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Estimating the National and Local Prevalence of Problem Drug Misuse in Scotland

Executive Report

September 2001

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Executive Summary

In this report we outline the results of the first study undertaken to provide estimates of the prevalence of problematic drug misuse at both a national and a local level within Scotland. Estimates of the prevalence of problematic drug misuse (defined as use of opiates and benzodiazepines) have been provided for every Council area, Drug Action Team area, Health Board area and Police Force area within Scotland. As well as estimating the prevalence of problematic drug misuse for the year 2000, we have also sought to provide an estimate of the prevalence of drug injecting within Scotland and the number of drug injectors who are hepatitis C virus positive.

The prevalence estimation research we have undertaken has utilised the capture-recapture methodology. This method has been identified by the European Monitoring Centre for Drugs and Drug Addiction as the most appropriate method for obtaining estimates of the prevalence of problematic drug misuse.

In terms of the national prevalence of problematic drug misuse we estimate that there were 55,800 individuals misusing opiates and benzodiazepines in the year 2000. The minimum number of individuals already known to drug treatment, police and other agencies as using these drugs in the year 2000 is 22,795. The previous best guess as to the extent of problematic drug misuse within Scotland has placed the figure at around 30,000. In general the male to female ratio for problematic drug misuse is 3:1.

In terms of the local estimates we have identified problematic drug misuse in every Council area, Drug Action Team area, Health Board area and Police Force area within Scotland. As one would expect, higher prevalence levels have been identified in the non-rural Council areas compared to the rural Council areas. The prevalence of problematic drug misuse by Council area has ranged from 3.9% of the 15-54 year old population in Glasgow through to 0.3% in the Orkney Isles. The prevalence of problematic drug misuse by Drug Action Team area by contrast has ranged from a high of 3.5% of those aged 15 to 54 in Dundee to a low of 0.3% in the Orkney Isles. Greater Glasgow is the Health Board area with the highest prevalence of problematic drug misuse estimated as being 3.1% of the 15 to 54 age range. Finally, an estimated 53% of problematic drug misusers are resident within the Strathclyde Police Force area.

In terms of drug injecting we estimate that 22,805 people were injecting opiates and benzodiazepines in 2000. The highest prevalence of drug injecting was identified in the Grampian and Greater Glasgow Health Board areas (1.4% of the 15-54 population).

By combining the injecting prevalence estimates with information on hepatitis C virus (HCV) infection prevalence in injector populations, we estimate that there are approximately 10,000 HCV infected current injectors in Scotland (0.4% of the total 15-54 population).

Analysis of the prevalence rates identified within Scotland shows the close association that exists in most areas, although not all, between problematic drug misuse and the proportion of the population in receipt of income support. Whilst the latter may be an imperfect measure of social exclusion, the association suggests a link between drug use and at least one measure of social exclusion. There is a need to combine efforts at tackling drug misuse within Scotland with broader efforts at tackling social exclusion.

Whilst it will only be with successive prevalence estimation studies that we will be able to assess whether problematic drug misuse is increasing, decreasing, or remaining stable within Scotland, we have been able to undertake a limited comparison with the results of previous prevalence estimation research carried out in a small number of areas within Scotland. These comparisons indicate that within some parts of Scotland prevalence of problematic drug misuse has remained reasonably stable over the last few years whilst in other areas it has increased.

We recommend undertaking similar prevalence estimation research on a three-yearly cycle in order to provide evidence as to the changing nature and extent of problematic drug misuse within Scotland. However, in those areas where the situation may be more rapidly changing, prevalence estimation should be undertaken on a more frequent basis.

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1 Introduction

In this report we outline the results of research carried out jointly by the Centre for Drug Misuse Research at the University of Glasgow and the Scottish Centre for Infection and Environmental Health to provide national and local estimates of the prevalence of problematic drug misuse within Scotland. There is a clear commitment within the Scottish and UK drug strategies to base policy and service provision in relation to drug misuse on evidence (Scottish Office, 1999; President of the Council, 1999). Clearly, obtaining information on the prevalence of drug misuse is a key part of the evidence that is needed to underpin policy and service provision in this area. However, obtaining information on the prevalence of a hidden and stigmatised activity is a far from easy task. Whilst it is possible to obtain information on the prevalence of cannabis use through the Scottish Crime Survey (Anderson and Frischer, 1997), a general population survey would be inappropriate for estimating the prevalence of more problematic forms of drug misuse e.g. heroin use. For this reason we have used what has come to be known as the capture-recapture method for estimating the prevalence of problematic drug misuse within Scotland. The capture-recapture method has been used in previous Scottish drug misuse prevalence studies and has been identified as the most appropriate means for estimating the prevalence of problem drug misuse at the local level by the European Monitoring Centre for Drugs and Drug Addiction.

The method involves collating information on drug misusers in contact with a wide range of agencies to provide a minimum enumeration of the known drug misusing population. Statistical methods are then applied to these collated data to obtain an estimate of the size of the hidden population, which can be combined with the known data to provide an estimate of the total prevalence of drug misuse. There are a number of benefits associated with this method. First, its use is not dependent upon individuals self-reporting the details of their drug use to a researcher. Second, in being based upon clear principles of data collection and analysis it is possible to replicate the research in successive years to provide comparable estimates of the changing level of drug prevalence across different years. Third, and again as a result of the fact that the method is based upon agreed principles and procedures, it can be applied across a range of local areas to enable comparisons to be made as to the nature and extent of problematic drug misuse in different parts of the country. Fourth, the method allows for estimates of drug misuse prevalence to be produced which have a 95% confidence interval around them. By quoting a single figure for the prevalence of drug misuse it is possible to present a spurious degree of precision in the estimation of an activity which by its very nature is very hard to estimate. It is more helpful to provide an estimate of the prevalence of problematic drug misuse which also includes the range

within which the true estimate is likely to be found and this is what we have done here.

In this Executive Report we outline the estimated prevalence of opiate and / or benzodiazepine misuse in Scotland. We have focussed upon these drugs in particular because they are the drugs most commonly associated with problematic drug misuse within Scotland. In our estimate of the prevalence of problematic drug misuse we have also included individuals who are receiving methadone on either a maintenance or a reducing basis. Our reason for this is because these individuals are being prescribed methadone because of their dependence upon opiate based drugs and for this reason we felt that it would have been misleading to remove these individuals from the present research. As well as providing a national estimate of the prevalence of opiate and benzodiazepine misuse in Scotland, we have also provided estimates for each and every Council area, Health Board area, Drug Action Team area and Police Force area within Scotland for the calendar year 2000. Although at one level it may seem confusing to provide estimates of drug misuse prevalence for so many different areas, these are all important boundaries for each of the organisations which they represent. Finally, in this report we provide estimates of the prevalence of drug injecting in Scotland and the likely number of drug injectors who may be hepatitis C virus (HCV) positive. The reason why we have focussed on these two areas in particular is because many of the greatest harms associated with drug misuse are the result of drug injecting and because HCV is probably the single greatest health risk which drug injectors now face within Scotland.

In separate reports we provide a detailed account of the statistical methods used within this research and a series of local area reports for each Drug Action Team area within Scotland.

2 Methods

In this section we provide a description of the research methods used to generate estimates of the prevalence of drug misuse in Scotland. In a separate report we are providing a detailed description of the capture-recapture methodology and it is not our intention here to repeat the technical detail that is contained within that report. We provide here only a general description of the research methods used.

The capture-recapture method was originally developed over a century ago to estimate the size of animal populations. It was adapted in the 1940s by demographers to count human populations and then further extended by epidemiologists in the 1970s to study the prevalence of disease. Since the 1980s the methodology has been applied to estimating hidden populations such as drug users, the homeless or prostitutes. It is now the standard method used to correct for under-ascertainment in diabetes registers and to examine the precision of the

US census (IWGDMF, 1995), and is increasingly recognised as the best method to estimate the prevalence of problem drug misuse.

Within the drug misuse field, the first researchers to apply the capture-recapture method were Hartnoll et al (1985) who were undertaking research to estimate the prevalence of opiate use in an area of London. The research team collected data concerning opiate users who had attended a drug clinic and those who had been admitted to a hospital for infectious diseases as a result of their drug use. By comparing these sources of data they found that 20%, or a fifth, of the hospital sample had also attended the drug clinic. The researchers realised that the total number of opiate users could be estimated as being five times the number who attended the drug clinic. Thus in that study then the size of the hidden population of drug users was estimated by merging two existing sources of data and examining the overlap between them.

That simple example masks some of the problems of the two-sample capture-recapture methodology. If those who were attending the clinic were more likely to have been admitted to the hospital then the resultant figure would be an underestimate. In other words, if there had been some kind of relationship between data sources the estimate would almost certainly have been biased. Unfortunately it is often unclear if such relationships, or interactions, are present and therefore the validity of estimates obtained when examining two data sources is often questionable. More recent applications of the capture-recapture methodology however have compensated for this problem by employing three or more sources. The extra information present in the additional samples can be used within a statistical model to examine whether or not interactions are present between data sources. If any interactions are found then the estimate of the total population size can be adjusted accordingly. In this research we have been able to apply the capture-recapture method with three or more samples across Scotland.

3 Data Sources

In this section we provide a description of the data sources employed in this study. Following this we will outline the principle method by which these data were analysed to provide an estimate of the prevalence of problematic drug use in Scotland.

3.1 Scottish Drug Misuse Database

The most substantial data source we have drawn upon in this research is the Scottish Drug Misuse Database. This database obtains anonymised demographic data on individuals who are in contact with a range of drug services, including non-statutory agencies and general practitioners. As the database currently collates only information on new contacts at agencies, it cannot on its own be used to provide

information on the total number of individuals attending drug services in Scotland. The data on drug users held on the Drug Misuse Database was therefore augmented by data held by a wide range of other drug treatment agencies.

After discussions with Drug Development Officers across Scotland, relevant drug agencies were approached and asked to contribute data for the research project. Where necessary, trained data collectors from the Centre for Drug Misuse Research were used to extract the required information manually. The following drug agencies, listed by Health Board area, supplied anonymised data concerning their current clients. Although this list does not represent every single drug treatment agency within Scotland, it is worth noting that the agencies listed provided over 90% of the agency returns to the Scottish Drug Misuse Database in 2000.

Argyll & Clyde
Alternatives, West Dunbartonshire Community Drug Services, Dumbarton
Inverclyde Community Drug Team, Greenock
Inverclyde Drug Problem Service, Ravenscraig Hospital, Greenock
Johnstone Social Work Area Team
Lomond Drug Problem Service, Dumbarton Joint Hospital
Outreach Service, Renfrew Substance Abuse Resource, Barrhead
Red Tower, Helensburgh
Renfrew Substance Abuse Resource, Paisley
Social Work Department, Alexandria Area
Social Work Department, Dumbarton Area
Social Work Department, Renfrew

Borders
Big River Project, Turning Point, Galashiels
Borders Community Addictions Team, Galashiels
Borders Counselling on Alcohol & Drugs, Galashiels

Dumfries & Galloway
Cameron House / Crichton Royal Hospital, Dumfries

Fife
Central Fife Substance Misuse Team, Kirkcaldy
Drug & Alcohol Project, Levenmouth
Fife Community Drug Team, Buckhaven
NE Fife Substance Misuse Team, Cupar
West Fife Community Drug Project, Dunfermline
West Fife Substance Misuse Team, Dunfermline

Forth Valley
Community Alcohol & Drug Service, Bannockburn

Grampian
Drugs Action, Aberdeen
Needle Exchange, Fraserburgh
Substance Misuse Service, Royal Cornhill Hospital, Aberdeen

Greater Glasgow
Aberlour Childcare Trust, Glasgow
Addictions Clinic, Leverndale Hospital, Glasgow
Castlemilk Drugs Project, Glasgow
Clydebank Social Work Department
Community Drug & Alcohol Service, Gartnavel Royal Hospital, Glasgow
Drug Project, Southern General Hospital, Glasgow
Drumchapel Addiction Services, Glasgow
East Dunbartonshire Addiction Team, Kirkintilloch
East End Addiction Services, Glasgow
East Renfrewshire Substance Misuse Team, Newton Mearns
Easterhouse Drugs Initiative, Glasgow
Eshara Project, Glasgow
Gartnavel Royal Hospital, Glasgow
Glasgow Drug Problem Service
Glasgow Drug Crisis Service
Gorbals Addiction Services, Glasgow
Govan Addiction Services, Glasgow
Maryhill Addiction Services, Glasgow
Molendinar Drug Services, Glasgow
NW2 Social Work Department, Glasgow
Pollok Addiction Services, Glasgow
Possil Drug Project, Glasgow
Rutherglen Substance Misuse Team
Shawbridge Alcohol & Drug Service, Glasgow
Springburn Youth Alcohol & Addiction Team, Glasgow
The Orchards, Glasgow

Highland
Osprey House, Inverness

Lanarkshire
Addiction Advisory Centre, Airdrie
Bellshill Cross Addiction Centre
Community Addiction Team, Torrance House, Motherwell
Lanarkshire Drug Problem Service, Kirkwood Clinic, Coatbridge
Rushes, Bellshill
Shield Centre, Wishaw
Social Work Substance Misuse Services, Blantyre, Clydesdale, East Kilbride, Hamilton & Larkhall

Lothian
Bethany Addiction Team, Edinburgh
Brenda House, Aberlour Childcare Trust, Edinburgh

Castle Drugs Project, Edinburgh
Community Care Resource Team, Social Work Department, Edinburgh
Community Drug Problem Service, Edinburgh
Links Project, Edinburgh
Mid & East Lothian Drugs (MELD), Dalkeith
North Edinburgh Drug Advice Centre, Edinburgh
South West Locality Clinic, Edinburgh
Turning Point, Forrest Road, Edinburgh
Turning Point, Leith, Edinburgh
West Lothian Drug & Alcohol Service, Livingston

Shetland
Shetland Community Drugs Team, Lerwick

Tayside
Drug & Alcohol Team, Social Work Department, Angus
Drug & Alcohol Team, Social Work Department, Dundee
Perth Drug & Alcohol Team, Social Work Department
Tayside Drug Problems Service, Dundee

Although some needle exchanges collate sufficient information on their clients to enable their inclusion within a capture-recapture analysis, the provision of needle exchanges across Scotland is inconsistent; therefore needle exchange data have not been used within these analyses. The data from needle exchanges which contribute to the Scottish Drug Misuse Database have not been included in the combined Scottish Drug Misuse Database / Agency data source.

Within each Council area, the data from all contributing treatment agencies were combined with the agency returns to the Scottish Drug Misuse Database to obtain a single data source, which was then reviewed to remove erroneous or incomplete data records, those which did not meet the case definition of the study (the use of opiates or benzodiazepines), and to eliminate multiple occurrences of a unique individual. Along with data from GPs, these data represent a minimum assessment of the number of drug users in treatment who are resident in each Council area.

3.2 General Practitioners

In addition to the returns from drug treatment agencies, the Scottish Drug Misuse Database collates information from GPs on patients reporting drug misuse. Data on opiate or benzodiazepine users were extracted from the GP returns to the database to construct a GP data source for each Council area.

3.3 Social Enquiry Reports

Social Enquiry Reports are compiled by Social Work or corresponding departments to help in assessing the most suitable form of sentencing where an individual is being processed by the criminal justice system. As the report is written in relation to the individual's offending behaviour and a particular crime, any drugs that an individual is using may not be noted if the Social Worker does not feel that this is related to the case. This data source is, however, particularly relevant in identifying drug users who have committed acquisitive crime and who may be less likely to be contacting drug treatment agencies. All 32 Councils granted the research project access to Social Enquiry Reports and over 30,000 reports were screened by trained data collectors. Thus for each Council area, a Social Enquiry Report data source was compiled which contained information on those who had the use of opiates or benzodiazepines noted within a report.

3.4 Police

Data on individuals who had been detained under the Misuse of Drugs Act were made available by all of Scotland's Police Forces. Although many individuals were detained in connection with cannabis offences, information on individuals detained because of opiate or benzodiazepine offences was collated within a Police source for each Council area.

3.5 Scottish Centre for Infection and Environmental Health

The Scottish Centre for Infection and Environmental Health (SCIEH) collates information on requests for serological testing for HCV infection. Drug injecting or needle sharing could be noted as a risk factor and therefore a list of drug injectors was constructed which was used to estimate the prevalence of drug injecting for each Health Board area of Scotland.

3.6 Data Collection Protocol

From all of the above agencies, a common set of data was requested;

- forename initial,
- surname initial,
- date of birth,
- gender,
- postcode sector.

Information was also requested, where it was available, on whether or not an individual was a current drug injector and what drugs were commonly used. Due to data protection and confidentiality concerns, two Police Forces did not supply forename initial or postcode sector;

however these Forces allocated the Health Board and Council of residence to individuals before supplying the data.

In the case of NHS Ayrshire and Arran, no data were provided relating to drug treatment agency contacts as a result of concerns on the part of staff within the Ayrshire and Arran Primary Care Trust regarding data protection.

4 Analysis

In the analysis stage of the research, what one is attempting to do is to apply statistical methods to describe the pattern of overlap between different sources of data on the known drug misusing population and then apply this knowledge to assess the likely size of the hidden problematic drug misusing population. The estimate of the total drug misusing population is arrived at by combining the minimum enumeration of known drug misusers and the statistically estimated hidden population.

Within the context of the present study, it was necessary to undertake separate analyses of the available data for each Council area to analyse the overlaps between these data sources to produce a series of estimates of the hidden drug misusing population for each Council area. The process of arriving at a national estimate involved summing all of the previous local estimates. The unit of analysis in this research has therefore been the Council area. On the basis of these Council area estimates, it has been possible to produce estimates for the differently configured Health Board areas, Drug Action Team areas and Police Force areas in Scotland. In addition, separate analyses have also needed to be undertaken within those Council areas straddling Health Board boundaries (East Renfrewshire, North Lanarkshire, South Lanarkshire and West Dunbartonshire).

For most of the Council areas, the estimates were derived using four separate sources of data (treatment, GPs, police and social work). In the case of Ayrshire and Arran, as a result of the non-provision of treatment data, it was necessary to undertake the prevalence estimation exercise using three data sources. In the Eilean Siar and Orkney Isles Council areas, there were insufficient data to perform capture-recapture analyses. Therefore the prevalence estimates in those areas were obtained by applying the known to unknown ratio of problem drug users found elsewhere in Scotland to both of those areas.

Data have been collected only on problem drug users aged 15 or over, as the remit of the research was to estimate the prevalence of problem drug use in adults. The prevalence estimates contained in this report relate to the calendar year 2000.

The following figures present the minimum total of known problem drug users in each area combined with our estimates of the hidden numbers of drug users, expressed as a percentage of the 15 to 54 year old age range in each area. The population figures refer to mid-year estimates for 2000 (© Crown copyright, data supplied by General Register Office for Scotland).

5 Results

In this section we present the information on both the national and local estimated prevalence of problematic drug misuse within Scotland. We provide a national estimate first, followed by separate estimates for each Council area, Drug Action Team area, Health Board area and Police Force area. At each point where we present the local prevalence information, we provide a graphical representation of the data on a map of Scotland, followed by a bar chart and a table summarising the minimum known drug using population and the prevalence estimates.

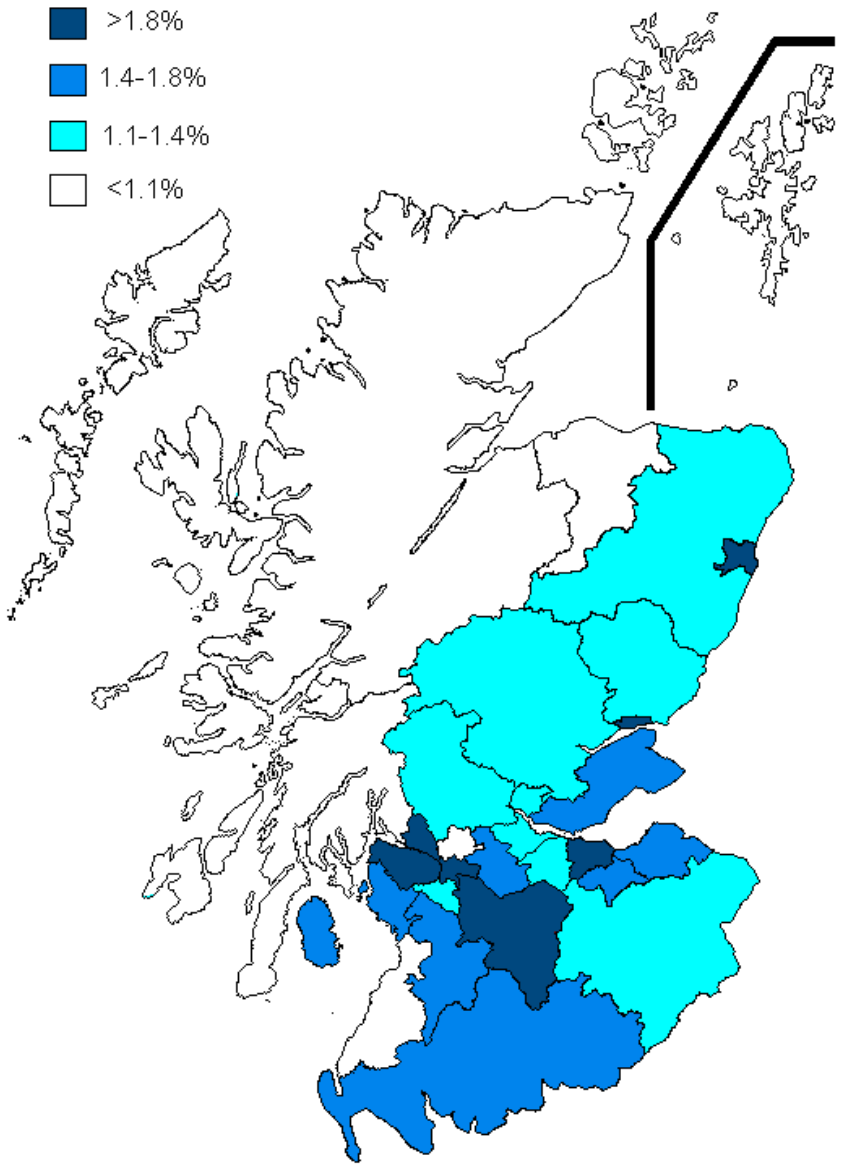
5.1 National Prevalence

To obtain a national estimate of the prevalence of problematic drug misuse in the year 2000, we have summed the local estimates for each of the 32 Council areas in Scotland. On this basis, we estimate that there are 55,800 individuals who are misusing opiates or benzodiazepines within Scotland. The 95% Confidence Interval (CI) attached to this estimate is 43,664 to 78,443. These figures correspond to a prevalence rate of 2% of the Scottish population aged between 15 and 54 (95% CI 1.5-2.7%). The minimum number of drug users identified as being in contact with services or identifiable from criminal justice sources is 22,795 (40% of the estimated total).

5.2 Council Areas

Figure 1 summarises the estimates of the prevalence of problematic drug misuse for each of the 32 Council areas in Scotland.

Figure 1 Estimated prevalence of problem drug use by Council Area



In Figures 2 and 3 we have summarised the information on the prevalence of problematic drug misuse by differentiating between the rural and non-rural Council areas. Within this research we classify a Council area as rural if it has a population density of less than one person per hectare (Scottish Executive, 2000*a*).

Figure 2 Estimated prevalence of problem drug use by Council Area (non rural areas)

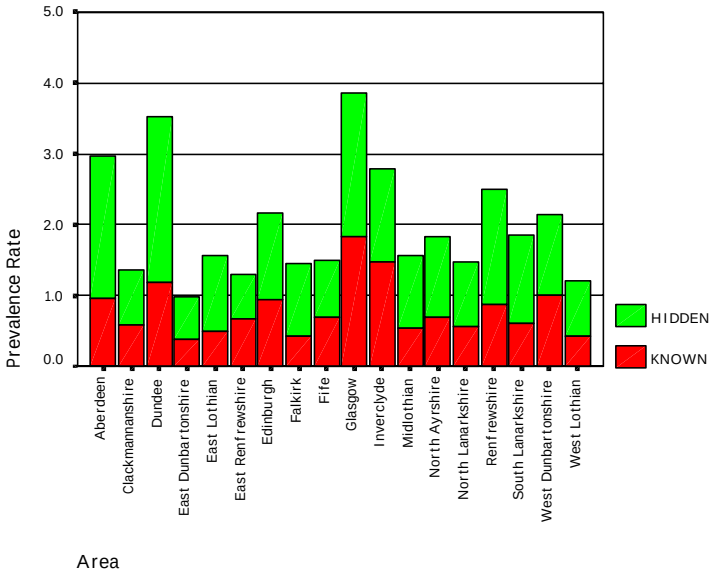
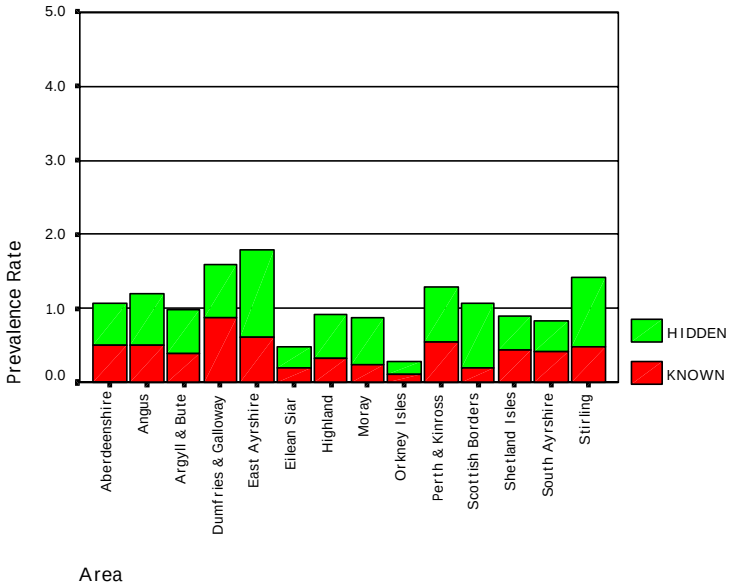


Figure 3 Estimated prevalence of problem drug use by Council Area (rural areas)



One can see here that whilst the prevalence of problematic drug misuse is clearly lower in the rural as opposed to the non-rural areas, problematic drug misuse is occurring in both rural and non-rural areas.

Table 1 summarises the information on drug misuse prevalence upon which the previous bar charts and map were based.

Table 1 Estimates of the number of problem drug users by Council Area

Area	Known	Total Estimate		Population (age 15-54)	Prevalence	
		n	95% CI		%	95% CI
Aberdeen City	1,194	3,645	2,659-5,965	123,240	3.0	2.2-4.8
Aberdeenshire†	639	1,372	1,091-1,808	128,371	1.1	0.8-1.4
Angus†	291	702	558-916	58,395	1.2	1.0-1.6
Argyll & Bute†	186	460	334-684	46,626	1.0	0.7-1.5
Clackmannanshire	155	362	255-566	26,575	1.4	1.0-2.1
Dumfries & Galloway†	651	1,179	1,034-1,368	73,642	1.6	1.4-1.9
Dundee City	899	2,700	1,828-4,523	76,509	3.5	2.4-5.9
East Ayrshire†	399	1,171	927-1,525	64,909	1.8	1.4-2.3
East Dunbartonshire	234	605	450-856	62,162	1.0	0.7-1.4
East Lothian	239	779	551-1,180	49,422	1.8	1.1-2.4
East Renfrewshire	329	641	505-887	49,834	1.3	1.0-1.8
Edinburgh, City of	2,536	5,872	4,754-7,573	271,103	2.2	1.8-2.8
Eilean Siar†	27	65		13,775	0.5	
Falkirk	346	1,163	716-2,351	80,324	1.4	0.9-2.9
Fife	1,348	2,867	2,355-3,636	192,389	1.5	1.2-1.9
Glasgow City	6,514	13,788	12,196-15,875	355,788	3.9	3.4-4.5
Highland†	358	1,029	644-2,073	111,033	0.9	0.6-1.9
Inverclyde	680	1,280	1,039-1,674	45,996	2.8	2.3-3.6
Midlothian	246	729	452-1,450	46,673	1.6	1.0-3.1
Moray†	107	398	247-731	45,533	0.9	0.5-1.6
North Ayrshire	518	1,384	1,109-1,781	75,520	1.8	1.5-2.4
North Lanarkshire	1,026	2,898	2,236-3,960	185,297	1.6	1.2-2.1
Orkney Isles†	12	29		10,163	0.3	
Perth & Kinross†	385	902	623-1,486	69,965	1.3	0.9-2.1
Renfrewshire	838	2,441	1,773-3,598	97,614	2.5	1.8-3.7
Scottish Borders†	106	585	297-1,503	54,800	1.1	0.5-2.7
Shetland Isles†	54	109	66-237	12,359	0.9	0.5-1.9
South Ayrshire†	254	503	415-626	59,862	0.8	0.7-1.0
South Lanarkshire	1,062	3,220	2,305-4,931	172,907	1.9	1.3-2.9
Stirling†	229	683	392-1,599	47,878	1.4	0.8-3.3
West Dunbartonshire	531	1,123	924-1,408	52,506	2.1	1.8-2.7
West Lothian	402	1,116	835-1,579	92,512	1.2	0.9-1.7
SCOTLAND	**22,795**	**55,800**	**43,664-78,443**	**2,853,682**	**2.0**	**1.5-2.7**

† Councils classified as rural within this research. In the Eilean Siar and Orkney Isles Council areas, there were insufficient data to perform capture-recapture analyses. Therefore the prevalence estimates in these areas were obtained by applying the known to unknown ratio of problem drug users found elsewhere in Scotland to the number of known drug users in those areas.

As one might have expected, the highest prevalence rates amongst the non-rural Council areas are found in the major urban centres. The highest prevalence rate is Glasgow City at 3.9% of the population aged 15 to 54 (95% CI 3.4-4.5%). The next highest is Dundee City at 3.5%

(95% CI 2.4-5.9%). The third highest is Aberdeen City at 3.0% (95% CI 2.2-4.8%).

Although many people would associate Scotland's drug problem with the two cities of Glasgow and Edinburgh, it is striking that Aberdeen City has the third highest prevalence in Scotland behind Dundee. Edinburgh City, which featured prominently as a result of the rapid rise in HIV infection amongst its injecting drug using population, has the sixth highest prevalence rate of problematic drug misuse at 2.2%. Three of the Council areas in the Argyll and Clyde Health Board area have prevalence rates above the Scottish average, in particular high levels of drug misuse are to be found in Inverclyde (2.8%) and Renfrewshire (2.5%). This clearly demonstrates that problematic drug misuse in Scotland has extended beyond the major urban centres.

The prevalence of problematic drug misuse overall is lower in the rural Council areas and in only two cases does it exceed 1.5%; Dumfries and Galloway (1.6%, 95% CI 1.4-1.9%) and East Ayrshire (1.6%, 95% CI 1.4-2.3%). Apart from Eilean Siar and Orkney, the remaining rural Council areas have prevalence rates around 1% of the population aged 15 to 54.

5.3 Drug Action Team Areas

Drug Action Teams have become the major administrative entities for the co-ordinated response to drug misuse within the United Kingdom. While some are mapped along Health Board boundaries, other Drug Action Teams have divided in accordance with Council boundaries. In Figures 4 and 5 we present graphical representation of drug misuse prevalence across the 22 Scottish Drug Action Team areas.

Figure 4 **Estimated prevalence of problem drug use by Drug Action Team Area**

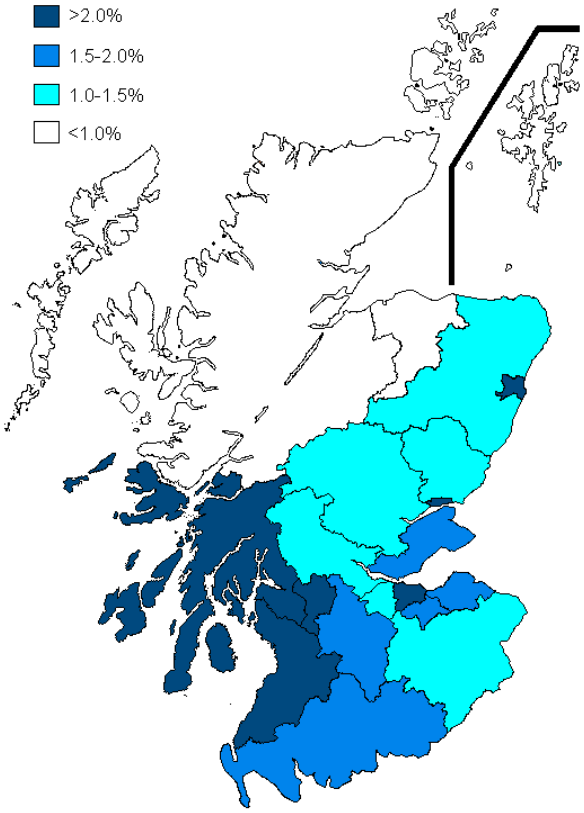


Figure 5 **Estimated prevalence of problem drug use by Drug Action Team Area**

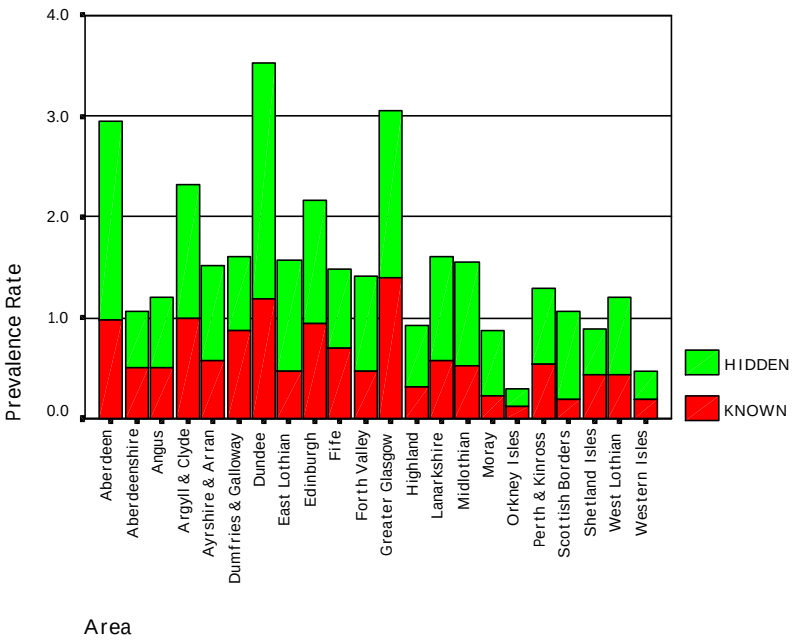


Table 2 Estimates of the number of problem drug users by Drug Action Team Area

Area	Known	Total Estimate		Population (age 15-54)	Prevalence	
		n	95% CI		%	95% CI
Aberdeen City	1,194	3,645	2,659-5,965	123,240	3.0	2.2-4.8
Aberdeenshire	639	1,372	1,091-1,808	128,371	1.1	0.8-1.4
Angus	291	702	558-916	58,395	1.2	1.0-1.6
Argyll & Clyde	2,324	5,405	4,183-7,431	231,543	2.3	1.8-3.2
Ayrshire & Arran	1,171	3,058	2,451-3,932	200,291	1.5	1.2-2.0
Borders	106	585	297-1,503	54,800	1.1	0.5-2.7
Dumfries & Galloway	651	1,179	1,034-1,368	73,642	1.6	1.4-1.9
Dundee City	899	2,700	1,828-4,523	76,509	3.5	2.4-5.9
East Lothian	239	779	551-1,180	49,422	1.6	1.1-2.4
Edinburgh City	2,536	5,872	4,754-7,573	271,103	2.2	1.8-2.8
Fife	1,348	2,867	2,355-3,636	192,389	1.5	1.2-1.9
Forth Valley	730	2,208	1,363-4,516	154,777	1.4	0.9-2.9
Greater Glasgow	7,248	15,975	13,797-19,069	519,332	3.1	2.7-3.7
Highland	358	1,029	644-2,073	111,033	0.9	0.6-1.9
Lanarkshire	1,828	5,076	3,782-7,373	317,855	1.6	1.2-2.3
Midlothian	246	729	452-1,450	46,673	1.6	1.0-3.1
Moray	107	398	247-731	45,533	0.9	0.5-1.6
Orkney Isles	12	29		10,163	0.3	
Perth & Kinross	385	902	623-1,486	69,965	1.3	0.9-2.1
Shetland Isles	54	109	66-237	12,359	0.9	0.5-1.9
West Lothian	402	1,116	835-1,579	92,512	1.2	0.9-1.7
Western Isles	27	65		13,775	0.5	
SCOTLAND	**22,795**	**55,800**	**43,664-78,443**	**2,853,682**	**2.0**	**1.5-2.7**

In the Orkney Isles and Western Isles Drug Action Team areas, there were insufficient data to perform capture-recapture analyses. Therefore the prevalence estimates in these areas were obtained by applying the known to unknown ratio of problem drug users found elsewhere in Scotland to the number of known drug users in those areas.

We see here that the Dundee Drug and Alcohol Action Team area has the highest prevalence rate at 3.5% (95% CI 2.4-5.9%), followed by the Greater Glasgow Drug Action Team area at 3.1% (95% CI 2.7-3.7%). Aberdeen City Drug Action Team area follows closely behind with a prevalence rate of 3.0% (95% CI 2.2-4.8).

5.4 Health Board Areas

In the next section we look at the same prevalence information, but this time divided in accordance with Health Board area.

Figure 6 **Estimated prevalence of problem drug use by Health Board Area**

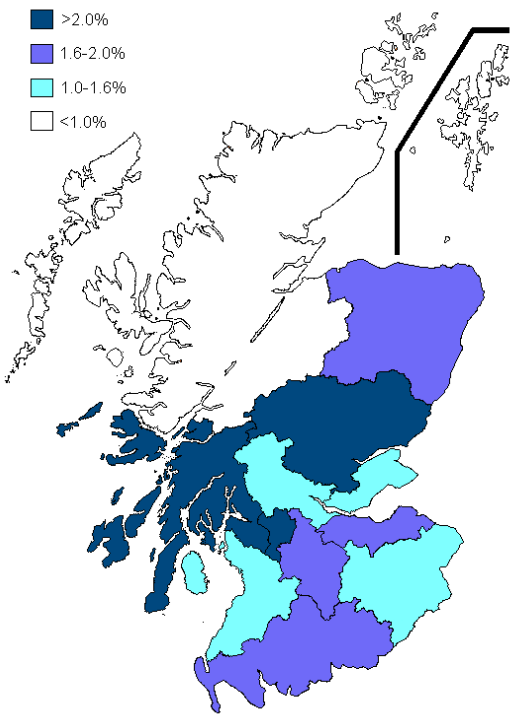


Figure 7 **Estimated prevalence of problem drug use by Health Board Area**

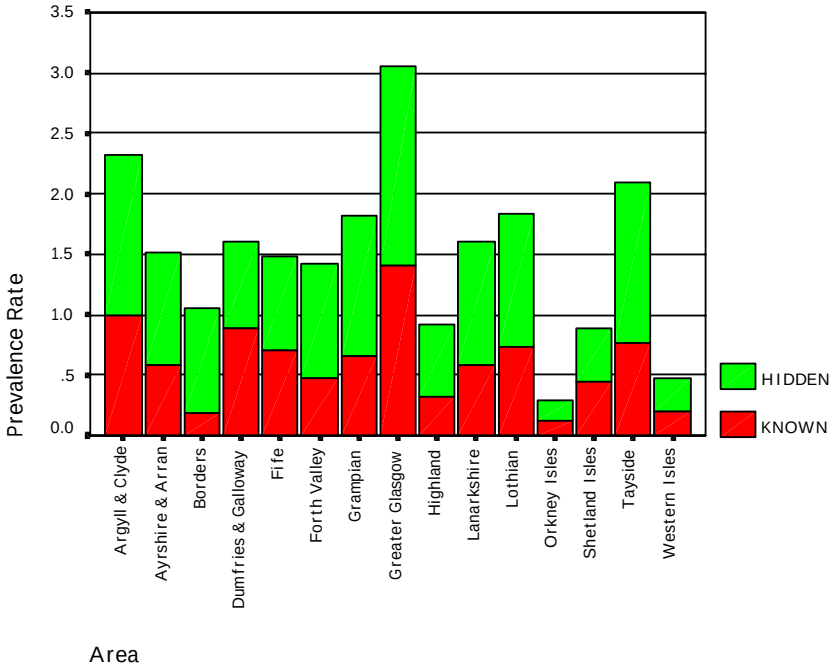


Table 3 Estimates of the number of problem drug users by Health Board Area

Area	Known	Total Estimate		Population (age 15-54)	Prevalence	
		N	95% CI		%	95% CI
Argyll & Clyde	2,324	5,405	4,183-7,431	231,543	2.3	1.8-3.2
Ayrshire & Arran	1,171	3,058	2,451-3,932	200,291	1.5	1.2-2.0
Borders	106	585	297-1,503	54,800	1.1	0.5-2.7
Dumfries & Galloway	651	1,179	1,034-1,368	73,642	1.6	1.4-1.9
Fife	1,348	2,867	2,355-3,636	192,389	1.5	1.2-1.9
Forth Valley	730	2,208	1,363-4,516	154,777	1.4	0.9-2.9
Grampian	1,940	5,415	3,997-8,504	297,144	1.8	1.3-2.9
Greater Glasgow	7,248	15,975	13,797-19,069	519,332	3.1	2.7-3.7
Highland	358	1,029	644-2,073	111,033	0.9	0.6-1.9
Lanarkshire	1,828	5,076	3,782-7,373	317,855	1.6	1.2-2.3
Lothian	3,423	8,496	6,592-11,782	459,710	1.8	1.4-2.6
Orkney Isles	12	29		10,163	0.3	
Shetland Isles	54	109	66-237	12,359	0.9	0.5-1.9
Tayside	1,575	4,304	3,009-6,925	204,869	2.1	1.5-3.4
Western Isles	27	65		13,775	0.5	
SCOTLAND	**22,795**	**55,800**	**43,664-78,443**	**2,853,682**	**2.0**	**1.5-2.7**

In the Orkney Isles and Western Isles Health Board areas, there were insufficient data to perform capture-recapture analyses. Therefore the prevalence estimates in these areas were obtained by applying the known to unknown ratio of problem drug users found elsewhere in Scotland to the number of known drug users in those areas.

By expressing the estimated number of drug misusers in each area as a percentage of the population aged 15 to 54, it is possible to make comparisons across Health Board areas. On that basis, the area with the highest prevalence rates for problematic drug misuse is Greater Glasgow at 3.1% (95% CI 2.7–3.7%). The next highest is Argyll and Clyde at 2.3% (95% CI 1.8–3.2%). The third highest is Tayside at 2.1% (95% CI 1.5-3.4%). There is a range of Health Board areas with prevalence levels between 1% and 2%; they are Lothian (1.8%), Grampian (1.8%), Dumfries and Galloway (1.6%), Lanarkshire (1.6%), Ayrshire and Arran (1.5%), Fife (1.5%), Forth Valley (1.4%) and Borders (1.1%). Four Health Board areas had prevalence rates under 1%; Highland (0.9%), Orkney Isles (0.3%), Shetland Isles (0.9%), Western Isles (0.5%).

The Health Board area with the highest number of problem drug users is Greater Glasgow, where the estimated total is 15,975, 95% confidence interval 13,797 to 19,069. The minimum known total is 7,248. The next highest area is Lothian, where the minimum total of known drug misusers is 3,423 and the estimated total is 8,496, 95% confidence interval 6,592 to 11,782. The area with the third highest total is Argyll & Clyde, with a minimum identified number of drug misusers of 2,324 and an estimated total of 5,405, 95% confidence interval 4,183 to 7,431.

5.5 Police Force Areas

Finally we present the information on drug misuse prevalence by Police Force area. Again we have constructed a map to show this information followed by a bar chart followed by a table summarising the results.

Figure 8 Estimated prevalence of problem drug use by Police Force Area

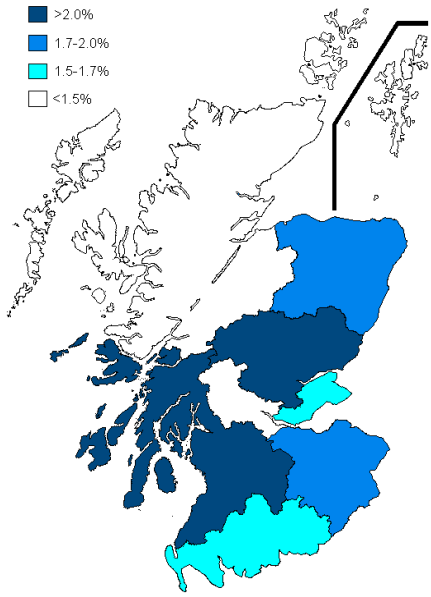


Figure 9 Estimated Prevalence of problem drug use by Police Force Area

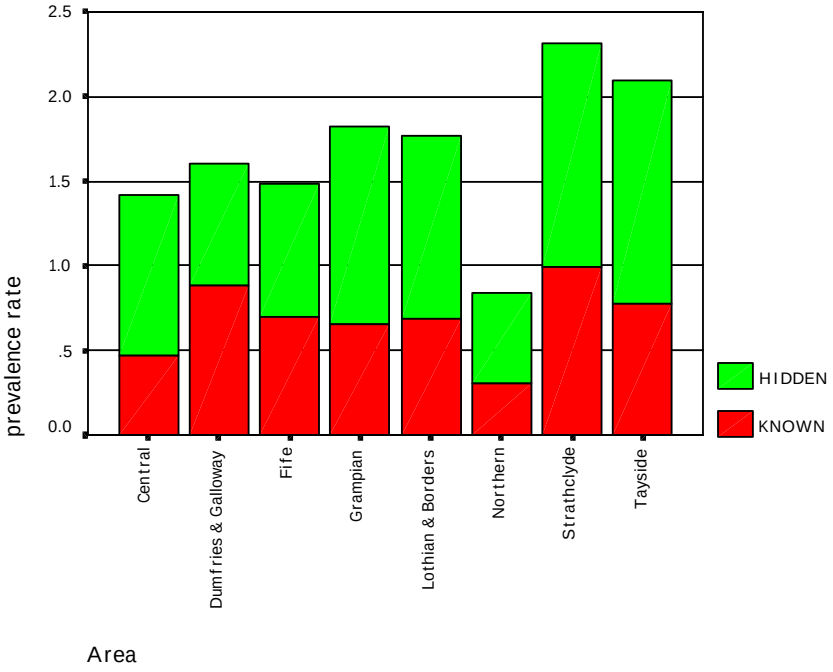


Table 4 Estimates of the number of problem drug users by Police Force Area

Area	Known	Total Estimate		Population (age 15-54)	Prevalence	
		N	95% CI		%	95% CI
Central	730	2,208	1,363-4,516	154,777	1.4	0.9-2.9
Dumfries & Galloway	651	1,179	1,034-1,368	73,642	1.6	1.4-1.9
Fife	1,348	2,867	2,355-3,636	192,389	1.5	1.2-1.9
Grampian	1,940	5,415	3,997-8,504	297,144	1.8	1.3-2.9
Lothian & Borders	3,529	9,081	6,889-13,285	514,510	1.8	1.3-2.6
Northern	451	1,232	804-2,404	147,330	0.8	0.5-1.6
Strathclyde	12,571	29,514	24,213-37,805	1,269,021	2.3	1.9-3.0
Tayside	1,575	4,304	3,009-6,925	204,869	2.1	1.5-3.4
SCOTLAND	**22,795**	**55,800**	**43,664-78,443**	**2,853,682**	**2.0**	**1.5-2.7**

In the Orkney Isles and Western Isles areas of the Northern Constabulary area, there were insufficient data to perform capture-recapture analyses. Therefore the prevalence estimates in these areas were obtained by applying the known to unknown ratio of problem drug users found elsewhere in Scotland to the number of known drug users in those areas.

Whilst drug misuse is clearly occurring in all Force areas, the greatest proportion (53%) is occurring within the Strathclyde Police Force area, where 44% of the Scottish population aged 15 to 54 is resident. The prevalence of drug misuse in the Strathclyde area is 2.3% of the population within the 15 to 54 age range (95% CI 1.9-3.0%). The area with the second highest prevalence is Tayside at 2.1% (95% CI 1.5-3.4%). The area with the lowest prevalence is Northern Constabulary at 0.8% (95% CI 0.5-1.6%).

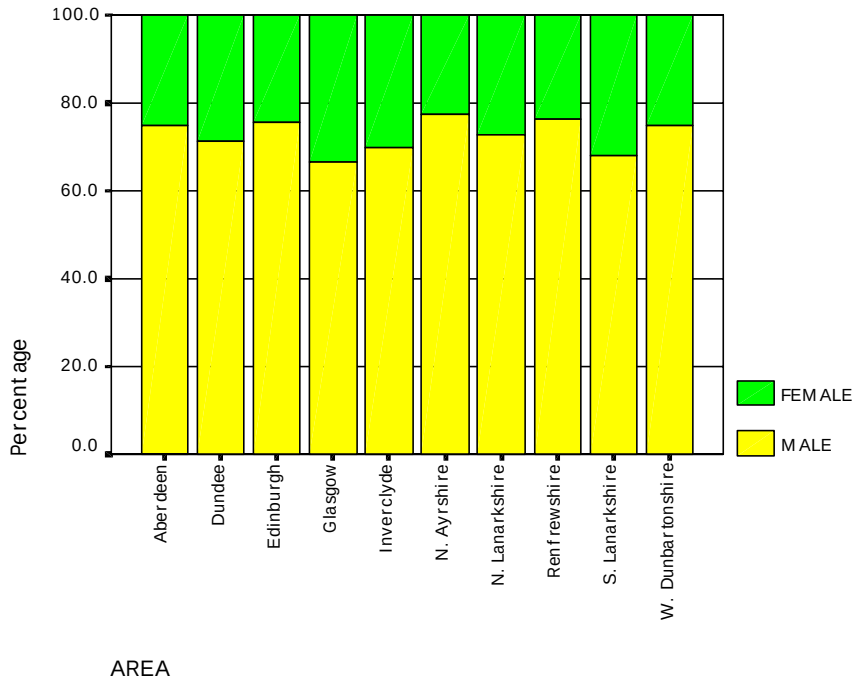
5.6 Age and Gender

In the case of the ten Council areas with the highest prevalence of problematic drug misuse (constituting 51% of the Scottish population), it has been possible to stratify the prevalence estimates by both age and gender. In the case of Table 5, the males constitute between 69% and 78% of the minimum known drug misusing population and between 67% and 77% of the estimated total population. The finding that the 3:1 ratio is so widespread is puzzling since it is far from clear why problematic drug misuse should so consistently produce such a ratio across a broad range of areas. The gender balance within the estimated problematic drug misusing population across the ten Council areas with the highest prevalence is shown graphically in Figure 10.

Table 5 Estimated prevalence of problem drug use by gender

	KNOWN				TOTAL ESTIMATES			
Area	**males**	**%**	**females**	**%**	**Males**	**%**	**Females**	**%**
Aberdeen City	886	74	308	26	2,724	75	921	25
Dundee City	643	72	256	28	1,929	71	771	29
Edinburgh, City of	1,764	70	772	30	4,433	75	1,439	25
Glasgow City	4,522	69	1,992	31	9,172	67	4,616	33
Inverclyde	487	72	193	28	896	70	384	30
North Ayrshire	404	78	114	22	1,110	77	324	23
North Lanarkshire	740	72	286	28	2,065	71	883	29
Renfrewshire	596	71	242	29	1,679	69	762	31
South Lanarkshire	798	75	264	25	2,177	68	1,017	32
West Dunbartonshire	385	73	146	27	805	75	271	25

Figure 10 Estimated prevalence of problem drug use by gender

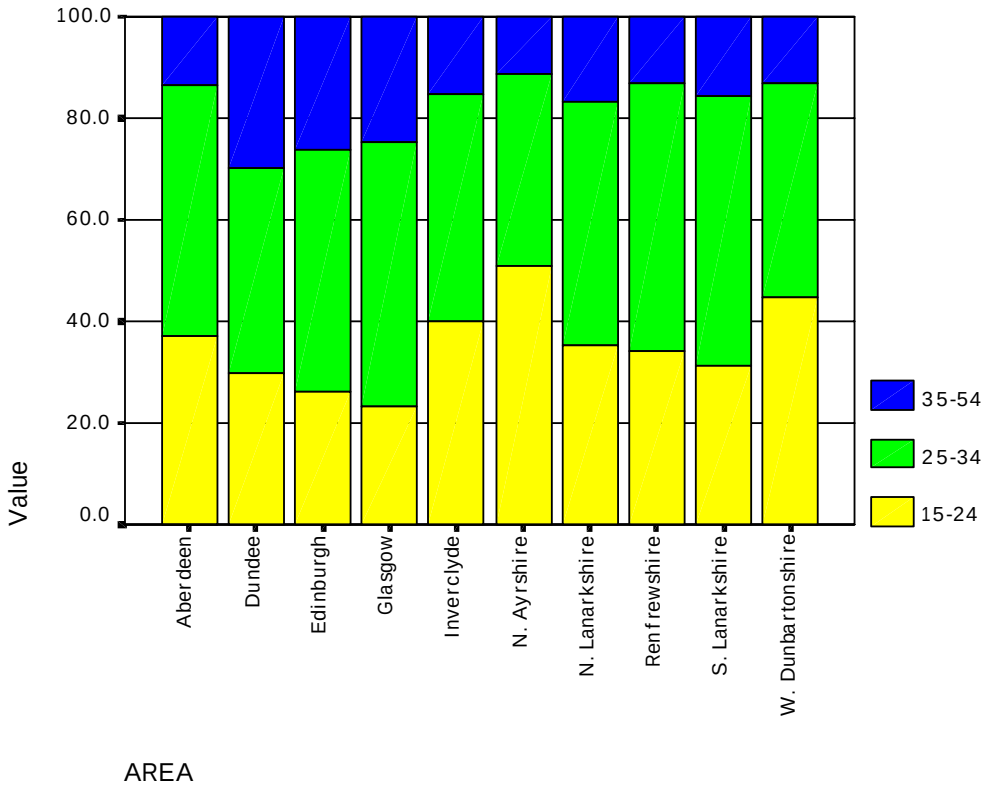


In Table 6, we provide an analysis by age group comparing the estimated numbers of problem drug users in the 15-24 age range, along with the corresponding prevalence rate, against the numbers and rate within the wider 15-54 age range. We see here that the areas with the highest rate of drug use in the 15-24 age range are Inverclyde (5.1%) and Aberdeen City (4.7%). This compares with 3.7% in Glasgow and 2.4% in Edinburgh.

Table 6 Estimated prevalence of problem drug use by age group

Area	Estimate (15-24)	Rate	Estimate (15-54)	Rate
Aberdeen City	1,356	4.7	3,645	3.0
Dundee City	828	4.2	2,700	3.5
Edinburgh, City of	1,546	2.4	5,872	2.2
Glasgow City	3,229	3.7	13,788	3.8
Inverclyde	521	5.1	1,280	2.8
North Ayrshire	686	4.0	1,384	1.8
North Lanarkshire	978	2.3	2,898	1.6
Renfrewshire	820	4.0	2,441	2.5
South Lanarkshire	1,296	3.4	3,220	1.9
West Dunbartonshire	505	4.0	1,123	2.1

Figure 11 Estimated prevalence of problem drug use by age group



The estimated age breakdown (expressed as a percentage of the total estimated population) is shown graphically in Figure 11. We see here that those areas with what is most probably the longest standing drug problem (Dundee, Edinburgh and Glasgow) have the highest proportion of older drug users. By comparison, those parts of Scotland whose drug problem is most probably of more recent origin (Aberdeen, West Dunbartonshire, North Ayrshire and Renfrewshire) have the

lowest proportion of drug users in the older age range and the greater proportion of drug users in the younger age category.

5.7 Drug Injecting

Although not all problematic drug misuse involves drug injecting, it is known that injecting is associated with some of the most significant harms including overdose, blood-borne infections (including HIV and hepatitis), vascular problems and abscesses. For this reason, we have sought to provide estimates of drug injecting prevalence in addition to the estimates of overall drug misuse prevalence. The following section summarises the estimates in relation to those identified as injecting within the year 2000.

To obtain our estimates of current injecting prevalence, we have drawn upon the following data:

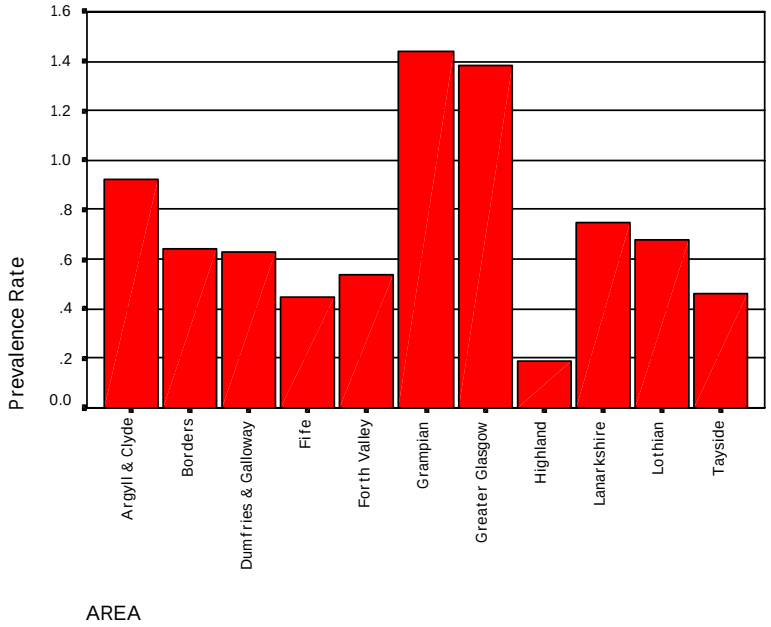
- Agency returns to the Scottish Drug Misuse Database
- General Practitioner returns to the Scottish Drug Misuse Database
- Social Enquiry Reports
- A register of HCV positive drug injectors collated by the Scottish Centre for Infection and Environmental Health.

In terms of the Scottish Drug Misuse Database, contributing agencies or General Practitioners record whether or not an individual had been injecting drugs in the month preceding the initial contact. We have not utilised data direct from drug agencies within the injecting analyses as injecting status is not uniformly recorded across all drug agencies. To obtain meaningful estimates of the prevalence of drug injecting, it has been necessary to employ the restrictive definition of drug injecting found in the reporting system to the Scottish Drug Misuse Database (injecting in the preceding month). In the case of the Social Enquiry Reports, the inclusion of information pertaining to the route of drug use is not uniform and is largely dependent on whether the route of administration has some bearing on the offence for which the report is being prepared.

In terms of the HCV test data, the request for information on risk category is an integral part of the procedures for obtaining a test and it is this behavioural information that we have drawn upon within our analysis. Part of the difficulty we have confronted in relation to drawing up the HCV data is the fact of not knowing whether the individual has indeed injected within the recent past. It is conceivable that an

individual may be requesting such a test as a result of concerns arising from injecting drug use in the more distant past.

Figure 12 Estimated prevalence of drug injecting by Health Board area



In relation to Table 7, it is important to point out that the minimum number of drug injectors may seem surprisingly small relative to the prevalence of drug injecting estimate. It is very likely that agencies within Health Board areas in Scotland will feel that the minimum number stated here under-represents their own known population of drug injectors. However, to calculate the overall prevalence of drug injecting we have had to employ readily available data on drug injecting from the Scottish Drug Misuse Database rather than attempt to obtain information on the injecting status of each individual in contact with drug agencies within Scotland. One of the consequences of this is that there is a greater difference between the overall estimate of drug injecting prevalence and the known minimum number of drug injectors than is the case between the overall estimate of problem drug use and the known minimum number of problematic drug misusers. This difference does not however affect the overall validity of the drug injecting prevalence estimates.

Table 7 Estimates of the number of drug injectors by Health Board Area

Area	Known	Total Estimate		Population (age 15-54)	Prevalence	
		N	95% CI		%	95% CI
Argyll & Clyde	593	2,138	1,601-2,990	231,543	0.9	0.7-1.3
Ayrshire & Arran				200,291		
Borders	56	348	128-1,866	54,800	0.6	0.2-3.4
Dumfries & Galloway	202	462	350-644	73,642	0.6	0.5-0.9
Fife	133	866	473-1,913	192,389	0.5	0.2-1.0
Forth Valley	270	838	635-1,155	154,777	0.5	0.4-0.7
Grampian	489	4,290	3,033-7,744	297,144	1.4	1.0-2.6
Greater Glasgow	1,946	7,187	6,085-8,615	519,332	1.4	1.2-1.7
Highland	25	216	55-3,385	111,033	0.2	0.0-3.0
Lanarkshire	279	2,369	1,281-5,289	317,855	0.7	0.4-1.7
Lothian	428	3,149	1,730-6,938	459,710	0.7	0.4-1.5
Orkney Isles				10,163		
Shetland Isles				12,359		
Tayside	121	942	464-2,491	204,869	0.5	0.2-1.2
Western Isles				13,775		
SCOTLAND	**4,542**	**22,805**	**15,835-43,030**	**2,853,682**	**0.8**	**0.6-1.6**

It has not been possible to provide an estimate of drug injecting for Orkney Isles, Shetland Isles or the Western Isles Health Board areas because of the low number of drug injectors identifiable from the relevant data sources. In the case of Ayrshire and Arran, insufficient data were available as a result of concerns on the part of staff within the Ayrshire and Arran Primary Care Trust regarding data protection.

On the basis of this analysis, we estimate there to have been 22,805 individuals who have injected drugs within the year 2000. We see the indications of the rapid and substantial spread of drug injecting in Grampian (1.4% 95% CI 1.0-2.6%) which, on the basis of our estimates, has a similar prevalence rate to that found in Greater Glasgow (1.4% 95% CI 1.2-1.7%). As found with the problem drug use prevalence figures, the Argyll & Clyde Health Board has a higher than average prevalence rate at 0.9% (95% CI 0.7-1.3%) of the population aged 15 to 54 years.

5.8 HCV Infection

As at June 2000, HCV infection had been diagnosed in almost 11,000 persons throughout Scotland; injecting drug use was the major cited risk factor among 88% (6326/7149) of cases for whom at least one risk factor was known. The incidence of injecting drug use in Scotland increased dramatically in the late 1970s and early 1980s and there is evidence that HCV was circulating among drug injectors at that time. Thus it is considered highly likely that large numbers of drug injectors in Scotland have been infected with HCV for many years.

Because HCV infection, generally, has a long incubation period before it causes severe symptomatic liver disease, the numbers of known infected cases in Scotland represent only a proportion of the total HCV infected population. It is important that the size of this proportion, and thus the total number of HCV infected cases, is estimated, with accuracy, so that models to predict how many persons will require anti-viral therapy and/or treatment, including liver transplantation, for their HCV-related severe liver disease in the future, can be generated. These predictors will inform those responsible for planning and providing the resources required to manage HCV infected persons.

The total HCV infected population comprises three principal groups: individuals who currently inject drugs, individuals who have injected in the past, and others. Accordingly, the investigators sought to estimate the size of the HCV infected current IDU population in Scotland.

Method

In this section we briefly describe the method used to provide (and corroborate) estimates of the number of HCV infected current drug injectors in Scotland.

Estimating HCV prevalence throughout Scotland: unlinked anonymous HCV testing surveys of injectors

SCIEH, in association with HCV testing laboratories, have co-ordinated a programme of unlinked anonymous HCV antibody testing of stored blood samples from injectors throughout Scotland who had undergone a named HIV test. SCIEH holds anonymised epidemiological data on all persons who have had a named HIV antibody test in Scotland. This resource enabled the identification of records belonging to drug injectors who had had an HIV test during 1999-2000. The laboratory specimen numbers on these records permitted the location of their corresponding stored specimens and these were unlinked from identifiers and tested for HCV antibodies.

Validating the HCV prevalence data using data from community-wide surveys of injectors

Community-wide surveys of drug injectors have been conducted in Scotland since 1990 and, most recently, in Greater Glasgow during 1999, Lanarkshire in 2000, and Highland in 2000-2001. A multi-site sampling strategy was used to avoid the selection bias which would have occurred if drug injectors had been recruited from single sites or particular geographical and social networks. Subject to consent, individuals who had injected drugs in the previous two months were interviewed about their risk behaviour and asked to provide a saliva specimen which would be tested, anonymously, for HCV antibodies.

HCV antibody positive status in saliva, indicative of HCV carriage, was compared with self-reported recent (since January 1999) HIV test uptake among these samples of current injectors in Glasgow, Lanarkshire and Highland, to assess if individuals who presented for HIV testing during 1999-2000 were more or less likely to be infected with HCV than those who had not had an HIV test. The answer to this question would allow an assessment of the representativeness, and thus the validity, of the HCV prevalence data, generated through the unlinked anonymous HCV antibody testing of residual HIV test sera.

Comparing estimates with other indicators of HCV prevalence

As a measure of the relative reliability of these results, the central estimates of HCV infected current drug injectors (presented as prevalence rates among Health Board populations aged 15-54 years) were correlated with data held at SCIEH on all persons diagnosed with HCV during 1999-2000. Three thousand and four persons were diagnosed in Scotland between 1st January 1999 and 30th June 2000, for whom 71% (2075/2903) were aged 15-34 years and injecting drug use was cited as the main risk factor in 96% (1955/2026) of cases for whom at least one risk factor was known. The number of persons diagnosed with HCV in each Health Board during January 1999 to June 2000 were converted into rates per 10,000 of the Health Board population aged 15-54 years and correlated with the central estimate of the number of HCV infected current injectors.

Results

Estimates of HCV prevalence among injectors throughout Scotland

Out of 2,141 Scottish injectors who underwent named HIV antibody testing during 1999-2000, 946 (44%) were found to be infected with HCV. The highest HCV prevalence at 62% was detected among Greater Glasgow injectors; this was followed by a rate of 53% among Tayside injectors and prevalences of between 23-41% among injectors in other Health Boards. HCV data for Borders and Island Health Boards were not available because so few injectors had presented for HIV testing in these areas.

These data on HCV prevalence, along with the estimated number of current drug injectors, the estimated number of HCV infected current injectors and the corresponding population prevalence rates are presented at the Heath Board area level in Table 8. Sufficient data were not available in the Island Health Board areas nor in Ayrshire & Arran or Borders.

Table 8 Estimates of HCV infection among injecting drug users by Health Board area in Scotland

Health Board	(i) Anti-HCV prevalence among injectors from HIV testing		(ii) Estimated number of current drug injectors		(iii) Estimated number of HCV infected current injectors		(iv) Estimated population prevalence of HCV infected current injectors	
	%	95% CI	N	95% CI	N	95% CI	%	95% CI
Argyll & Clyde	31	19-42	2,138	1,601-2,990	663	368-1,052	0.29	0.16-0.45
Dumfries & Galloway	28	17-40	462	350-644	129	72-213	0.18	0.10-0.29
Fife	29	20-39	866	473-1,913	251	105-584	0.13	0.06-0.30
Forth Valley	23	10-35	838	635-1,155	193	81-334	0.13	0.05-0.22
Grampian	38	33-42	4,290	3,033-7,744	1,630	881-2,954	0.55	0.30-0.99
Greater Glasgow	62	58-66	7,187	6,085-8,615	4,456	3,676-5,397	0.86	0.71-1.04
Highland	31	22-40	216	55-3,385	67	4-1,030	0.06	0.00-0.93
Lanarkshire	41	32-50	2,369	1,281-5,289	971	414-2,193	0.31	0.13-0.69
Lothian	36	31-41	3,149	1,730-6,938	1,134	510-2,530	0.25	0.11-0.55
Tayside	53	45-60	942	464-2,491	499	185-1,306	0.24	0.09-0.64
SCOTLAND [v]			**22,800**	**15,830-43,030**	**10,000**	**8,500-12,900**	**0.39**	**0.33-0.50**

(i) Injectors who had undergone attributable anti-HIV testing during 1999-2000 were tested anonymously for anti-HCV (unlinked anonymous surveys)
(ii) Estimates and confidence intervals derived using the capture-recapture method
(iii) Estimates of the number of current injecting drug users in 2000 infected with HCV were produced by combining estimates in (i) and (ii)
(iv) Prevalence rates expressed as a percentage of the population aged 15 to 54
(v) As five Health Boards have been omitted, the columns cannot be summed to provide the Scottish estimates

As data on HCV prevalence has been collated at the Health Board area level, it has only been possible to provide estimates of the number of HCV infected injectors at that level; this is less of a problem since responding to HCV is principally a concern of health services.

HCV prevalence and HIV testing behaviour

To assess the representativeness, and thus the validity, of the above HCV prevalence data, HCV antibody prevalence rates in saliva from community-wide samples of current injectors recruited in Greater Glasgow during 1999, Lanarkshire in 2000 and Highland in 2000-2001 were examined. HCV antibody prevalence in saliva was not statistically different among those who had and those who had not had a recent HIV test (since January 1999). In Lanarkshire and Highland, injectors who reported having a recent HIV test had slightly lower HCV salivary antibody prevalences (29% and 43%, respectively) compared to those who had not (31% and 48%, respectively). In Glasgow, HCV salivary antibody prevalence was higher among injectors who had an HIV test during 1999 (56%) compared to those who had no test (46%). However, a different recruitment criteria had been employed during the Glasgow 1999 study (i.e. all those who had commenced injecting since

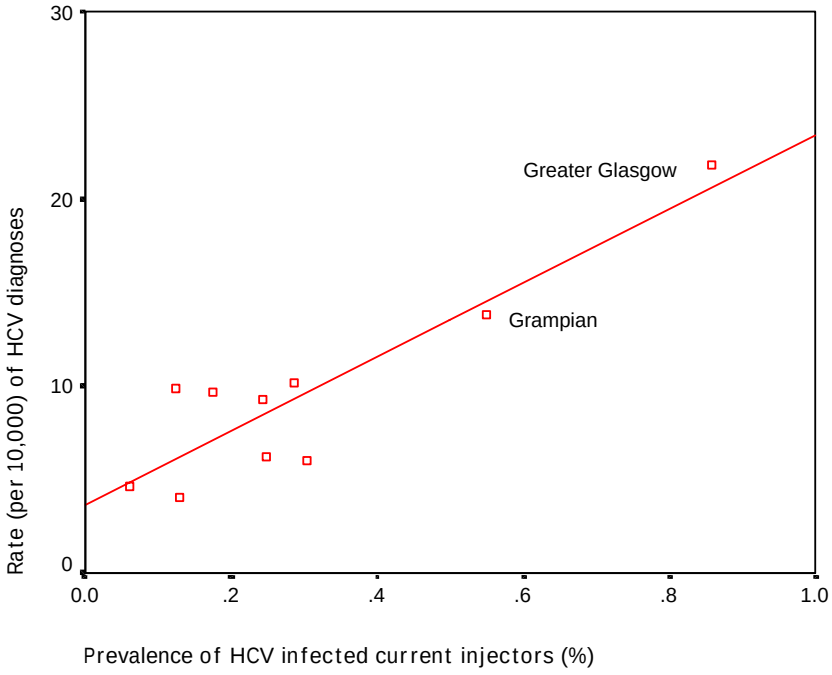
1990), which resulted in a large proportion of injectors who had made their injecting debuts within the previous two years; after excluding these latter cases from the analysis, HCV antibody prevalences in saliva were 63% and 59% respectively among those who had and who had not reported having an HIV test in 1999.

Thus, there was no evidence, in separate and diverse geographical areas, of a significant or consistent difference in HCV prevalence among drug injectors according to whether they had presented for an HIV test in 1999 or later. Accordingly, the investigators were confident that the estimates of HCV antibody prevalence detected among injectors who underwent HIV testing during 1999-2000 could be combined, validly, with the estimates of the size of the current injecting populations, to provide estimates of the number of HCV infected current injectors.

Comparison of rates of HCV infected current drug injectors and recent HCV diagnoses

The estimated prevalence of HCV infected current injectors, in Health Board populations aged 15-54 years, was highest in Greater Glasgow (0.86%) and Grampian (0.55%), and least in Highland (0.06%), Forth Valley (0.13%) and Fife (0.13%). The range of uncertainty associated with estimated prevalence was greatest in Highland (95% CI 0-0.93%), Grampian (95% CI 0.3-0.99%), Lanarkshire (95% CI 0.13-0.69%) and Tayside (95% CI 0.09-0.64%).

Figure 13 Plot of population prevalence of HCV infected current injectors against rate of recent HCV diagnoses by Health Board area



In Figure 13, the central prevalence estimates of HCV infected current injectors by Health Board area correlated, highly, with the rate of persons being diagnosed with HCV during January 1999 to June 2000. For example Greater Glasgow and Grampian, the two areas with the highest prevalence of HCV current injectors, also have the highest rate of HCV diagnoses. This high correlation therefore corroborates the estimates presented in Table 8.

6 Discussion

In this section, we discuss a range of methodological and substantive issues bearing upon our research on estimating the prevalence of problematic drug misuse within Scotland. As with all research there was an element of uncertainty as to whether it would be possible to provide estimates of the prevalence of problematic drug misuse for all areas within Scotland. Our uncertainty in this respect crystallised around two concerns. First, whilst we knew that it would be possible to employ the capture-recapture method to provide estimates of drug misuse prevalence in the major urban areas, we were uncertain that the method would be able to be applied within the rural areas in Scotland to provide comparable estimates of prevalence. Second, we were uncertain as to whether the capture-recapture method would allow us to estimate the prevalence of problematic drug misuse within particular population groups e.g. ethnic minorities.

Methodological Issues

Taking the application of the methods to the rural areas first our concern was whether it would be possible to use a population estimation method, which relied upon analysing the overlap between different agencies' samples of drug users in an area where there were few agencies in contact with drug misusers and fewer people overall. In fact we did not find it to be particularly difficult to apply the capture-recapture method to the vast majority of rural areas within Scotland. Where this did prove difficult was in relation to the island areas where the combination of small population size and few drug services meant that we were unable to apply the capture-recapture method. In all other areas however this was not the case. The important point to stress here is that in applying the capture-recapture method to estimate the prevalence of problematic drug misuse, it is not the overall size of the drug misusing population within an area which is critical but the likelihood that individuals will have been identified in more than one database. Similarly, whilst it may be thought that the likelihood of identifying a drug user in a rural area would be less than that in an urban area like Glasgow, in fact of course it is equally plausible that an individual drug user in Glasgow would be less likely to come to the attention of different agencies as a result of his or her drug use for the simple reason that there are so many drug users within the city.

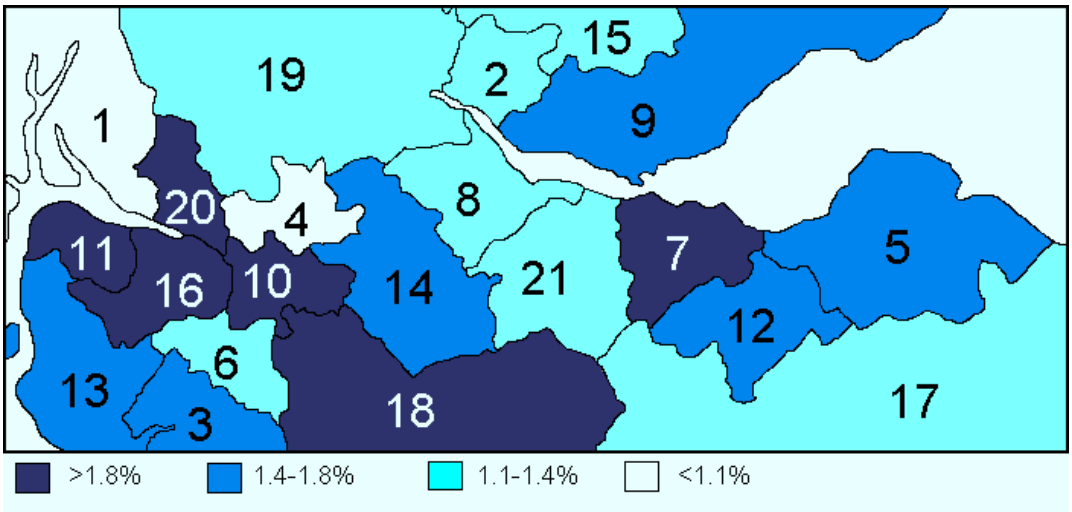
On the basis of the research we have undertaken it is possible to apply the capture-recapture method in both urban and rural areas. Where we feel the method has not worked has been in relation to estimating the prevalence of problematic drug misuse amongst ethnic minorities. For the capture-recapture method to work equally well with all ethnic minority groups it would be necessary either for the existing drug misuse agencies to be equally accessible to drug misusers from all ethnic groups and for the ethnic status of all clients to be routinely recorded by those agencies or for a range of drug misuse agencies to be provided for specific ethnic minority groups. In practice neither of these assumptions really apply. Firstly it is likely that a significant proportion of ethnic minority drug users do not contact established drug services when they begin to experience problems associated with their drug use. Secondly there are very few drug services within Scotland with a remit to target specific minority groups. As a result we do not feel that the capture-recapture method is an appropriate means to estimate the prevalence of problematic drug misuse amongst ethnic minority groups. On balance we would recommend using the method of snowball sampling as an alternative means of estimating the prevalence of drug misuse amongst ethnic minority groups within Scotland. Mounting such an exercise on a national level would be very costly; however an alternative would be to undertake such snowball sampling of ethnic minorities within specific areas.

The value of smaller area analysis in drug prevalence calculation

In the research we have undertaken here we have provided estimates of the prevalence of problematic drug misuse by Council area, Drug Action Team area, Health Board area, and Police Force area. These are all in important boundaries reflecting the various activities of the different organisations with which they are associated. However, these boundaries also represent relatively large heterogeneous areas which are likely to contain areas with differing levels of problematic drug misuse. By focussing the prevalence estimation research at each of these areas it has not been possible to reflect any more local “hot spots” of problematic drug misuse prevalence even where we know such “hot spots” exist. The clearest example of this is in the situation in the north east of Scotland. Returning to Figure 1, we can see that Aberdeenshire has an estimated prevalence of problematic drug misuse of 1.1%, whereas Aberdeen City has an estimated prevalence of 3.0%. It is not, however, possible on the basis of an analysis by Council area to show the situation within Fraserburgh where, in other research we have undertaken, we have estimated that the prevalence of problematic drug misuse may be as high as 2.5% of the 15-54 population (Hay, 2000). Since the capture-recapture analysis which we have undertaken here draws upon data at the level of post code sector it would be possible in principle and, with appropriate ethical approval, to undertake a finer grained analysis to identify areas of problematic drug misuse “hot spot” activity within the various Health Board, Drug Action Team, Council and Police Force areas. It is likely that such an

analysis, if undertaken, would be of value to each of the organisations whose own work is planned at the large geographical level i.e. Health Boards, Councils, Police Forces or Drug Action Teams.

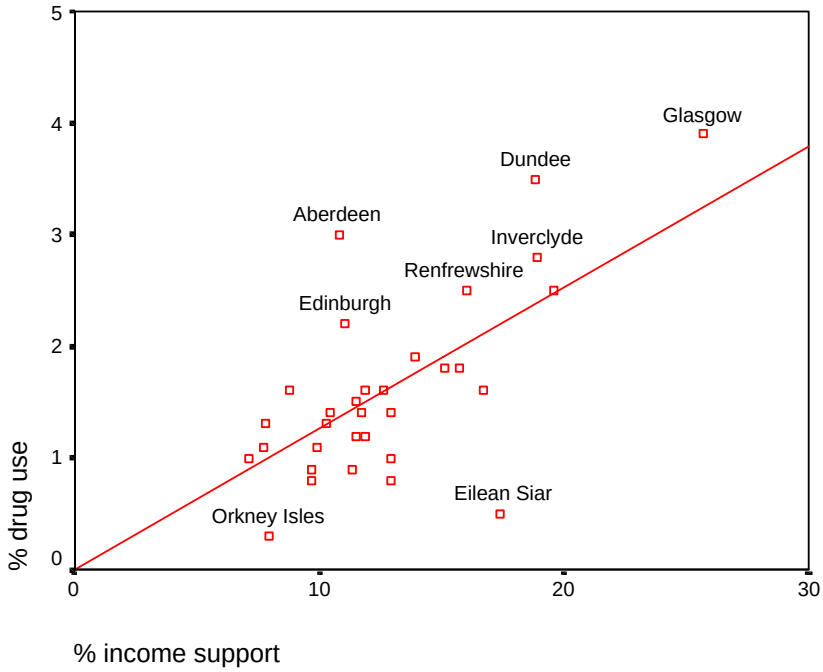
Figure 14 Estimated prevalence of problem drug use by Council Area (central Scotland)



1	Argyll & Bute	8	Falkirk	15	Perth & Kinross
2	Clackmannanshire	9	Fife	16	Renfrewshire
3	East Ayrshire	10	Glasgow City	17	Scottish Borders
4	East Dunbartonshire	11	Inverclyde	18	South Lanarkshire
5	East Lothian	12	Midlothian	19	Stirling
6	East Renfrewshire	13	North Ayrshire	20	West Dunbartonshire
7	Edinburgh, City of	14	North Lanarkshire	21	West Lothian

Figure 14 focuses on the prevalence of problem drug use at the Council area level in Central Scotland. Where the local area analysis is particularly revealing is in the comparison across areas. In west central Scotland, for example, we see that the high prevalence of problematic drug misuse in Glasgow is reflected in similar high levels in West Dunbartonshire, Inverclyde and South Lanarkshire. In east central Scotland where there is a high prevalence of problematic drug misuse in the City of Edinburgh, slightly lower levels of prevalence are found in East Lothian and Midlothian but not to the same degree in West Lothian. It is tempting to see the pattern of drug misuse identified in these areas as evidence of a process of diffusion from the major urban centres. In fact however we know relatively little about those factors now influencing the development of problematic drug misuse beyond the areas of Glasgow and Edinburgh and it may be that the spread into such areas as West Dunbartonshire, Inverclyde, South Lanarkshire, Midlothian and East Lothian has more to do with the association between problematic drug misuse and deprivation than their proximity to Glasgow and Edinburgh. To explore this possible explanation further, we have mapped our data on drug misuse prevalence onto existing information on the proportion of the population claiming income support (Department of Social Security, 2000) in each of the 32 Council areas within Scotland.

Figure 15 Plot of estimated drug use prevalence against income support claims by Council Area



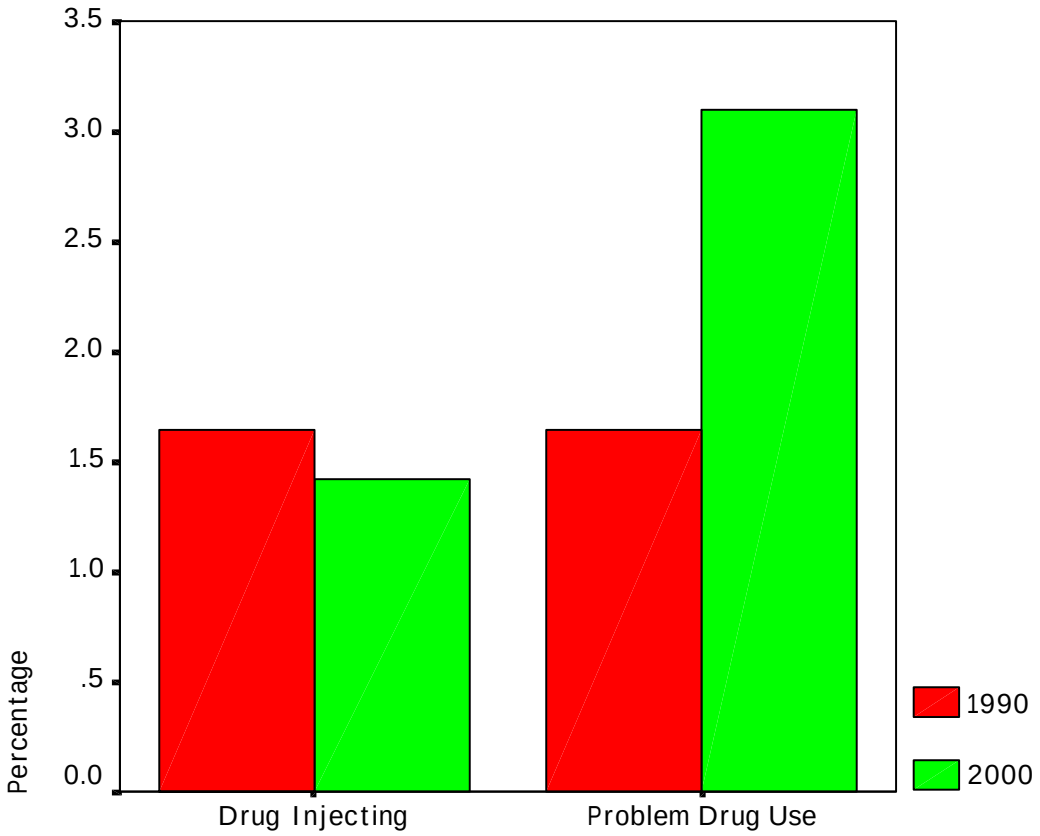
In Figure 15, there is an indication that as the proportion of the local population claiming income support increased so also does the overall prevalence of problematic drug misuse. Whilst this general pattern is evident, it is equally clear that the situation in Aberdeen is rather different since the drug misuse prevalence estimate is higher than expected, given the proportion of the local population claiming income support.

Changes in prevalence over time

In undertaking research aimed at estimating the prevalence of problematic drug misuse in Scotland one issue which immediately arises is that of assessing whether prevalence has increased, decreased or remained stable over recent years. To provide a clear answer to this question would require repeated estimates of drug misuse prevalence for Scotland. Whilst the research we have reported here is the first time that estimates have been produced for problematic drug misuse at both a national and local level across Scotland as a whole, nevertheless it is possible to draw upon some of the results of those areas within Scotland where previous drug misuse prevalence estimation research has been carried out to at least begin to provide an answer to the question of whether drug misuse prevalence has increased, decreased or remained stable over recent years.

Figure 16 makes the comparisons between our estimates and a previous estimate for the Greater Glasgow Health Board area. It appears that there has been a reduction in the prevalence of injecting drug use (from 8,494 to 7,187). If, however, the earlier estimate referred to problem drug use, then there has been a marked increase (to 15,975).

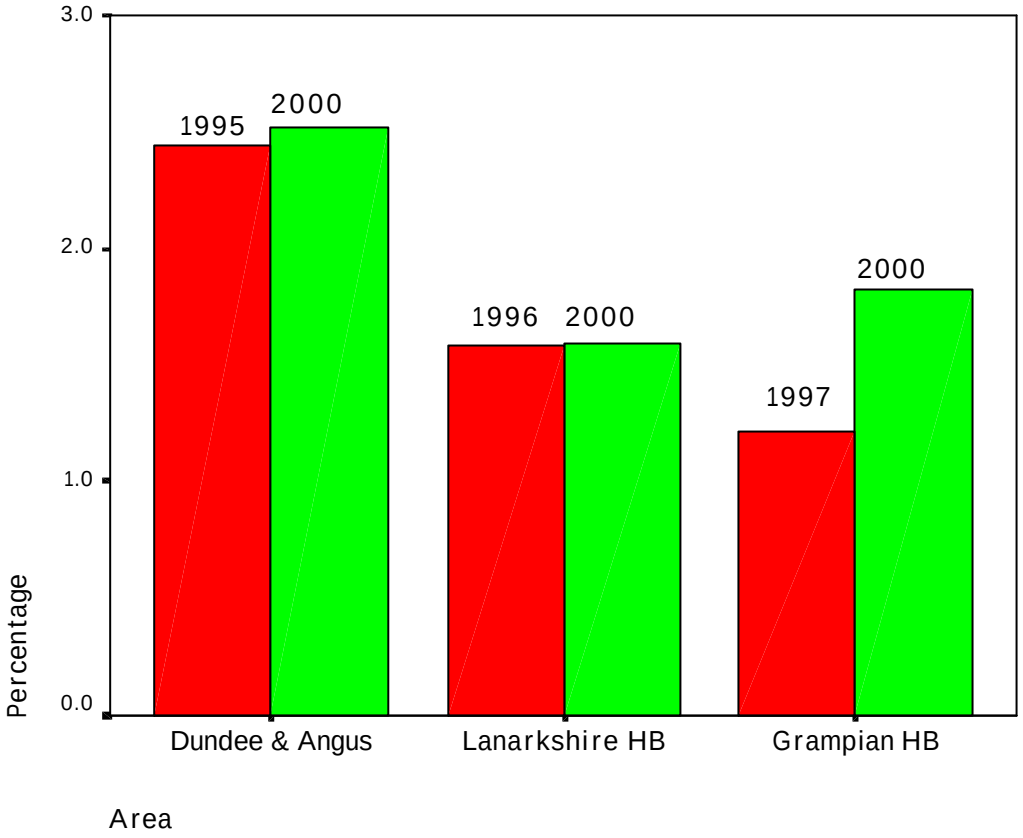
Figure 16 Changes in the estimated prevalence of drug use in Greater Glasgow



The 1990 estimate is from Frischer *et al* (1993). It should be noted that the previous prevalence estimation did not include a definition of problematic drug use other than that of drug injecting, whereas the more recent research provides estimates of problem drug use and drug injecting prevalence. In the period following the 1990 research, drug agencies became more focussed on obtaining information on drug use and drug injecting making it easier to distinguish route of administration.

Researchers at the Centre for Drug Misuse Research at Glasgow University have used the same capture-recapture analysis to provide previous estimates of the prevalence of problematic drug misuse (defined as misuse of opiates and / or benzodiazepines) for Dundee Council and Angus Council, Lanarkshire Health Board and Grampian Health Board areas. The comparison of the results of this earlier work with our current research is summarised in Figure 17.

Figure 17 Changes in the estimated prevalence of drug use in other areas



We see here that whilst the prevalence of problematic drug misuse has increased slightly between the years 1995 to 2000 in Dundee and Angus, the situation in Lanarkshire has hardly changed at all between 1996 and 2000 whilst for Grampian there has been a marked increase in the prevalence of problematic drug misuse between the years 1997 and 2000.

Finally in this discussion section we list some of the potential uses of information on the prevalence of problematic drug misuse. These are listed below in no particular order of importance:

Monitoring changes in prevalence locally and nationally

Now that estimates of problematic drug misuse prevalence have been provided for all Health Boards, Councils and Drug Action Teams, it is possible for these authorities to undertake similar research in their own area to build up a picture as to whether drug misuse is increasing, decreasing or remaining constant over a specific period.

Providing baseline information for assessing drug user mortality

At the present time, whilst information is being routinely collected on the number of drug related deaths in each Health Board area, it is extremely valuable to have an estimate of the overall prevalence of problematic drug misuse with which to calculate the mortality rate amongst problematic drug misusers. This is important because, whilst the overall number of drug related deaths recorded in any one year may have increased, this does not mean that the percentage of addicts dying has itself increased. To determine whether that is the case requires that one also has information on the overall prevalence of problematic drug misuse.

Estimating the number of injecting related cases of HCV or HIV infection in Scotland

Through a variety of research studies and the routine mechanisms for monitoring the health of injecting drug users, information has become available within Scotland on the percentage of injecting drug users who are HIV or HCV positive. Whilst this information is clearly of enormous value to those planning and providing services, no less valuable would be information on the actual total number of drug users who may be HIV or HCV positive. Such a calculation is now possible for those areas within Scotland which have information on the local prevalence of HIV and HCV amongst injecting drug users and thus can now be combined with the information presented here on the local prevalence of problematic drug misuse and drug injecting.

Tackling blood-borne disease

There is a commitment within the National Action Plan (Scottish Executive, 2000*b*) to provide drug injectors with vaccination against hepatitis B virus infection. In conjunction with information on the number of injectors to whom such vaccination is provided, it is now possible to judge the level of success on the part of the Health Boards and other agencies in mounting such vaccination programmes. Similarly, the drug injecting prevalence estimates will be useful in examining the epidemiology of HIV spread in Scotland.

Targeting drug services

Information on the prevalence of problematic drug misuse is valuable in targeting drug services and in assessing the current pattern of services. For example, whilst the major cities of Glasgow, Edinburgh, Dundee and Aberdeen already possess a well developed network of treatment services, such services are relatively under-developed in many of the more rural areas where we are now seeing the development of significant local epidemics of problematic drug misuse.

Assisting the funding of drug services

In the absence of detailed information on the national and local prevalence of drug misuse, it has been necessary for the Scottish Executive to determine the distribution of funding for drug misuse services in terms of information on the local population size, weighted in accordance with information on deprivation. It is now possible to allocate funding in relation to drug misuse treatment, prevention and enforcement in terms of information on the local prevalence of problematic drug misuse.

Assessing the future demand for drug services

In assessing the likely future demand for drug services as well as determining the location of those services, there is clear benefit in having access to information on the national and local pattern of problematic drug misuse.

Providing information of relevance to the Scottish Drug Enforcement Agency

The research that we were commissioned to undertake required us to provide estimates of drug misuse prevalence for all 32 Council areas, 22 Drug Action Teams areas, 15 Health Board areas and 8 Police Force areas. For reasons that we have already covered, it has not been possible to provide a more fine-grained analysis to identify areas of high intensity drug prevalence. Nevertheless, with the appropriate ethical approval, it would be possible to provide an analysis of this kind which could be of considerable value to the work of the Scottish Drug Enforcement Agency.

Calculating the economic impact of drug misuse

It is possible to combine the information on the local and national prevalence of drug misuse to provide similar estimates of the economic cost of drug misuse either in terms of the value, for example of drug related crime, or in assessments of the productive years lost as a result of individuals' involvement in problematic drug misuse.

Examining the relationship between social exclusion and drug misuse

As we have indicated above, it is possible to analyse information on the prevalence of drug misuse in Scotland contained in this report along with information on the proportion of the population claiming income support to assess the link between drug misuse and social exclusion.

7 Conclusions

In this report we have provided the first ever national and local estimates of the prevalence of problematic drug misuse within Scotland. We have shown that problematic drug misuse (defined as the misuse of opiates and / or benzodiazepines) is occurring in all areas of Scotland and that, on average, 2% of the population aged between 15 and 54 have used these drugs within the year 2000. In simple number terms this means that we estimate that there are approximately 56,000 problematic drug misusers within Scotland. Since this is the first time that an estimate of this kind has been produced there is no previous figure with which to make comparisons. Over the last few years the figure of 30,000 has generally been taken to be our best guess as to the extent of problematic drug users. Clearly on the basis of the estimate we have produced that figure is likely to have been a substantial underestimate.

Whilst we have seen that the problematic drug misuse is occurring in all parts of Scotland it is probably a mistake to think of Scotland as having a single drug problem. What appears to be happening instead is that Scotland is faced by a series of more local drug problems. The drug problems in Glasgow, Edinburgh and Dundee, for example, are of long standing and relatively well studied. There are indications in these areas that there are significant numbers of older drug users (those aged over 35). In the case of Aberdeen by comparison we are now seeing a rapid onset of a relatively new problem and as a result many of the drug users, both those who are known about and those whom we have estimated, tend to be somewhat younger than those found in Glasgow, Edinburgh and Dundee. Similarly whilst there are clear indications that problematic drug misuse is linked to social exclusion this does not mean that all of the local epidemics of problematic drug misuse will be equally associated with deprivation. In Aberdeen, for example, problematic drug use appears to be much less closely tied to indicators of deprivation than in many other areas. As we have shown very clearly we are now seeing the development of problematic drug misuse in many of the rural areas within Scotland – areas that up till now have not been associated with problematic drug misuse. Whilst we know relatively little about those factors influencing the development of problematic drug misuse within these areas, we have shown that in general the link with deprivation that has been identified in cities like Glasgow is being reproduced now in other parts of Scotland including the rural areas. At the present time however it remains the case that problematic drug misuse is less widespread within the rural parts of Scotland than within the major urban areas.

There are a number of notable points that are worth making about the development of problematic drug misuse within Scotland. First, whilst we have shown that problematic drug misuse is occurring in both urban and rural areas within Scotland, the vast majority of drug services

within Scotland are located in urban rather than rural areas. Unless we see a marked increase in rural based drug services this is likely to represent a significant problem in the coming period. Second, whilst we have acknowledged that the link between problematic drug misuse and deprivation is not uniform for all areas within Scotland, nevertheless there is a close and demonstrable link between these two. As a result it is essential that our efforts at tackling problematic drug misuse within Scotland are integrated with efforts at tackling social exclusion. Third, we see that drug injecting remains a very significant problem within Scotland. Injecting is without any doubt the single most risky way of consuming drugs. Individuals who are injecting drugs are at considerable risk of overdose, blood borne infections, vascular problems and abscesses. There is a clear need to continue to tackle drug injecting within Scotland and wherever possible encourage those individuals who are determined to continue to use illegal drugs to avoid drug injecting. Fourth, on the basis of the work undertaken here, drug injectors within Scotland are facing a major problem in relation to HCV. Over the next few years this problem is going to become increasingly apparent both to drug injectors themselves, their families and friends, and those working within the health services.

Finally, this research has shown that it is possible to provide estimates of the prevalence of problematic drug misuse at both a national and local level within Scotland. It will be important to build upon this work so that over time we have a much clearer picture of the extent to which the drug problem in Scotland is changing. We also have to recognise that the problem of illegal drugs within Scotland can change rapidly. At the present time the use of cocaine is not on a par with that of heroin amongst problematic drug users in Scotland. We need to ensure that if this situation were to change, we would have rapid and detailed knowledge of that fact. This indicates the importance of developing accurate on-going monitoring systems to identify rapid changes in the behaviour of drug users within Scotland. Allied to up to date information on the prevalence of problematic drug misuse this would provide us with important elements of the evidence that are needed to underpin how we are tackling the drug problem within Scotland. On the basis of having undertaken this research, we do not feel that it is necessary to repeat this exercise across the whole of Scotland on an annual basis; rather we feel that it is important to obtain information on the prevalence of problematic drug misuse on a three-yearly cycle. However, in those areas where the situation may be more rapidly changing, prevalence estimation should be undertaken on a more frequent basis. Only through this means will it be possible to judge the effectiveness of our combined efforts to tackle drug misuse within Scotland.

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