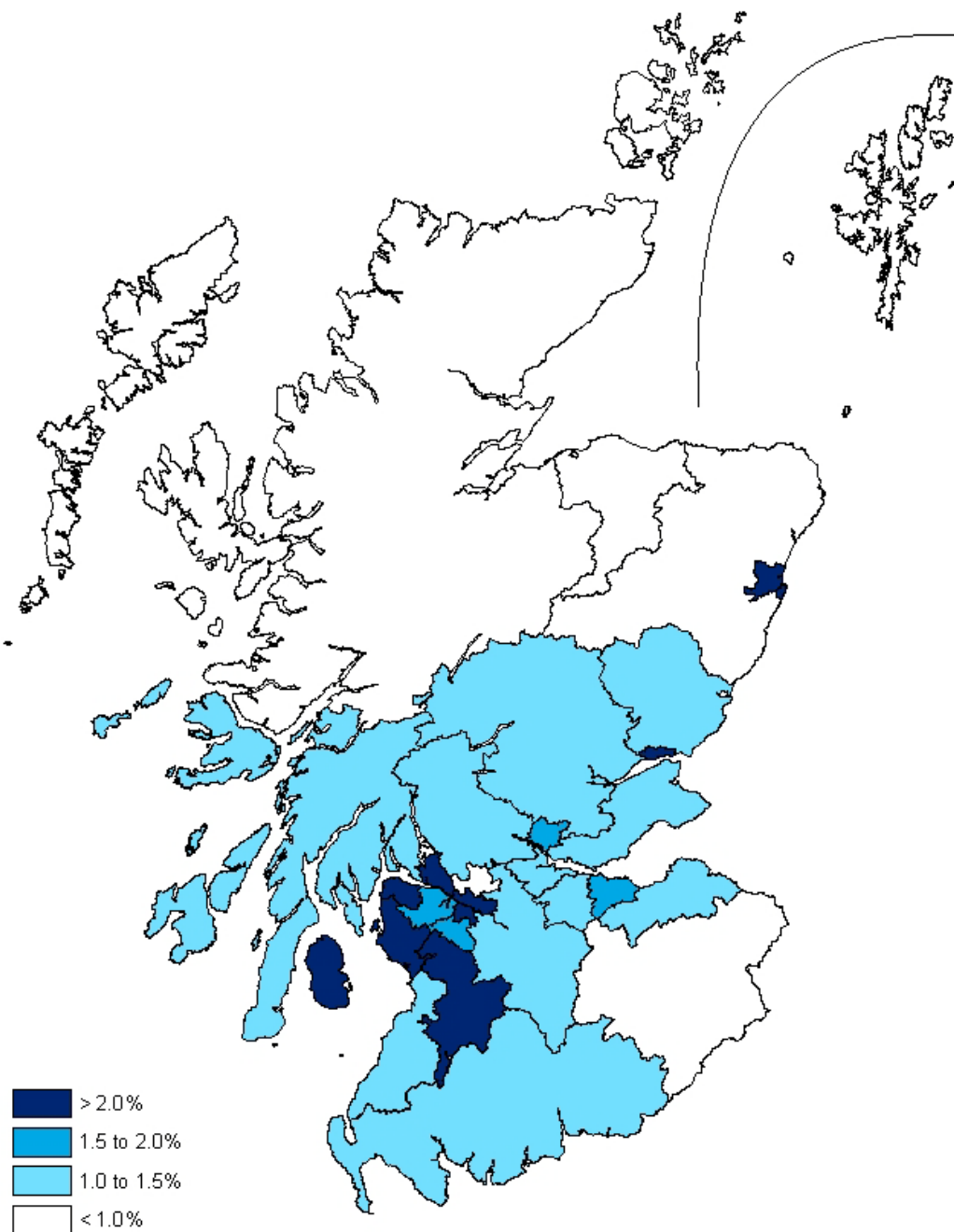


**Notes:**

Error bars are shown to indicate the range of the 95% confidence intervals.

The estimate for Orkney was produced using a multiplier method. This estimate does not have error bars attached to it, but is subject to error.

**Figure 7: Estimated prevalence rate of problem drug use by Alcohol and Drug Partnership area, ages 15 to 64 years old; 2009/10**

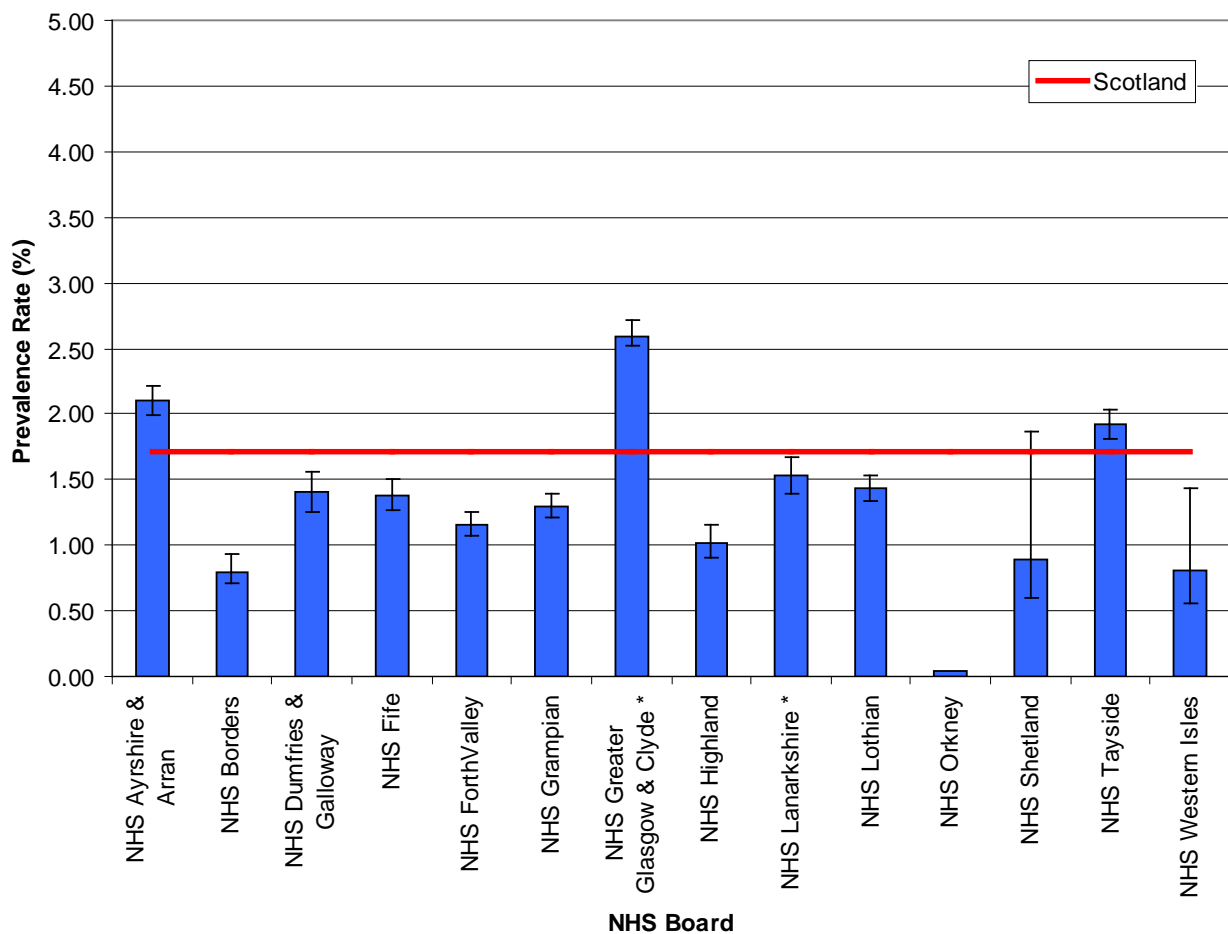


## NHS Boards

Table 5 shows the estimated number of individuals with problem drug use and the prevalence rate by NHS Board area.

- The highest prevalence rates of problem drug use were seen in NHS Greater Glasgow and Clyde with 2.59% (95% CI = 2.53% – 2.72%) and NHS Ayrshire and Arran with 2.10% (95% CI = 2.00% – 2.22%) (Table 5 and Figure 8).

**Figure 8: Estimated prevalence rate of problem drug use by NHS Board, ages 15 to 64 years old; 2009/10**



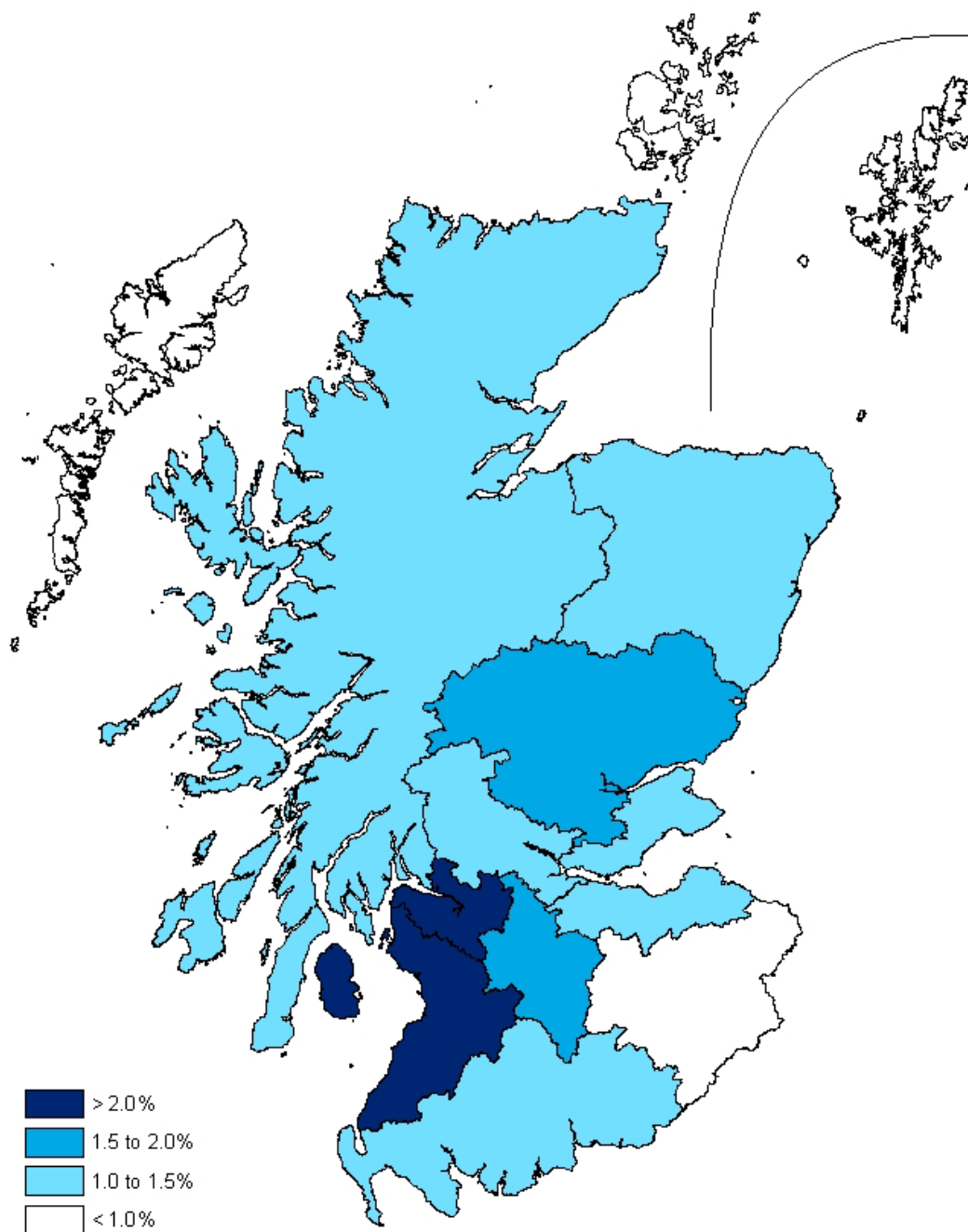
**Notes:**

Error bars are shown to indicate the range of the 95% confidence intervals.

The estimate for NHS Orkney was produced using a multiplier method. This estimate does not have error bars attached to it, but is subject to error.

\* The South Lanarkshire Council towns of Cambuslang and Rutherglen are included in NHS Greater Glasgow and Clyde.

Figure 9: Estimated prevalence rate of problem drug use by NHS Board, ages 15 to 64 years old; 2009/10



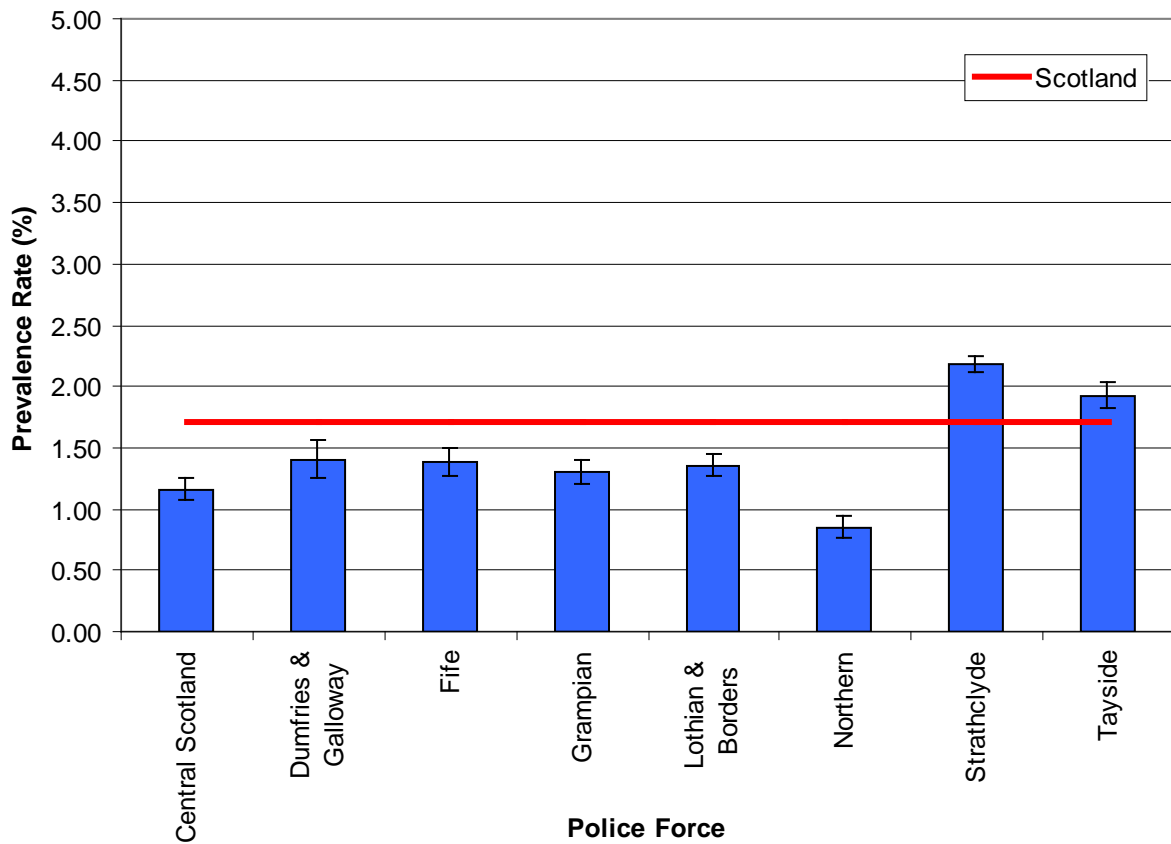


### Police Force Areas

Table 6 shows the estimated number of individuals with problem drug use and the prevalence rate by Police Force area in Scotland.

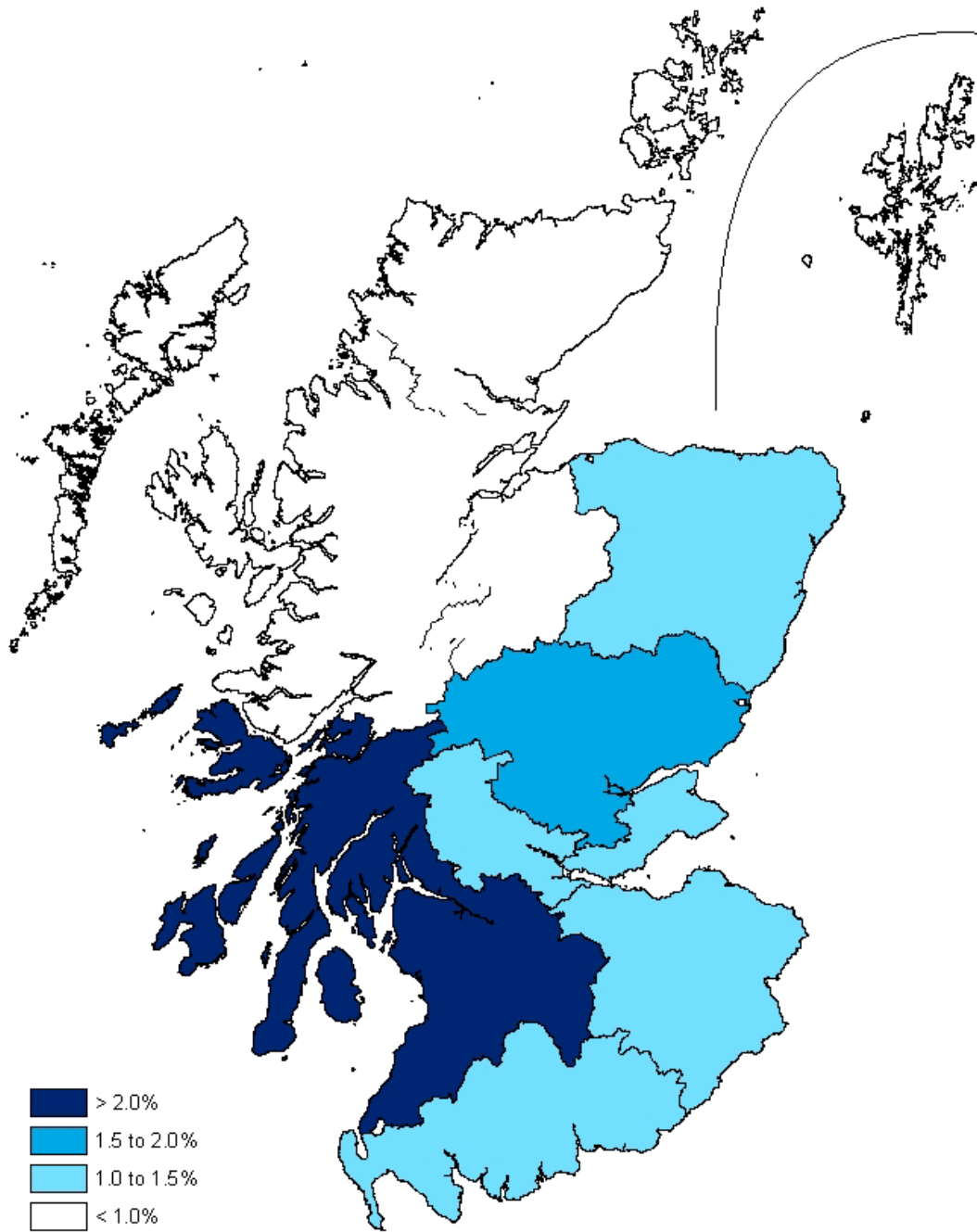
- The highest prevalence rate of problem drug use was in Strathclyde Police Force area with 2.18% (95% CI = 2.12% – 2.25%) while the lowest rate was in Northern Constabulary area with a prevalence rate of 0.84% (95% CI = 0.76% - 0.94%) (Table 6 and Figure 10).

**Figure 10: Estimated prevalence rate of problem drug use by Police Force area, ages 15 to 64 years old; 2009/10**



Notes:  
Error bars are shown to indicate the range of the 95% confidence intervals.

Figure 11: Estimated prevalence rate of problem drug use by Police Force area, ages 15 to 64 years old; 2009/10



## Comparison between 2006 and 2009/10

This section looks at the potential for comparing the 2009/10 estimates presented here with those produced for 2006 by the Centre for Drug Misuse Research, University of Glasgow (Hay *et al.* published by ISD in October 2009).

As the estimates have a range (confidence interval) within which the true number of problem drug users is expected to lie, significant increases or decreases are identified as being those where the confidence intervals for the years being compared do not overlap.

Comparisons are not made to prevalence estimates prior to the 2006 estimates as these were based on a population aged 15 to 54 years old, rather than the 15 to 64 year old population the 2006 and 2009/10 estimates refer to<sup>4</sup>.

- The estimated prevalence of problem drug use amongst 15 to 64 year olds in Scotland has increased from 1.62% (95% CI = 1.59% - 1.67%) in 2006 to 1.71% (95% CI = 1.67% - 1.75%) in 2009/10. Although the estimate of problem drug use prevalence was higher in 2009/10 compared to 2006, it cannot be said conclusively that actual prevalence has increased. This is due to the fact that the confidence limits shown are very close and do not take into account potential data and methodological differences between the years being compared. However, we can be reasonably sure that actual problem drug use prevalence has not declined since 2006 (Table 7).
- Looking at the change between 2006 and 2009/10 by age group there are apparent decreases in the estimated prevalence rate in both the 15 to 24 and 25 to 34 year old age groups (from 1.75% in 2006 to 1.63% in 2009/10 for 15 to 24 year olds and from 3.90% in 2006 to 3.60% in 2009/10 for 25 to 34 year olds. However, for the 35 to 64 years old age group the estimated prevalence rate appears to have increased from 0.89% in 2006 to 1.18% in 2009/10 (Table 8). This pattern seems to be reflected in data sources such as Scottish Drug Misuse Database (SDMD), hospital discharges and drug related deaths which have seen increases in older age groups and decreases in younger age groups. The percentage of new patients/clients attending drug treatment services on the SDMD aged 35 and over increased from 30% in 2006/7 to 35% in 2009/10 (Drug Misuse Statistics Scotland 2010, Table A1.3). The number of known individuals with problem drug use in treatment in 2009/10 as a percentage of the estimated prevalence of problem drug misuse is virtually unchanged from 2006 at 42%.
- Aberdeen 1.80% (95% CI = 1.62% – 2.01%) in 2006 compared to 2.31% (95% CI = 2.07% – 2.60%) in 2009/10, East Ayrshire 2.32% (95% CI = 2.13% – 2.58%) in 2006 compared to 3.11% (95% CI = 2.81% - 3.36%) in 2009/10, East Renfrewshire 0.95% (95% CI = 0.72% - 1.29%) in 2006 compared to 1.66% (95% CI = 1.31% - 2.14%) in 2009/10 and West Lothian 0.91% (95% CI = 0.83% - 1.00%) in 2006 compared to 1.29% (95% CI = 1.15% - 1.47%) in 2009/10 show an apparent increase in the prevalence rate of problem drug use between 2006 and 2009/10. Other areas showing a rise in prevalence were not showing a clear increase due to an overlap in confidence limits. This means that in these areas we cannot say that prevalence has actually increased (Table 7).

<sup>4</sup> The change to a 15 to 64 year old age group was made in line with European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) data requirements.

- In all the areas where the estimates indicate a decline in prevalence, we cannot say with certainty that actual prevalence has decreased, due to the overlap in confidence limits. This means that there were no areas where prevalence was shown to have actually declined (Table 7).

## Individuals Known to Services for Problem Drug Use

Table 9 shows the number of known individuals with problem drug use identified in each of the data sources used to produce these estimates. A total of 32,648 known individuals (aged 15 to 64 years old) were identified in the data sources reviewed for this work (see pages 3 and 18 for the data sources used). Individuals were identified from multiple records by matching initials, date of birth, gender and Council area of residence. It is possible therefore that there has been some under or over counting of individuals if these details were the same for different individuals or if an individual had records in more than one Council area. As in previous studies, the largest number of records came from the treatment data source (Scottish Drug Misuse Database and treatment records provided by services).

## Glossary

Benzodiazepine	The most commonly prescribed minor tranquilisers, known as anxiolytics (for daytime anxiety relief) and hypnotics (to promote sleep). Includes diazepam (Valium), lorazepam, librium, nitrazepam, temazepam.
Capture-recapture	This form of analysis uses data sources which in some way identify individuals with problem drug use to identify the overlap between the data sources. Further analysis can then be used to estimate the hidden (unknown) population who appear in none of the data sources, which, combined with the known population, generates a prevalence estimate.
Confidence interval	Provides an estimated range of values within which the true value is likely to lie. The width of the confidence interval gives an indication of the reliability of the value (ie. the smaller the range the more reliable the value).
Error Bars	Error bars are used on graphs to indicate the error, or uncertainty in a reported measurement. They give a general idea of how accurate a measurement is, or conversely, how far from the reported value the true (error free) value might be. The error bars in the charts in this publication are based on the confidence intervals shown in the tables.
Hidden population	The individuals with problem drug misuse who are not captured in any of the datasets used for the study.
Known population	The individuals identified with problem drug use in the datasets used for the study.
Multiplier Method	Produces estimates by applying the known to unknown ratio in a larger region to the known population in a smaller area. This was used where an area had too small a number of known users to produce estimates using capture-recapture.
Opiate	A drug containing opium or its derivatives, used in medicine for inducing sleep and relieving pain. Includes heroin (diamorphine), morphine, methadone, opium, codeine, pethidine, dihydrocodeine (DF118).
Prevalence	In epidemiology, the prevalence of a health-related state (typically disease, but also other things like drug use) in a statistical population is defined as the total number of cases of the risk factor in the population at a given time. It is used as an estimate of how common a disease is within a population over a certain period of time. The prevalence rate is the number of individuals shown as a proportion of the overall population.

Problem drug use	The problematic use of opiates (including illicit and prescribed methadone use) and/or the illicit use of benzodiazepines and implies routine and prolonged use as opposed to recreational and occasional drug use.
Rural	A council area has been classified as rural if its population density is below one person per hectare (Scottish Executive, 2000).
Urban	A council area has been classified as urban if its population density is more than one person per hectare (Scottish Executive, 2000).

## List of Tables

Table No.	Name	Time period	File & size
1	Estimated number of individuals with problem drug use by Council area (ages 15 to 64); 2009/10	2009/10	Excel [108kb]
2	Estimated number of individuals with problem drug use by Council area and gender (ages 15 to 64, mainland Scotland); 2009/10	2009/10	Excel [108kb]
3	Estimated number of individuals with problem drug use by Council area and age group (ages 15 to 64, mainland Scotland); 2009/10	2009/10	Excel [108kb]
4	Estimated number of individuals with problem drug use by Alcohol & Drug Partnership (ages 15 to 64); 2009/10	2009/10	Excel [108kb]
5	Estimated number of individuals with problem drug use by NHS Health Board (ages 15 to 64);2009/10	2009/10	Excel [108kb]
6	Estimated number of individuals with problem drug use by Police Force area (ages 15 to 64); 2009/10	2009/10	Excel [108kb]
7	Estimated prevalence of problem drug use by Council area (ages 15 to 64); 2006 and 2009/10	2006 and 2009/10	Excel [108kb]
8	Estimated prevalence of problem drug use by age group (ages 15 to 64, mainland Scotland); 2006 and 2009/10	2006 and 2009/10	Excel [108kb]
9	Summary of data on problem drug use by Council area (ages 15 to 64); 2009/10	2009/10	Excel [108kb]



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## Further Information

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## Appendix

### A1 – Background Information

#### Data Collection

Throughout the study, which began in July 2010, ISD have attempted to replicate as fully as possible the data collection and analysis which took place in previous studies carried out by the Centre for Drug Misuse Research, University of Glasgow. While we have ensured this to the best of our knowledge and have drawn on the technical expertise of the project advisory group, it is possible that there have been some differences in data collection between this study and previous studies.

The study collected information from several data sources on illicit use of opiates (including methadone) or benzodiazepines and additionally on prescribed use of methadone. It was also recorded whether an individual had injected any illicit drug.

Data were collected from:

- Scottish Drug Misuse Database (SMR 25a) and treatment agencies held by ISD
- Hospital discharges (SMR01 and SMR04) held by ISD
- Social Enquiry Reports held by local authority social work departments
- Police data on reports to the Procurator Fiscal under the Misuse of Drugs Act

The variables collected from each data source were:

- Forename initial
- Surname initial
- Gender
- Date of Birth
- Postcode district
- Drug of use

Information on the known individuals with problem drug use is presented in Table 9.

Across all data sources data were aggregated by initials, date of birth, gender and Council area of residence in order to identify unique individuals. Data from multiple records were combined to ensure that information on drug use was not lost during this process.

Where possible, postcode district was used to identify Council area of residence. If postcode was not available but information on the town the individual lived in was provided then this was used to allocate the individual to a Council area. If neither postcode district nor town of residence details were provided and the data could be identified as being provided by a single Council area then it was assumed that the individual was resident in that Council area. Where data sources covered an area larger than a Council (eg. Strathclyde Police Force) and both the postcode and town were not available it was not possible to allocate the individual to a Council area therefore these cases were not able to be included in the final datasets.

If any of the identifying information was missing (eg. initials, date of birth, gender) these records were excluded from the final dataset.

## **Scottish Drug Misuse Database and treatment agencies**

Information was extracted from the Scottish Drug Misuse Database (SDMD) on clients who had an initial assessment for drug treatment during 2009/10 and who were recorded as using opiates and/or benzodiazepines. This data extract matched those provided by ISD to the University of Glasgow in the previous studies. In addition, treatment agencies were asked to provide information about clients in treatment during 2009/10. The SDMD and treatment agency data were combined to create a single source.

## **Hospital discharges**

Information was extracted from general hospital (SMR01) and psychiatric hospital (SMR04) discharge records for any patients with a discharge relating to opioid use during 2009/10. This did not have to be the primary diagnosis but was included as long as it was recorded as a diagnosis in the discharge record. Opioid use was identified using the World Health Organisation's International Classification of Diseases 10th Revision (ICD10) codes F11 (opioid use) and F19 (multiple psychoactive drugs). Additionally where ICD10 codes of I35 (), I80 (), L02 () and L03 () were used alongside recording of an opiate problem it has been assumed that these patients are drug injectors. This data extract matched those provided by ISD to the University of Glasgow in the previous studies.

## **Social Enquiry Reports**

Social Enquiry Reports (SERs) are compiled by Social Work Departments for use by Courts in sentencing. SERs are requested by the Court. The SER will contain information on the individual's background and personal circumstances where considered relevant to the offence and sentencing. Drug use may or may not be noted in the report based on the Social Worker's view. Additionally, where drug use is noted, this may not necessarily identify the specific drugs involved. SERs from 2009/10 were reviewed by ISD data collectors (between July 2010 and February 2011) who collected information where opiate and/or benzodiazepine drug use was recorded or where opiate substitute prescribing was recorded. If injecting status was mentioned this was also recorded.

ISD has tried to replicate the data collection from previous studies, however had limited information available about instructions which were given to data collectors in previous studies. ISD are content that the data collection meets the definitions required for this study. Further details of the criteria used in the data collection and extraction are given in the technical report.

## **Police**

All Police Forces in Scotland provided information on individuals who had been reported to the Procurator Fiscal under the Misuse of Drugs Acts for opiate and/or benzodiazepine related offences. ISD believes that these data are in line with that supplied by Forces in previous studies.

## Methods

Capture-recapture is one of the most generally accepted methods for prevalence estimation in drug use epidemiology (EMCDDA, 2000, Hook & Regal, 2000). This form of analysis requires two or more data sources which in some way identify individuals with problem drug use (e.g. initials, date of birth and sex) and can identify the overlap between the data sources that is the number of people that occur in two or more data sources. Log linear analysis can then be used to estimate the hidden (unknown) population who appear in none of the data sources, which, combined with the known population, generates the prevalence estimates (Hickman et al. Online Report 36/04 2004).

### Unit of analysis

The main unit of analysis in this research has been the Council area. In accordance with the methods outlined in the previous Scottish prevalence study, it was necessary to undertake separate analyses of the available data for each Council area (Hay et al. 2009). Arriving at a national estimate involved summing all of these local estimates. On the basis of these Council area estimates, it has been possible to produce estimates for the differently configured Alcohol and Drug Partnership (ADP) areas, NHS Health Board areas and Police Force areas in Scotland.

A separate analysis was undertaken for the area of South Lanarkshire Council which overlaps the Greater Glasgow and Clyde Health Board area- i.e. Rutherglen and Cambuslang. The prevalence figures for the overlap were estimated proportionately from the South Lanarkshire prevalence estimates using the population estimates. The overlap area estimates were included in both the Greater Glasgow and Clyde Health Board estimates and in the South Lanarkshire council area estimates, but not in the estimates for Lanarkshire Health Board.

### Model selection

With four data sources, the number of possible log linear models is vast and one of the challenges of the capture-recapture analysis is to find the best (most simple) model that still fits the data. A very simple model is a model with main effects only, indicating that the presence in one data source does not affect the probability of being in another source. This is rather unlikely where one data source is Police arrests and another is Social Enquiry Reports (SERs) because the latter are usually only made after a person is being arrested. This will lead to interaction terms in the model between this pair of data sources. A model that assumes two interaction terms is simpler than a model with three interaction terms. Usually, more complex models lead to higher prevalence estimates. This is illustrated in prevalence estimates of the number of injecting drug users in Glasgow with four data sources. A model with 2 interactions (between pairs of data sources) yielded an estimate of 8,055, while a model with 2 interactions (between pairs of data sources) and 1 interaction term between 3 data sources resulted in an estimate of 8,494 (Frischer 1997).

The first stage of model selection involved testing how well a very simple model, that assumed all data sources were independent of each other, matched the observed overlap in the data sources. Then other models, representing dependencies between single pairs of data sources, and two pairs of data sources were tested. In total this amounts to 22 models, which we will label "simple" models. The model that best matched the overlap was chosen using objective statistical criteria; more complex models were only chosen if they

provided a better match (on comparing AIC values) than simpler models (Hook & Regal 1997).

The search into more complex models can go via several methods. Starting with a simple model and adding more and more interaction terms until the fit is acceptable (forward selection), or starting with the most complex model and eliminating interaction terms that do not result in a significant loss of fit (backward elimination). In this report we choose to fit all the possible models, starting from a model with main effects only up to and including a model with all four 3-way interaction terms. (The model with the 4-way interaction is not an option due to the structural zero of the cell with the hidden population. The model with four 3-way interactions is the saturated model). There are possible 113 models in total. This approach makes it possible to calculate a (weighted) average estimate of the hidden populations of all the models and compare estimates of specific models with that average.

ISD's analysis used the following (hierarchical) steps:

1. The models used for evaluation were the 22 models including main effects and only 1 or 2 interactions between pairs of data sources effects when evaluating log linear models of capture-recapture using four data sources.
2. The weighted average of the 22 models was calculated using the SIC (Schwarz Information Criterion) to give greater weight to better models.
3. Models were deemed to be a satisfactory fit if the AIC value was less than zero and the estimated population differed by less than 10% from the weighted estimate.
4. An un-stratified model was fitted (the fitted models were restricted to main effects and no more than 2 interactions between pairs of data sources, a total of 22 possible models). If this was satisfactory the estimate was accepted.
5. If the model with the best (lowest) AIC differed more than 10% from the weighted estimate, the model with the next lowest AIC ( $\leq 0.0$ ) which agreed with the weighted estimate was chosen. Out of 32 Councils: 16 estimates with a simple un-stratified model were obtained. In all of these models the sum of the stratified estimates (male/female) were within the 95%CI of the un-stratified estimate.
6. If a satisfactory un-stratified model was not found, separate models were fitted to male and female strata. Out of 32 Councils: 7 estimates with simple male/female strata were obtained.
7. For men - if no models fitted satisfactorily to the male stratum but a model for the female stratum fitted, separate models were fitted to female strata and age specific male strata (males 15-24, males 25-34, males 35-64). Out of 32 Councils: 3 estimates with simple female and age specific male strata, were obtained.
8. For women - if no models fitted satisfactorily to the female stratum but a model for the male stratum fitted, separate models were fitted to male strata and age specific female strata (females 15-24, females 25-34, females 35-64). Out of 32 Councils: No estimates with simple male and age specific female strata, were obtained.
9. If all above failed, age strata were fitted (age 15-24, age 25-34, age 35-64). Out of 32 Councils: 4 estimates with simple age specific strata were obtained.
10. Narrower age bands were fitted (6 male age groups and 6 female age groups). Out of 32 Councils: 1 estimate using narrow age bands was obtained.
11. If all the above failed, more complex models were investigated by fitting all of the 113 models, ranging from a model with main effects only to a model with four 3-way interactions. Out of 66 strata, 2 strata (Glasgow males 35-39 and Perth & Kinross males 25-34) with estimates from more complex models were obtained.
12. When more complex models were fitted and resulted in unreasonable estimates, estimates from more simple models were used. This was the case in Perth & Kinross for males 25-34.

## **A2 – Advisory Group Membership**

### **Scottish Government**

Dr Julie Carr, Social Researcher, Justice Analytical Services  
John Somers, Policy Officer, Drugs Policy Unit  
Ian Johnson, Head of Safer Communities Analytical Unit, Justice Analytical Services  
Gareth Brown, Health Protection Team lead on BBV and injecting  
Sandra Campbell, Statistician, Justice Analytical Services  
Gillian Russell, Deputy Director, Drugs and Community Safety

### **ISD Scotland**

Lorna Jackson, Head of Programme for Substance Misuse  
Adam Redpath, Project Lead

### **Social Work Criminal Justice**

Rosemary White, Addiction Co-ordinator

### **Police**

Detective Inspector Tommy Crombie, National Drugs Co-ordinator, Scottish Crime & Drug Enforcement Agency

### **Health Protection Scotland and Strathclyde University**

Dr. Sharon Hutchinson, Analytical Epidemiologist

### **University of Glasgow**

Dr Gordon Hay, Senior Research Fellow

### **Public Health**

Jim Sherval, Specialist in Public Health Medicine, NHS Lothian

### **University of Bristol**

Dr Matthew Hickman, Reader, Department of Social Medicine

### **Alcohol and Drug Partnerships**

Ian Smillie, Perth and Kinross ADP  
Nicholas Smith, City of Edinburgh ADP  
Julie Murray, Borders ADP

### **UK Focal Point on Drugs**

Alan Lodwick, Head of UK Focal Point, Department of Health  
Colin Taylor

**A3 – Publication Metadata (including revisions details)**

<b>Metadata Indicator</b>	<b>Description</b>
Publication title	Estimating the National and Local Prevalence of Problem Drug Use in Scotland 2009/10
Description	The report contains estimates of the prevalence of problem drug use (opiates and benzodiazepines) in 2009/10 for council, Alcohol and Drug Partnership (ADP), health board (HB), and police force areas in Scotland.
Theme	Health and Social Care
Topic	
Format	PDF report with Excel tables
Data source(s)	Scottish Drug Misuse Database, SMR01 and SMR04, Social Enquiry Reports, Police data
Date that data is acquired	February 2011
Release date	29 <sup>th</sup> November 2011
Frequency	As commissioned
Timeframe of data and timeliness	The timeframe for this publication is April 2009 to March 2010. The publication is considered timely as there have been no delays.
Continuity of data	Data is considered comparable with the previous report produced by University of Glasgow.
Revisions Statement	Revisions are not planned for this data.
Revisions relevant to this publication	None.
Concepts and definitions	See main report
Relevance and key uses of the statistics	Relevant to understanding extent of problem drug use in Scotland. Statistics will be used for policy making and service planning.
Accuracy	Methods and final report signed off by Advisory Group. Report has been peer reviewed.
Completeness	Data collected from all areas of Scotland in line with previous studies.
Comparability	Data is considered comparable with previous studies produced by University of Glasgow. Data is not directly comparable outwith Scotland.
Accessibility	It is the policy of ISD Scotland to make its web sites and products accessible according to published guidelines. See attached link for further details: <a href="http://www.isdscotland.org/About-ISD/Accessibility/">http://www.isdscotland.org/About-ISD/Accessibility/</a>

Coherence and clarity	The report is available as a PDF file with tables clearly linked for ease of use.
Value type and unit of measure	Estimated number and percentage of individuals with problem drug use
Disclosure	There is considered to be a low risk of disclosure.
Official Statistics designation	Official Statistics
Official Statistics	Not yet undergoing assessment
Last published	6 <sup>th</sup> October 2009
Next published	To be confirmed.
Date of first publication	September 2001
Help email	<a href="mailto:Laurawood1@nhs.net">Laurawood1@nhs.net</a>
Date form completed	15/11/2011



## **A4 – Early Access details (including Pre-Release Access)**

### **Pre-Release Access**

Under terms of the "Pre-Release Access to Official Statistics (Scotland) Order 2008", ISD are obliged to publish information on those receiving Pre-Release Access ("Pre-Release Access" refers to statistics in their final form prior to publication). The standard maximum Pre-Release Access is five working days. Shown below are details of those receiving standard Pre-Release Access and, separately, those receiving extended Pre-Release Access.

Standard Pre-Release Access:

Scottish Government Justice Department

NHS Board Chief Executives

NHS Board Communication leads

Alcohol and Drug Partnerships (varied access up to maximum of 5 days)

### **Extended Pre-Release Access**

Extended Pre-Release Access of 8 working days is given to a small number of named individuals in the Scottish Government Health Department (Analytical Services Division). This Pre-Release Access is for the sole purpose of enabling that department to gain an understanding of the statistics prior to briefing others in Scottish Government (during the period of standard Pre-Release Access).

Scottish Government Justice Department (Analytical Services Division)

These statistics will also have been made available to those who needed access to help quality assure the publication:

Scottish Government Justice Department

Advisory Group Members

Peer Reviewers (University of Bristol and University of Manchester)