Hepatitis B, Hepatitis C and HIV In Irish Prisoners, Part II:

Prevalence and Risk in Committal Prisoners 1999

Report prepared for the Minister for Justice, Equality and Law Reform

by

the Department of Community Health and General Practice,
Trinity College, Dublin

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List of Abbreviations

CI	Confidence interval
df	Degrees of freedom
EIA	Enzyme immunoassay
GP	General practitioner
HBc	Hepatitis B virus core antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
IDU	Injecting drug use/user
RIA	Radio-immune assays

Glossary of terms

(Terms underlined first time used in text)

A cross sectional survey is a descriptive (epidemiological) study in which the status of a group of individuals is assessed at a point in time, with respect to the presence or absence of both the exposure(s) and disease(s) of interest.

Committal prisoners are prisoners who have been admitted to the prison within the preceding 48 hours, accused or guilty of a new crime, excluding those on temporary release or transferred from another prison. The committal population includes individuals entering on remand, following sentence, committed as a result of a bench warrant, and non-nationals without valid documents.

Prevalence estimates the proportion of the population that have a disease at a specific point or period in time.

Random sampling is a technique used to select the survey sample from the total population of interest by which every member has an equal chance of being selected.

A confidence interval is the range of values in which the true value of a parameter (e.g. proportion) is likely to be found. By convention a 95% confidence interval is usually calculated i.e. the range that will include the true value 95% of the time.

A p-value is a probability value which measures the likelihood that an observed result occurred due to chance alone. Probability is measured between the range 0-1. By convention a value of $p < 0.05$ is considered statistically significant (for health related studies).

X2 test is a statistical test to determine if there is a statistically significant association between two grouped variables.

Multiple logistic regression analysis is a statistical technique employed to estimate the level of association between one or more variables and a binary outcome of interest while controlling for a number of confounding factors (other factors independently associated with both the exposure and the outcome). The odds ratio is used to measure the association.

The odds ratio calculates the ratio of the odds of exposure among the cases (those with the disease) to that among the controls (those without the disease). An odds ratio of 1 implies the same experience among the cases and the controls. An odds ratio less than 1 implies the exposure is protective and an odds ratio greater than 1 implies those exposed have a higher risk of contracting the disease.

Response rate is the proportion of the selected sample who take part in a study.

IgG is a test which ensures that the specimen is of adequate quality for analysis.

RIBA is a confirmatory test for hepatitis C.

Summary

The results of a census survey of 1205 Irish prisoners, published in August 1999, showed that the prevalence of infection with hepatitis B was 9%, the prevalence of infection with hepatitis C was 37%, and the prevalence of infection with HIV was 2%. The current report presents the results of a survey of committal prisoners. The reason the committal survey was undertaken was to ensure adequate representation of short-term prisoners, and to determine if the prevalence of the infections differed in committal prisoners from that found in 'resident' prisoners.

Five of the seven Irish committal prisons were included in the survey. A total of 607 prisoners took part in the survey, a response rate of 96%. The survey consisted of completing a four page questionnaire and collecting a sample of oral fluid for testing for antibodies to hepatitis B, hepatitis C and HIV. The fieldwork was carried out between 6th April and 1st May 1999.

Overall the prevalence of infection with hepatitis B among committal prisoners was 6%, the prevalence of infection with hepatitis C was 37% and the prevalence of HIV was 2%. Almost one quarter (140/596) of the committal prisoners tested had evidence of at least one of the three infections. Prevalence in women prisoners was significantly higher: 22% for hepatitis B, 56% for hepatitis C, and 10% for HIV. Prevalence was also higher among drug users (18% for hepatitis B, 72% for hepatitis C, and 6% for HIV) and in the Dublin prisons.

Multivariate logistic regression analyses showed that injecting drug use was by far the most important predictor of hepatitis B and hepatitis C infection. Female gender was an independent risk factor for all three infections. Reporting treatment for sexually transmitted infection, and increasing time spent in prison, were also associated with higher rates of hepatitis C. Among injecting drug users, sharing needles in prison and high frequencies of injecting in the previous month were linked to increased risk of hepatitis C infection. The prevalence of HIV was higher in those who had spent more than three of the last 10 years in prison.

Comparison of census and committal surveys

Respondents in the committal survey were significantly younger than in the census survey. For example, 27% of the committal population were less than 20 years old compared to 15% of the census population. The sentence profile differed in the two surveys. A higher proportion of the committal prisoners were on remand: 53% compared to 13% in the census population. Only 17% (88) of committal respondents reported having been in prison for more than three of the last 10 years compared to 46% in the census survey. Although the overall prevalence for hepatitis B and hepatitis C was lower in the committal population, the proportions of injecting drug users infected with hepatitis B, hepatitis C and HIV were similar in both surveys.

The proportion of committal prisoners who reported completing the three dose course of hepatitis B vaccination was significantly lower (10%) than in the census survey (29%); this was partly explained by the high proportion of first time committals to prison.

There were fewer drug users among the committals: 31% reported smoking heroin in the last year and 29% reported ever injecting drugs compared to 46% and 43% respectively in the census survey. The injecting drug using respondents in both surveys were similar with respect to age of starting to inject and the time interval between the last time they injected and committal to prison. However injecting practices in the two surveys differed. Although a higher proportion of injectors in the census survey reported not injecting in the month prior to the survey, the proportion sharing injecting equipment, both in and out of prison, was higher than in the committal survey.

The proportion of injectors reporting that they first started injecting in prison was similar in both surveys: 17% (30/173) in the committal survey and 21% (104/506) in the census survey.

The main findings were similar in both the census and committal surveys. There are large numbers of injecting drug users in the Dublin prisons, many of whom continue to inject while in prison. Most of these drug users are infected with hepatitis C and there are significant numbers with hepatitis B and HIV. The hepatitis B vaccination programme is not reaching many of those at risk. Over the next decade hepatitis C is likely to be responsible for significant morbidity in Irish prisoners.

1 Introduction

1.1 Rationale for the study

Two studies which examined the sociological and criminological profile of prisoners in Mountjoy Male Prison between 1986 and 1996 identified that there was a growing problem with injecting drug use and HIV infection.[1, 2] However, these studies were based on self reporting, were confined to one prison in the Mountjoy Complex, and did not specifically include hepatitis B and hepatitis C. There was clearly a need to quantify, using laboratory based assessments, the extent of drug related infections in all Irish prisons.

The results of a census survey estimating the prevalence of hepatitis B, hepatitis C and HIV in 1,205 prisoners were published in August 1999.[3] The second phase of this work: a survey of 607 committal prisoners is presented here. The terms of reference in the Request for Proposal are given in Appendix 1. The reasons for the committal survey were to ensure adequate representation of short-term prisoners (long-term prisoners are likely to be over represented in a census survey) and to determine if the prevalence of the infections differed in this substantial subgroup. There were 11,131 committals to Irish prisons in 1998; if they have a different profile this would affect the overall prevalence for hepatitis B, hepatitis C and HIV in Irish prisoners.

Committal prisoners are prisoners who have been admitted to the prison within the preceding 48 hours, accused or guilty of a new crime, excluding those on temporary release or transferred from another prison. The committal population includes individuals entering on remand, following sentence, committed as a result of a bench warrant, and non-nationals without valid documentation.

The census survey of Irish prisoners conducted from August to October 1998 revealed that the overall prevalence of infection with hepatitis B among this group was 9%, the prevalence of infection with hepatitis C was 37% and the prevalence of infection with HIV was 2%.[3]

The results of the committal survey are presented in this report and, where appropriate, compared with the census survey.[3]

1.2 Study objectives

The objectives of the survey were to:

- measure the prevalence of three blood-borne viral infections: hepatitis B, hepatitis C and HIV, among committal prisoners in high and medium risk Irish prisons.
- estimate the extent of hepatitis B immunisation in the committal prisoner population.
- determine the extent of self-reported risk behaviours, in particular injecting drug use, in committal prisoners and the association of these behaviours with prevalence.
- compare self-reported prevalence of hepatitis B, hepatitis C and HIV with actual prevalence in committal prisoners.
- compare reported risk behaviours and prevalence in the committal survey with the findings in the census survey.

2 Methods

2.1 Sampling

The annual committal population in Ireland is approximately 11,000, committed to seven prisons: Cork, Castlerea, Limerick, Mountjoy Male and Female, Portlaoise and St. Patrick's Institution. For sampling purposes, prisons were categorised as high risk (3 prisons), medium risk (3 prisons) and low risk (1 prison) based on the predicted prevalence of infection. All except two prisons, Castlerea and Portlaoise, were included in the survey. These prisons were excluded as the numbers omitted are very small and it would have been difficult to maintain confidentiality. (The number of committals to Castlerea was 136 in 1998; only a very small number of high security prisoners (approximately 50) are committed annually to Portlaoise.)

The five prisons included were Mountjoy Male and Female, and St. Patrick's Institution (high risk) and Cork and Limerick (medium risk). Based on the predicted prevalence of hepatitis c infection, it was estimated that a sample size of 534 was required. Given the usual committal rate, it was estimated that it would take three to four weeks to collect a sample of this size.

The survey was carried out from 6th April to 1st May 1999. The fieldwork involved visiting each prison daily during this period and interviewing all those committed within the previous 48 hours. The list of committals was obtained from the committal register maintained in each prison. Prisoners who were considered unstable were placed in a secure environment for 24 hours and interviewed the following morning. None of the prisoners committed during the survey period were considered a security risk for the interviewers. Six individuals who were unable to provide informed consent were excluded from the survey. Due to space constraints or the nature of the prisoners' offence, 85 committals were released or transferred from the committals area before they could be interviewed.

2.2 Fieldwork

As in the census survey, preparatory work was carried out in each prison through correspondence and meetings between the research team and the prison governor and key staff. The approach taken in carrying out the survey varied slightly in different prisons according to the prison conditions, wishes of the prison authorities, and the time prisoners were usually transferred from the courts. Staff and prisoners were briefed in advance of the survey through individual information leaflets.

The survey was carried out by a team of researchers who met the prisoners individually or in pairs. The survey team was briefed in advance and consisted of health professionals or experienced researchers (Appendix 2). A health professional was available at all times to answer questions of a medical nature. The prisoners were given an introductory talk lasting five minutes, explaining the purpose and process of the survey. They were advised that all data collected would be anonymous and confidential and that no information that could identify an individual would be released to the prison authorities or to the Department of Justice, Equality and Law Reform. Prisoners were informed that they would not be able to get their individual test results from the survey, but were advised that testing was available through the prison medical service. They were invited to ask questions or make comments. With the agreement of the prisoners, the survey then proceeded.

Prisoners who did not wish to provide an oral fluid sample were asked to complete a questionnaire. The survey was voluntary. All eligible prisoners were encouraged to participate but no inducements were offered and no negative sanctions were imposed on non-respondents.

2.3 Data collection instruments

There were two parts to the survey: collection of an oral fluid specimen and completion of a questionnaire (Appendices 3a and 3b). In order to complete the process as quickly as possible, the questionnaire was generally filled in while the oral fluid specimen was being collected.

The questionnaire consisted of closed, multiple choice questions and was similar to that used in the Irish prison census survey with minor adaptations. The questions relating to demography, history of injecting drug use, self-reported HIV and hepatitis testing and results, and hepatitis B vaccination history were the same as those used in the census survey. The questions covering details of prison sentences were adapted to suit the committal population. Additional questions on sexual practices were included and prisoners were asked about tattooing inside and outside prison. The respondents were encouraged to complete the questionnaire themselves; this took an average of five minutes. A researcher assisted those who had difficulties. The survey was anonymous – no name, address or other identifier was recorded on either the questionnaire or the oral fluid specimen. Once completed, the questionnaire and oral fluid specimen were placed in an envelope and all envelopes were then placed in a collection bag. A number was later assigned to each questionnaire and specimen, linking the two. At the end of each day of fieldwork the questionnaires were checked for internal consistency.

The survey procedures, including the use of the questionnaire and the oral fluid testing, were piloted on committal prisoners in Mountjoy prison and minor alterations were made subsequently.

On the survey day, anonymous demographic information was gathered on the entire committal prison population in each prison to calculate response rate and establish representativeness of respondents.

2.4 Collection of oral fluid specimens

Oral fluid specimens were collected with a proprietary device called EpiScreen™ (Epitope Inc., Oregon, USA). It consists of a cotton fibre pad treated with a hypersonic salt solution on a plastic stick. Capillaries lining the gum and cheek mucosae leak significant amounts of plasma proteins, including immunoglobulins, into the mouth. EpiScreen™ pad is designed to collect oral fluid specimens rich in this capillary transudate (‘oral mucosal transudate’). The pad is placed between the lower gum and cheek and held in place for at least two minutes. After collection, the pad is placed in a tube, provided as part of the collection kit, containing a non-toxic preservative solution that inhibits bacterial growth and degradation of immunoglobulins. Once specimens are collected they can be stored for up to 21 days at temperatures between 4°C and 37°C. For this study, specimens were kept refrigerated until transported in several large batches by overnight courier to the Central Public Health Laboratory in the United Kingdom. Laboratory processing of the specimens commenced on the next working day and the specimens were tested blind to demographic and risk factor characteristics. The laboratory techniques used by the Central Public Health Laboratory are described in Appendix 4.

2.5 Explanation of laboratory tests used

The laboratory test used on the oral fluid specimens was different for each of the three viruses examined. Knowledge of what each test implies is necessary to interpret the test results, and a brief description of each test is given here.

The hepatitis B antibody test used in this survey measures antibodies to the hepatitis B core antigen. This is a measure of ever having been infected ‘naturally’ with the hepatitis B virus. Best available evidence is that the long-term carrier rate, and hence infectivity of someone who has ever been infected with hepatitis B is 10%[4]. The anti hepatitis core test in this survey has a sensitivity of 82% (18% false negative) and specificity greater than 99% (less than 1% false positive).

For hepatitis C, the Central Public Health Laboratory tests for antibodies to the hepatitis C virus. The presence of antibodies to hepatitis C virus indicates previous or current infection; in 80% to 85% of cases the infection persists.[5, 6] The sensitivity of the antibody test used in

this survey is estimated to be 80%. This means that the false negative rate is 20%: one in every five who test negative are actually positive. The specificity was 100% which implies that all test results which are positive are truly positive.

The test for antibodies to the HIV virus used in this survey is a measure of ever having been infected with HIV. Best knowledge is that people who have ever been infected with HIV remain infectious for the duration of their lifetime. Both sensitivity and specificity for the antibody test to HIV used in this survey were greater than 99% (manufacturer's data).

2.6 Statistical methods

Data entry was carried out using an automated procedure[7] and was subsequently checked manually. Statistical analysis was carried out using JMP IN[8], and Stata.

Pearson X^2 test, and Fisher's exact test were used to compare proportions in independent groups of categorical data. The X^2 test for trend was used to identify linear trends in categorical data. Multiple logistic regression models were developed to determine which variables best predicted positive antibody results. Exact 95% confidence intervals were calculated for proportions of binomial variables and for regression adjusted odds ratios.

3 Results

The results of this study are presented in nine sections.

3.1 General information including response rate, age and gender profile and prison history of the respondents.
3.2 Prevalence of hepatitis B, hepatitis C and HIV.
3.3 Hepatitis B vaccination.
3.4 Prevalence and characteristics of drug use.
3.5 Sexual practices.
3.6 Tattooing.
3.7 Analysis of factors contributing to increased risk of hepatitis B, hepatitis C and HIV.
3.8 Comparison with the census survey.[3]
3.9 Estimated the total numbers of cases of hepatitis B, hepatitis C and HIV in the Irish prison population.

The frequency distributions of the responses to all questions are given in appendix 5.

Table totals vary throughout as not all respondents answered all questions.

To preserve confidentiality, most analyses are given by prison group rather than by individual prison.

Relevant comparisons with the census survey[3] are provided in Section 3.8. The frequency distributions of the responses to the census survey questionnaire are given in appendix 6.

3.1 General information

3.1.1 Response rates

The governors of the five selected prisons agreed to the survey; 607 out of 633 prisoners agreed to participate in the survey, an overall response rate of 96%; 596 prisoners contributed an analysable oral fluid sample. The response rate for each prison is shown in Table 1. Just over 5% (31) of the respondents said they had participated in the census survey, and two respondents were recommitted during the survey period (not shown separately in tables).

Table 1 – Committal survey response rate by prison

Prison	Committal population during the survey period	Released or transferred immediately	Sample available	Exclusions	Refusals	Number responded	Response rate (%)
High risk							
Mountjoy Male	343	45	298	2	7	289	97
Mountjoy Female	47	9	38			38	100
St Patrick's	176	21	155	1	3	151	97
Medium risk							
Cork	95	6	89	1	4	84	94
Limerick M&F	57	4	53	2	6	45	85
Total	718	85	633	6*	20	607#	96

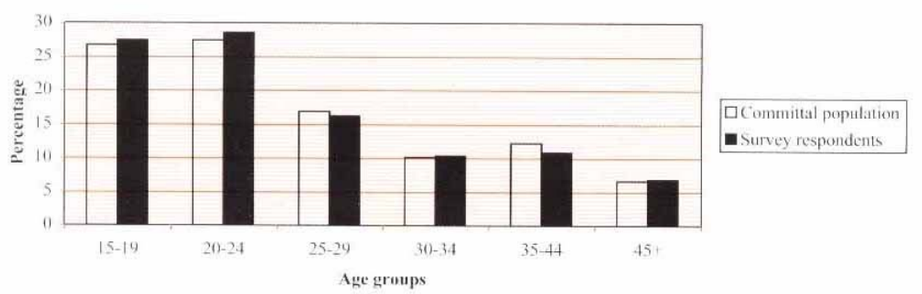
* 6 individuals were excluded from the survey as it was not possible to obtain informed consent (language or psychological difficulties).
\# 10 respondents did not provide an oral fluid sample and one sample was inadequate for analysis. Two individuals did not complete the questionnaire but provided samples.

3.1.2 Age and gender of respondents

The age profile of the respondents was similar to that of the overall population of the five participating prisons at the time of the survey (Figure 1) (X^2 = 0.9, df 5, p = 0.97). As anticipated, the prison population was very young. Over half (56.0%) the respondents were less than 25 years of age and 74 (12.3%) were less than 18 years of age (Appendix 5).

Just over 7% (43/607) were women. The age distribution was similar in men and women (X^2 = 0.9, df 4, p = 0.92). Five (6.8%) of the 74 committals under 18 years were female.

Figure 1 – Age profile of prison population and committal survey respondents

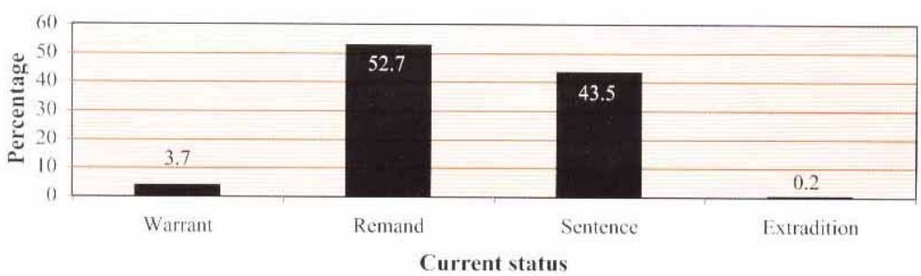


3.1.3 Prison history

Only 43.5% of the respondents had been sentenced prior to committal while the remainder were in on remand (52.7%), or on a warrant (3.7%) or for extradition (0.2%) (Figure 2). More than one third of the respondents (38%, 201) said they had never been in prison before. Within the committal population, the majority of prisoners had not been sentenced. Over one fifth (21.1%, 127) of the respondents had been committed to prison more than 5 times.

Almost half (36) of the 74 respondents aged less than 18 had never been in prison before but one had spent more than three of the past 10 years in prison. Sixty three (85%) of these young prisoners were detained in St. Patrick's Institution.

Figure 2 – Committal survey respondents current sentence



3.2 Prevalence of hepatitis B, hepatitis C and HIV

Prevalence was determined using antibody assays of oral fluid (Section 3.2.1). These rates were compared with self-reported infection status (Section 3.2.2). Although most of those with infections reported injecting drug use or sexual risk behaviours, some respondents had evidence of infection without apparent risk factors. This finding is discussed in Section 3.2.3.

3.2.1 Prevalence of antibodies in oral fluid

Table 2a presents the prevalence of the three blood-borne viral infections. Hepatitis C was by far the most common with 22% of respondents (130/596) testing positive. Hepatitis B was less common with 6.2% testing positive (37/596). HIV was relatively uncommon: only 12 respondents (2.0%) tested positive.

As expected, infection rates were significantly higher in the high risk prisons. For example, 27.3% of respondents were positive for hepatitis C in the high risk prisons compared to 0.8% in the medium risk prisons (Table 2a). The three Dublin prisons, Mountjoy Male and Female, and St. Patrick's Institution, had been defined for sampling purposes as high risk prisons as they were known to have illicit drug problems (see Methods). The proportion of respondents in these three prisons who reported ever injecting drugs was 36.2%, significantly higher than the 1.6% in the medium risk i.e. non-Dublin prisons (see Table 7, Section 3.4.1). The high infection rates in the high risk prisons are consistent with the high infection risks in injecting drug users (see below).

Table 2a – Prevalence of hepatitis B, hepatitis C and HIV in committal prisoners by prison category

	All **Total: 596** **No. (%)** ***95% CI***	**High risk** **Total: 473** **No. (%)** ***95% CI***	**Medium risk** **Total: 123** **No. (%)** ***95% CI***	**Test of association**
Hepatitis B positive	37 (6.2) *4.4-8.5*	35 (7.4) *5.2-10.1*	2 (1.6) *0.2-5.7*	Testing positive for hepatitis B was significantly more likely in prisoners committed to a high risk prison Pearson X2 = 5.6, df = 1, p < 0.02
Hepatitis C positive	130 (21.8) *18.6-25.4*	129 (27.3) *23.3-31.5*	1 (0.8) *0.02-4.4*	Testing positive for hepatitis C was significantly more likely in prisoners committed to a high risk prison Pearson X2 = 40.1, df=1, p < .0001
HIV positive	12 (2.0) *1.0-3.5*	10 (2.1) *1.0-3.8*	2 (1.6) *0.2-5.7*	Pearson X2 = 0.1, df = 1, p = 0.73. NS

NS = not significant

The three infections were far more common in those who reported ever injecting drugs or smoking heroin (in the last year) than in non-users (Table 2b and 2c). Hepatitis C was more common in those under 30 than in those aged 30 or over (Table 2d). The highest infection rate for hepatitis C was found in those aged 20-24 years (not shown in table). Infection rates were significantly higher amongst the women (Table 2e): hepatitis C was almost three times higher in women than men, hepatitis B was four times higher, while HIV was seven times more likely in women. These differences are likely to be attributable to the fact that the proportion of female committals reporting injecting drug use was considerably higher, at 60.5%, than the equivalent figure for men (26.6%) (see Table 8). Respondents never previously in prison had a much lower prevalence than those previously imprisoned. Prevalence rates for all three infections increased significantly with increasing time spent in prison (Table 2f).

Seven of the 74 respondents under 18 years of age were hepatitis C positive; four were positive for hepatitis B and none HIV positive.

Table 2b – Prevalence of hepatitis B, hepatitis C and HIV in committal prisoners by injecting drug use (IDU)

	IDU **Total: 173** **No. (%)** **95% *CI***	**Non IDU** **Total: 420** **No. (%)** ***95% CI***	**Test of association**
Hepatitis B positive	31 (17.9) *12.5-24.5*	5 (1.2) *0.4-2.8*	Testing positive for hepatitis B was significantly associated with reported injecting drug use Pearson X2 = 60.1, df = 1, p < .0001
Hepatitis C positive	124 (71.7) *64.3-78.3*	6 (1.4) *0.5-3.1*	Testing positive for hepatitis C was significantly associated with reported injecting drug use Pearson X2 = 353.2, df = 1, p < .0001
HIV positive	10 (5.8) *2.8-10.4*	2 (0.5) *0.1-1.7*	Testing positive for HIV was significantly associated with reported injecting drug use Pearson X2 = 17.4, df = 1, p < .0001

Table 2c – Prevalence of hepatitis B, hepatitis C and HIV in committal prisoners by heroin smoking in the last year

	Smoked heroin Total: 184 No. (%) 95% *CI*	Did not smoke heroin Total: 409 No. (%) *95% CI*	Test of association
Hepatitis B positive	27 (14.7) *9.9-20.6*	10 (2.4) *1.2-4.5*	Testing positive for hepatitis B was significantly associated with reported heroin smoking Pearson X2 = 32.4, df = 1, p < .0001
Hepatitis C positive	103 (56.0) *48.5-63.3*	26 (6.4) *4.2-9.2*	Testing positive for hepatitis C was significantly associated with reported heroin smoking Pearson X2 = 183.6, df = 1, p < .0001
HIV positive	8 (4.3) *1.9-8.4*	4 (1) *0.3-2.5*	Testing positive for HIV was significantly associated with reported heroin smoking Pearson X2 = 7.3, df = 1, p = < 0. 01

Table 2d – Prevalence of hepatitis B, hepatitis C and HIV in committal prisoners by age

	< 30 yr Total: 427 No. (%) *95% CI*	≥ 30 yr Total: 166 No. (%) *95% CI*	Test of association
Hepatitis B positive	24 (5.6) *3.6-8.2*	12 (7.2) *3.8-12.3*	Pearson X2= 0.5 df = 1, p < 0.46 NS
Hepatitis C positive	109 (25.5) *21.5-29.9*	19 (11.4) *7.0-17.3*	Testing positive for hepatitis C was significantly more likely in respondents under 30 years of age. Pearson X2 = 14.0, df = 1, p < .0001
HIV positive	6 (1.4) *0.5-3.0*	6 (3.6) *1.3-7.7*	Pearson X2= 2.9 df = 1, p < 0.09 NS

NS = not significant

Table 2e – Prevalence of hepatitis B, hepatitis C and HIV in committal prisoners by gender

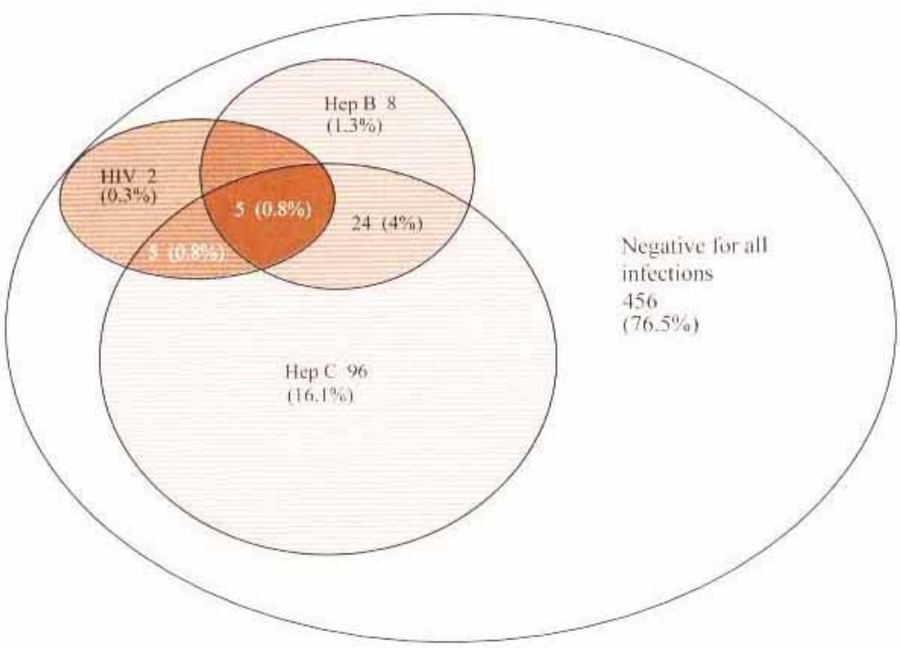
	Women Total: 41 No. (%) *95% CI*	Men Total: 555 No. (%) *95% CI*	Test of association
Hepatitis B positive	9 (22.0) *10.6-37.6*	28 (5.0) *3.4-7.2*	Testing positive for hepatitis B was significantly more likely in women. Pearson X2 = 18.7, df = 1, p < .0001
Hepatitis C positive	23 (56.1) *39.8-71.5*	107 (19.3) *16.1-22.8*	Testing positive for hepatitis C was significantly more likely in women. Pearson X2 = 30.3, df = 1, p < .0001
HIV positive	4 (9.8) *2.7-23.1*	8 (1.4) *0.6-2.8*	Testing positive for HIV was significantly more likely in women. Pearson X2 = 13.4, df = 1, p = 0.0003

Table 2f – Prevalence of hepatitis B, hepatitis C and HIV in committal prisoners by time spent in the last 10 year

	Time spent in prison None Total: 197 No. (%) 95% *CI*	1 day–3 years Total: 235 No. (%) *95% CI*	< 3 years Total: 87 No. (%) *95% CI*	Test of association
Hepatitis B positive	4 (2.0) *0.6-5.1*	20 (8.5) *5.3-12.8*	10 (11.5) *5.7-20.1*	Prevalence of hepatitis B increased significantly with increased length of time spent in prison. X2 for trend = 10.9, p < 0.001
Hepatitis C positive	5 (2.5) *0.8-5.8*	62 (26.4) *20.9-32.5*	53 (60.9) *49.9-71.2*	Prevalence of hepatitis C increased significantly with increased length of time spent in prison. X2 for trend = 118.3, p < 0.0001
HIV positive	1 (0.5) *0.01-2.8*	4 (1.7) *0.5-4.3*	7 (8.0) *3.3-15.9*	Prevalence of HIV increased significantly with increased length of time spent in prison. X2 for trend = 11.8, p < 0.0006

Figure 3 shows the inter-relationship between the three infections; 23.5% of prisoners had evidence of infection with at least one virus. Most of those who had antibodies to hepatitis B or HIV also had antibodies to one or more of the other two viruses (78.4% and 83.3% respectively) whereas only 26.2% (34/130) of those infected with hepatitis C had an additional infection.

Figure 3 – Number (%) of committal prisoners oral fluid test positive for hepatitis B, hepatitis C and HIV and the overlap between the infections, N = 596 (100%)



3.2.2 Comparison of prevalence from self-reporting and from oral fluid assays

The self-reported prevalence for each infection (calculated as a proportion of the total survey population) was lower than the prevalence derived from the oral fluid assays (Table 3). Using self reports to estimate prevalence for all committal prisoners would therefore have under-estimated the scale of the infection problem. The majority of respondents said they had not been tested previously. Others did not know whether they had been tested for the viruses, and of those who said they had been previously tested, a considerable number said they did not know the result.

Table 3 – Comparison of proportions positive for oral fluid test with self-reported status in committal prisoners, as a percentage of the total survey population and as a percentage of those tested

		By oral fluid test	Self-reported status	
			% of total survey population	% of those tested
	Antibody status	**No. (%)**	**No. (%)**	**No. (%)**
Hepatitis B	Positive	37 (6.2)	21 (3.4)	21 (17.3)
	Negative	559 (93.8)		84 (69.4)
	Do not know			16 (13.2)
	Total	596 (100)	607 (100)	121 (100)
Hepatitis C	Positive	130 (21.8)	89 (14.7)	89 (69.0)
	Negative	446 (78.2)		25 (19.4)
	Do not know			15 (11.6)
	Total	596 (100)	607 (100)	129 (100)
HIV	Positive	12 (2.0)	11 (1.8)	11 (6.5)
	Negative	584 (98.0)		126 (74.1)
	Do not know			33 (19.4)
	Total	596 (100)	607 (100)	170 (100)

The respondents who reported previous tests for any of these infections differed from the wider group in that they were more likely o be drug users. For example, those who reported having had a test for:

- hepatitis C were 16 times more likely to report injecting drug use (65.7% of injectors said they had had a test compared to only 4.0% of non injectors);
- hepatitis B were 10 times more likely to report injecting drug use;
- HIV were five times more likely to report injecting drug use (see Appendix 5).

Tables 4a-4c show the number of respondents who reported a previous negative test result but tested positive to the oral fluid assay and vice versa. (Note: The numbers in these tables relate only to respondents who knew their test results.) Almost one quarter (6/25) who claimed to have had a negative test result for hepatitis C had a positive oral fluid test result. The proportion of those testing positive but reporting negative was lower for hepatitis B (12/84) and for HIV (2/126). It was surprising to note that 60% (6/10) of those who reported being HIV positive, tested negative on the oral fluid assay, while almost half who self reported being hepatitis B positive tested negative. Only three (3.4%) of those who reported that they were hepatitis C positive were negative on the oral fluid test. Possible reasons for these discrepancies include: mistakes in filling out the questionnaire, misunderstanding the question, deliberate misrepresentation, change in antibody status since the previous test, and test error (including low test sensitivity for hepatitis B and C, and discrepancies between different laboratories).

Table 4a – Self-reported hepatitis B status and the oral fluid test results in committal prisoners

Oral fluid Test result	Reported hepatitis B result Positive	Negative	
Positive	11	*12* •	23
Negative	*9**	72	81
	20	84	104

• Respondent reported negative hepatitis B status but tested positive

* Respondent reported negative hepatitis B status but tested positive

Table 4b – Self-reported hepatitis C status and the oral fluid test results in committal prisoners

Oral fluid Test result	Reported hepatitis C result Positive	Negative	
Positive	85	*6* •	91
Negative	*3**	19	22
	88	25	113

• Respondent reported negative hepatitis C status but tested positive

* Respondent reported negative hepatitis C status but tested positive

Table 4c – Self-reported hepatitis HIV status and the oral fluid test results in committal prisoners

Oral fluid Test result	Reported HIV result Positive	Negative	
Positive	4	*2* •	6
Negative	*6**	124	130
	10	126	136

• Respondent reported negative HIV status but tested positive

* Respondent reported negative HIV status but tested positive

3.2.3 Infections among respondents with no risk factors

Of the 607 respondents, 370 reported having none of the main risk factors (i.e. said they had never injected drugs, never had anal sex with a man either inside or outside prison, and never been treated for a sexually transmitted infection). Among this subgroup, three respondents tested hepatitis B positive, five hepatitis C positive and two HIV positive. All were men.

Thirty-two of these 370 reported smoking heroin in the last year; two of these had hepatitis C. When respondents who smoked heroin, had tattoos, or had been paid for sex were excluded, there still remained one case of hepatitis B, one of hepatitis C and two cases of HIV who had no reported risk factors. None of these four respondents had more than one infection and none of them reported having been aware that they had one of the infections.

Inaccurate self-reporting of risk behaviours might explain these infections in respondents with no apparent risk factors. (Inaccurate reporting is always a potential problem in surveys, particularly with sensitive topics such as illicit drug use and sexual practices). Alternatively they may have had a partner whose sexual history was unknown to them. Or they may have

been infected through needle stick injuries, infected blood products or other unidentified routes of infection such as sharing razors and/or toothbrushes.

3.3 Uptake of hepatitis B vaccine

Self reported vaccine uptake rate is shown in Table 5. Vaccine uptake overall was disappointingly low:

- only 9.8% of respondents reported completing three doses of hepatitis B
- 11.7% completed one or two doses
- 78.5% reported not receiving hepatitis B vaccine.

Coverage was higher in those who had previously spent time in prison (Table 5). Vaccine uptake rates were equally low in those who were still susceptible to hepatitis B infection i.e. respondents whose antibody status was hepatitis B negative (Table 5). Only two of the 74 respondents under 18 had completed three doses of hepatitis B vaccine; a further two had received one or two doses.

Nevertheless, 79.1% (91) of the partially or fully vaccinated respondents had been immunised in prison.

Table 5 – Reported hepatitis B vaccination coverage in committals prisoners, respondents previously in prison, and hepatitis B negative respondents

	Completed 3 doses No. (%)	Completed 1 or 2 doses No. (%)	Did not receive Vaccine No. (%)	Total
All respondents	55 (9.8)	66 (11.7)	442 (78.5)	563
Respondents previously spent time in prison	50 (13.2)	62 (16.4)	266 (70.4)	378
Hepatitis B negative respondents	49 (9.4)	59 (11.4)	410 (79.1)	518

Table 6a shows the proportions vaccinated by length of time spent in prison over the last ten years. It is Department of Justice, Equality and Law Reform policy that all prisoners sentenced for eight months (equivalent to serving six months) or more should be offered hepatitis B vaccination. Therefore it is not surprising that commencement rates were highest in those who had spent more than three of the last 10 years in prison.

Overall however coverage is low and it is clear that the vaccination programme is targeted to long term prisoners but no necessarily to those most at risk (see Tables 6a-6c).

Table 6a – Reported hepatitis B vaccination coverage in committal prisoners by time spent in prison in the last 10 years

Hepatitis B vaccine status	Time in prison in the past 10 years			Test of association
	Never No./Total (%)	1 day-3 years No./Total (%)	>3 years No./Total (%)	
1 or more doses	7/180 (3.9)	52/228 (22.8)	52/85 (61.2)	X2 for trend = 262.9, p < 0.0001 Respondents who had spent time in prison were significantly more likely to have started a course of hepatitis B vaccine.
3 doses completed (of those who had at least 1 dose)	3/7 (42.8)	18/52 (34.6)	28/52 (53.8)	X2 for trend = 2.6, p = 0.11 NS

Table 6b – Reported hepatitis B vaccination coverage in committal prisoners by injecting drug use

Hepatitis B vaccine status	Injecting drug use Yes No./Total (%)	 No No./Total (%)	Test of association
1 or more doses	79/172 (45.9)	42/390 (10.8)	Respondents who were IDUs were significantly more likely to have commenced a course of vaccine. Pearson X2 = 87.3, df = 1, p < 0.0001
3 doses completed (of those who had at least 1 dose)	41/79 (51.8)	14/42 (33.3%)	Pearson X2 = 31.1, df = 1, p = 0.05 NS

Table 6c – Reported hepatitis B vaccination coverage in committal prisoners by hepatitis B status

Hepatitis B vaccine status	Hepatitis status (oral fluid) Negative No./Total (%)	 Positive No./Total (%)	Test of association
1 or more doses	108/518 (20.8)	13/36 (36.1)	Respondents who were oral fluid positive for hepatitis B were significantly likely to have commenced hepatitis B vaccine Pearson X2 = 4.6, df = 1, p = 0. 03
3 doses completed (of those who had at least 1 dose)	49/108 (45.4)	6/13 (46.1)	Pearson X2 = 0.1, df = 1, p = 0.89 NS

3.4 Drug use

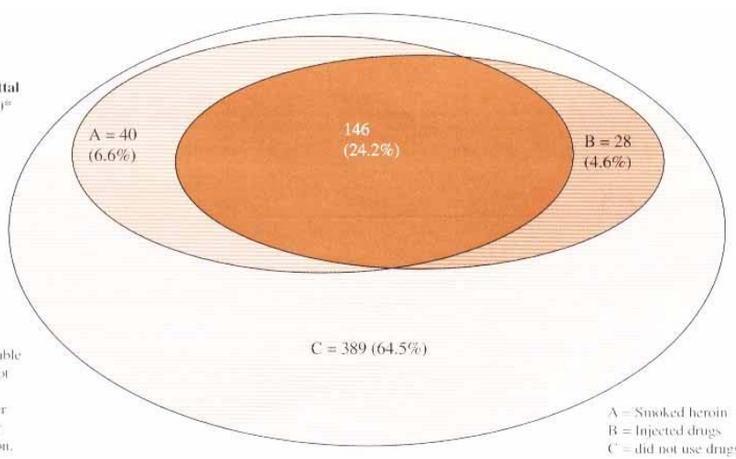
3.4.1 Reported drug use

Table 7 shows that 186 respondents said they had smoked heroin in the last year and 175 stated they had (ever) injected drugs. The proportion reporting drug use was much higher in the high risk prisons. Overall, 214 of the 604 respondents said hey had used heroin (Figure 4). Most, but not all, of those who said they had smoked heroin in the last year had also injected drugs and vice versa.

Table 7 – Proportion of committal prisoners who smoked heroin or ever injected drugs by prison category

	All No./Total (%)	High No./Total (%)	Medium No./Total (%)	Test of association
Smoked heroin in the last 12 months	186/604 (30.8)	173/477 (36.3)	13/127 (10.2)	Smoking heroin in the last year was significantly more common in high risk prisons Pearson X2 = 31.9, df = 1, p <0.0001
Ever injected drugs	175/604 (29.0)	173/478 (36.2)	2/126 (1.6)	Injecting drug use was significantly more common in high risk prisons Pearson X2 = 58, df = 1, p= <0.0001

Figure 4 – Inter-relationship between smoking heroin and injecting drug in committal prisoners, N=603 (100%)*



* The total differs from Table 7 as one respondent did not answer the ever injected drugs question and another respondent did not answer the smoked heroin question.

A = Smoked heroin
B = Injected drugs
C = did not use drugs

Twelve of the 74 respondents under 18 years of age reported smoking heroin in the last year and the same number reported ever injecting drugs.

Women prisoners were more likely to smoke heroin and/or inject drugs. Sixty five percent of women respondents reported smoking heroin in the last year compared to 28.2% of male respondents; 60.2% of male respondents; 60.5% of women respondents reported ever injecting drugs compared to 26.6% of men (Table 8).

Table 8 – Proportion of committal prisoners who smoked heroin or ever injected drugs by gender

	Gender		Test of association
	Women No./Total (%)	Men No./Total (%)	
Smoked heroin in the last year	28/43 (65.1)	158/561 (28.2)	Women were significantly more likely than men to report smoking heroin. Pearson X2 = 25.6, df = 1, p < 0.0001
Ever injected drugs	26/43 (60.5)	149/561 (26.6)	Women were significantly more likely than men to report drug use. Pearson X2 = 22.3, df = 1, p < 0.0001

Almost half the injectors (48.6%, 85) said they had commenced injecting before their 18th birthday (Figure 5); 68% (118) had first injected more than three years ago. Sixty six percent of injectors said they had injected drugs in the week prior to committal (42.2% in the previous 24 hours) (Appendix 5). This suggests that most were current drug users. Eight of the 12 injectors under 18 years of age reported injecting in the previous month. Of the 169 respondents with a history of injecting drug use, 35 (20.7%) reported injecting 1 to 19 times in the previous month while 87 (51.5%) said that they had injected more than 20 times.

3.4.2 Reported drug using behaviour in prison

Thirty prisoners (4.9% of the 607 respondents), or 17.3% of injectors (30/173), said they first started injecting drugs while in prison.

A higher number of injectors said they shared needles and syringes inside prison than outside:

- 64 (40.3%) said they shared needles while in prison whereas 53 (30.8%) said they shared in the month before committal
- 69 (43.4%) said they shared syringes in prison while 57 (33.1%) reported sharing outside.

(Note: no information was asked about the number of times injecting equipment was shared.)

Seven of the 12 injectors under the age of 18 reported sharing injecting equipment in the month before coming into prison, and only one reported sharing injecting equipment in prison.

Those who shared injecting equipment were significantly more likely to be infected with hepatitis C than those who did not share (Table 9a). Almost 82% (75) of injectors who said they had shared injecting equipment in the month before coming into prison were infected with hepatitis C compared to 59.5% (47) of those who had not shared outside in the month

Table 9a – Prevalence of hepatitis C committal prisoners in relation to sharing injecting equipment in prison or outside

	Shared Outside*		Test of association
	Yes No./Total (%)	No No./Total (%)	
Hepatitis C positive	75/92 (81.5)	47/79 (59.5)	Respondents who tested positive for hepatitis C were significantly more likely to have shared injecting equipment in the month prior to committal Pearson X2 = 10.1, df = 1, p = 0.001
	Shared Outside*		
Hepatitis C positive	63/69 (91.3)	53/87 (60.9)	Respondents who tested positive for hepatitis C were significantly more likely to have shared injecting equipment in prison Pearson X2 = 18.6, df = 1, p < 0.0001

*Shared injecting equipment in the month prior to this committal

before committal. The excess risk of sharing injecting equipment within the prison environment was even greater than sharing outside: 91.3% of those who said they had ever shared inside prison were infected with hepatitis C compared to 60.9% of those who had not shared in prison The prevalence of hepatitis C increased significantly with an increased frequency of injecting in the previous month (Table 9b).

Table 9b – Prevalence of hepatitis C results in committal prisoners by number of times injected in the last month

	0 No./Total (%)	1-19 No./Total (%)	20+ No./Total (%)	Test of association
Prevalence of hepatitis C	24/47 (51.1)	24/35 (68.6)	72/85 (84.7)	Prevalence of hepatitis C increased with an increased frequency of injecting X2 for trend = 17.5, df = 1, p < 0.0001

3.4.3 Methadone treatment prior to committal

Just over a third of the injecting drug users (60/173) said they were on a methadone programme prior to committal. This included five of the 12 injectors aged less than 18 years. A further three young respondents were on a methadone programme for heroin smokers at the time of committal.

A high proportion of those who said they were on methadone at committal (24/60, 40%) said they had injected on the day before entering the prison. A further 17 (28%) said they injected in the month before entering this committal. Only 12 (20%) respondents said they had not injected in the month prior to committal. Among those registered on a methadone programme:

- 12/55 had not injected in the last month
- 24/58 said they had injected more than 20 times in the previous month
- 20/59 reported that they had shared equipment during previous imprisonment
- 47/60 tested positive for hepatitis C

3.5 Sexual practices

The sexual risk factors reported by respondents are shown in Table 10 separately for injecting drug users and non-users. It was our impression that these questions were the least likely to have been answered truthfully.

Most respondents reported heterosexual activity in the year prior to committal. Only nine men

Table 10 – Reported sexual behaviour and risk factors in committal prisoners by reported IDU and non IDU

		All No./Total (%)	IDU No./Total (%)	IDU No./Total (%)
Heterosexual intercourse in the 12 months prior to committal		539/596 (90.4))	159/171 (93.0)	380/424 (89.6)
Number of heterosexual partners in the last year	**1-2**	340/536 (63.4)	104/157 (66.2)	236/379 (62.2)
	3-9	149/536 (27.8)	43/157 (27.4)	106/379 (28.0)
	10+	47/536 (8.8)	10/157 (6.4)	37/379 (9.8)
Use condoms during heterosexual intercourse		253/531 (47.6)	64/155 (41.3)	189/376 (50.3)
Men ever have anal sex with men		9/560 (1.6)	2/148 (1.4)	7/411 (1.7)
Use condoms during male homosexual intercourse		4/8 (50.0)	1/2 (50.0)	3/6 (50.0)
Men ever have anal sex with men in prison		3/354 (0.9)	1/131 (0.8)	2/222 (0.9)
Ever paid for any type of sex		26/559 (4.6)	8/148 (5.4)	18/410 (4.4)
Ever been paid for any type of sex		15/601 (2.5)	12/171 (7.0)	3/429 (0.7)
Ever treated for STI*		44/600 (7.3)	27/171 (15.8)	17/428 (4.0)

* Sexually transmitted infection

reported that they had ever had anal sex with a man (1.6% of the 560 men who responded to the question), and (0.9% of the 354 who answered the question) reported having had anal sex with a man while in prison. These two groups were not necessarily the same men. For example two men reported anal sex in prison having previously denied ever having sex with another man.

Other practices of note are listed below:

- Over half of the survey respondents reported never using condoms during heterosexual intercourse.
- Over one third reported having three or more heterosexual partners in the previous 12 months; this group was significantly more likely to use condoms (64%) than those who reported having one or two partners (36%) (Pearson X2 = 46.6, df 1, p < 0.0001).
- Almost 5% of respondents reported having been paid for any type of sex.
- Only 2.5% of respondents reported having been paid for any type of sex. However for all injecting drug users this figure rose to 7% and 21.7% for female injecting drug users.
- 7.3% of respondents reported that they had ever been treated for sexually transmitted infections. (A history of sexually transmitted infections in an indicator of "unsafe sex").

The tables in Appendix 7 show the frequency of the various sexual practices among those who tested positive for one or more of the three infections. Relevant features were:

- Respondents who tested positive for each of the three infections were significantly more likely to report ever having been paid for sex.
- Those who tested positive for hepatitis B and C were significantly more likely to report ever having been treated for sexually transmitted infections.

3.6 Tattooing

Three hundred and fifty eight respondents reported having a tattoo, almost half of all committals. Eighty-nine (25%) were tattooed in prison. One hundred and thirty-three tattoos were carried out by an artist, 112 by a friend, and 109 were self-administered.

Tattooing was significantly associated with injecting drug use (Pearson X^2 = 42.7, df 1, p = 0.0001), smoking heroin (Pearson X^2 = 29.4, df 1, p = 0.0001) and increased time spent in prison (X^2 for trend = 75.5, df 1, p < 0.0001).

Testing positive for hepatitis C was more common in those with a tattoo than in those without a tattoo (29.6% versus 10.3%, Table 11). Among the 87 who had a tattoo done in prison, 41.4% were hepatitis C positive compared to 26.2% (69/293) among those who had their tattoo done outside prison (Table 11). The prevalence of hepatitis C was higher in those who had done their own tattoo or had it done by a friend (35.5%) than in those who had it done by a tattoo artist (21.4%) (Table 11).

Table 11 – Tattooing as a risk factor for hepatitis C in committal prisoners

	Tattoo		**Test of association**
	Yes	**No**	
	No./Total (%)	**No./Total (%)**	
Hepatitis C positive	105/352 (29.8)	24/241 (10.0)	Hepatitis C positive respondents were more likely to have a tattoo Pearson X2 = 33.1, df = 1, p < 0.0001
	Tattoo done in prison		
	Yes	**No**	
	No./Total (%)	**No./Total (%)**	
Hepatitis C positive	36/87 (41.4)	69/263 (26.2)	Hepatitis C positive respondents were more likely to have had their tattoo(s) done in prison Pearson X2 = 7.1, df = 1, p = 0.007
	Tattoo done by:		
	Self/friend	**Artist**	
	No./Total (%)	**No./Total (%)**	
Hepatitis C positive	77/217 (35.5)	28/131 (21.4)	Hepatitis C positive respondents were more likely to have a self administered or friend administered tattoo(s) Pearson X2 = 7.7, df = 1, p = 0.005

3.7 Risk factors for infection

Analysis of individual risk factors showed that by far the most important predictor of both hepatitis B and hepatitis C was a history of injecting drug use. The link between injecting drug use and hepatitis C was particularly strong.

In order to clarify the links between the risk factors, the factors were combined in multivariate analyses (logistic regression), the main findings of which are described below. The relationships presented below are those that remained statistically significant after taking account of the inter-linking of risk behaviours. (The associations are expressed as odds ratios (OR) adjusted for confounding).

- Respondents with evidence of hepatitis B infection were more likely to be injecting drug users and women. Those who reported ever injecting drugs were 15 times more likely to be hepatitis B positive than those who did not report injecting (adjusted OR 15.9, CI 6.5-47.6). (Table 12a)
- Those positive for hepatitis C were very likely to be injecting drug users (adjusted OR 89.1, CI 37.4-255.3); women respondents reporting treatment for sexually transmitted infections and respondents who had spent increasing time in prison during the last 10 years were more likely to be hepatitis C positive (Table 12b). Tattooing was not a significant dependent risk factor.

Table 12a – Logistic regression model to identify independent associations with hepatitis B infection in the committal survey population

	Total sample 596 No.	**Hepatitis B negative 559 No.**	**Hepatitis B positive 37 No.**	**Prevalence of hepatitis B %**	**Odds ratio**	**95% CI**	**p-value**
Ever injected drugs							
No	420	415	5	1.2	1		
Yes	173	142	31	17.9	15.9	6.5-47.6	<0.0001
Missing	3						
Gender							
Male	555	527	28	5.1	1		
Female	41	32	9	21.9	2.7	1.1-6.5	0.0283
Missing	0						
Whole model	$X^2 = 59$ $R^2 = .22$ $p < 0.0001$						

Table 12b – Logistic regression model to identify independent associations with hepatitis C infection in the committal survey population

	Total sample 596 No.	**Hepatitis C negative 466 No.**	**Hepatitis C positive 130 No.**	**Prevalence of hepatitis C %**	**Odds ratio**	**95% CI**	**p-value**
Ever injected drugs							
No	420	414	6	1.4	1		
Yes	173	49	124	71.7	89.1	37.4-255.3	<0.0001
Missing	3						
Gender							
Male	555	448	107	19.3	1		
Female	41	18	23	56.1	7.3	1.9-35.8	0.009
Missing	0						
Total amount of time spent in prison over the last 10 years							
<3 months	261	248	13*	50	1		
3-11 months	64	48	16	25.0	4.9	1.5-17.4	0.01
12-36 months	107	69	38	35.5	5.2	2.0-14.6	0.001
>3 years	87	34	53	60.9	14.2	5.1-43.6	<0.0001
Missing	77						
Ever treated for STI							
No	546	445	101	18.5	1		
Yes	44	18	26	59.1	7.4	1.9-33.7	0.007
Missing	6						
Whole model	$X^2 = 353$, $R^2 = .64$ $p < 0.0001$						

*Sexually transmitted infection

- Women, and respondents who had spent more than three years in prison had an increased risk of HIV infection (Table 12c). The total number testing positive for HIV was very small (12/596) and the numbers with the two risk factors were even smaller (women: 4, and over three years spent in prison: 7). Therefore inferences from this model are limited.

Table 12c – Logistic regression model to identify independent associations with HIV infection in the committal survey population

	Total sample 596 No.	**HIV negative 584 No.**	**HIV positive 12 No.**	**Prevalence of HIV % **	**Odds ratio**	**95% CI***	**p-value**
Gender							
Male	555	547	8	1.4	1		
Female	41	37	4	9.7	9.6	2.3-37.4	0.001
Missing	0						
Total amount of time spent in prison over the last 10 years							
<3 months	261	260	1	0.4	1		
3-11 months	64	62	2	3.1	8.4	0.8-185.2	0.09
12-36 months	107	105	2	1.9	4.9	0.5-107.9	0.2
>3 years	87	80	7	8.0	27.1	4.5-521.2	0.003
Missing	77						

Whole model $X^2 = 23.2$, $R^2 = .20$ $p < 0.0001$

Injecting drug use was clearly the biggest contributor to infection with hepatitis B and hepatitis C. Consequently the data have been analysed to identify behaviours that contributed to the 'riskiness' of injecting. The relationships below are those that remained significant after taking account of the inter-linking of risk behaviours (The associations are expressed as odds ratios (OR) adjusted for confounding). The detailed models are presented in the tables in Appendix 8.

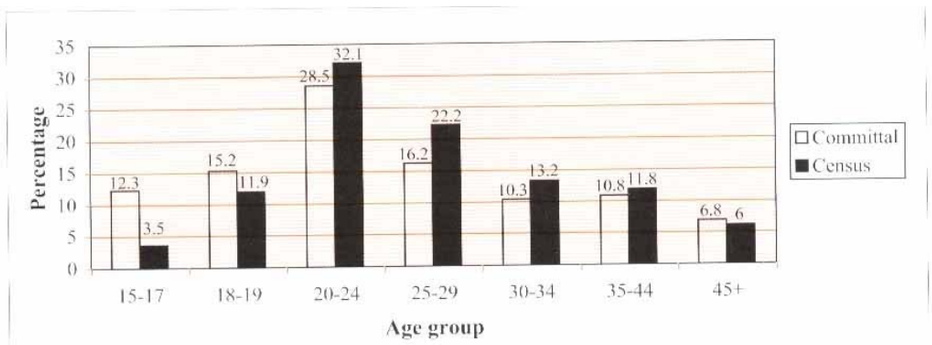
- Injecting drug users aged 30 or over were almost 5 times more likely than injectors under 30 (adjusted OR 4.8, CI 14.1) to have evidence of hepatitis B infection. Injectors with a history of more than 10 sex partners in previous 12 months had a higher hepatitis B risk than those who had reported having 1-2 partners (adjusted OR 5.3, CI 1.2-22.3), (see Appendix 8A)
- Those who reported frequent injecting in the month prior to the survey and injectors who had shared needles in prison (adjusted OR 5.9, CI 2.2-18.8) were at increased risk of hepatitis C infection. (see Appendix 8B)
- Injectors drug users age 30 or over were over six times more likely than injectors under 30 to have evidence of HIV infection (adjusted OR 7.3, CI 1.8-31.8); respondents who had shared needles in the month prior to imprisonment were seven times more likely to have evidence of HIV infection (adjusted OR 7.1, CI 1.8-36.7)

3.8 Comparison of the committal and census surveys

3.8.1 Age and gender of respondents

Respondents in the committal survey were significantly younger than in the census survey X^2 = 63.5, df 6 p-value < 0.0001) (Figure 5). For example, 27.4% (166/607) of the committal population were less than 20 years old compared to 15.4% (177/1147) of the census population. A higher proportion of the respondents in the committal survey were women: 7.1% (43/607) compared with 4.7% (57/1205) in the census survey (X^2 = 4.3, df 1, p = 0.0383).

Figure 5 – Age profile of committal and census survey respondents

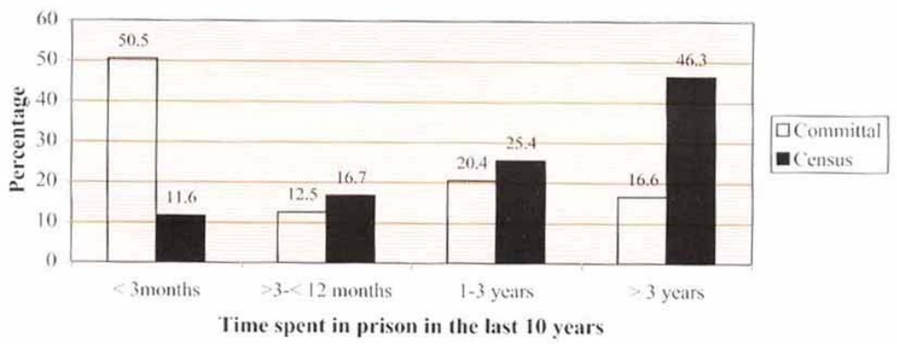


3.8.2 Prison history

The current sentence profile differed from that of the census population in that a higher proportion of the committal prisoners were on remand (52.7% v 13.1%) and a further 3.7% were committed for a short period on warrant, mainly for non payment of fines or breach of the peace.

The proportion of committals who reported having been in prison for more than three of the last 10 years (16.6%) was significantly lower than in the census survey (46.3%). (Figure 6)

Figure 6 – Time spent in prison in the last 10 years by committal and census survey



X^2 = 327.9, df 3, p <0.0001

3.8.3 Prevalence of hepatitis B, hepatitis C and HIV

In general hepatitis infection rates were lower in the committal population (Figure 7), although in both surveys the proportions of injecting drug users infected with hepatitis B, hepatitis C and HIV were similar (Figure 8)

Figure 7 – Prevalence of the three infections in committal and census surveys

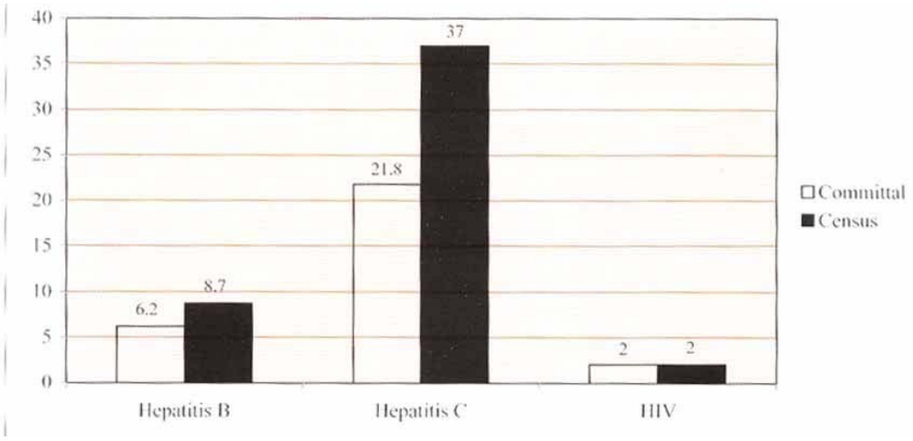
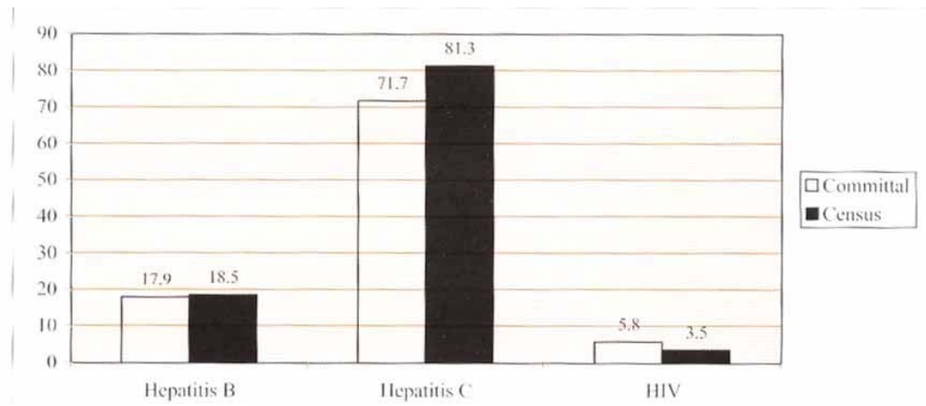
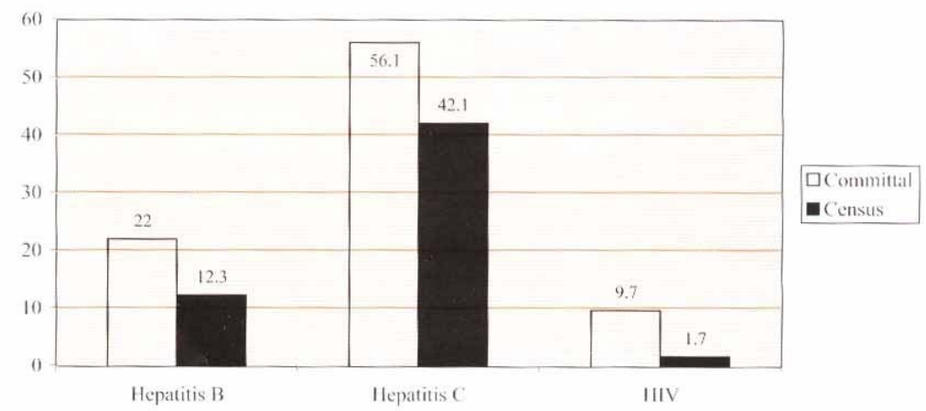


Figure 8 – Prevalence of the three infections in those reporting IDU in committal and census surveys



Infection rates for hepatitis B, hepatitis C and HIV in women were higher in the committal survey than in the census survey, (Figure 9).

Figure 9 – Prevalence of the three infections in women in committal and census surveys



The proportion of the total survey population infected with one or more viruses was lower in the committal survey (23.5%) than in the census survey (38.5%). The proportion with more than one infection was also slightly lower in the committal survey (8.5%) versus 5.7%).

In both surveys the levels of discrepancy between self-reported test results and laboratory test results were similar.

3.8.4 Hepatitis B vaccination

The reported overall hepatitis B vaccine coverage was significantly lower in the committal survey:

- 9.8% of respondents reported completing three doses of hepatitis B compared to 28.9% in the census survey.
- 11.7% completed one or two doses compared to 19.0% in the census survey.

When first time prisoners were excluded, the vaccine commencement rate was higher in the committal survey (29.6% compared to 19.0%), although the completion rate remained lower among the committal population (13.2% versus 28.9%). The high proportion of short-term prisoners in this population may explain this.

3.8.5 Drug use

The proportion reporting drug use was significantly lower in the committal survey than in the census survey (smoked heroin: 30.8% versus 45.9%, X2 = 37.9, df 1, $p < 0.0001$; ever injected drugs: 29% versus 43.2%, $X^2 = 34.6$, df 1, $p < 0.0001$).

Respondents in both surveys reported starting injecting at similar ages (Figure 10), although a higher proportion (82%) of the injecting drug users in the census survey reported commencing injecting more than three years ago (X2 = 15.5, df 4, p = 0.0038). This finding could be explained by the fact that the committal survey population has a higher proportion of young respondents. The proportions relating to the last time the respondents injected before committal to prison were also similar in the two surveys (Figure 11).

Figure 10 – Age stated injecting drugs in the committal and census survey respondents

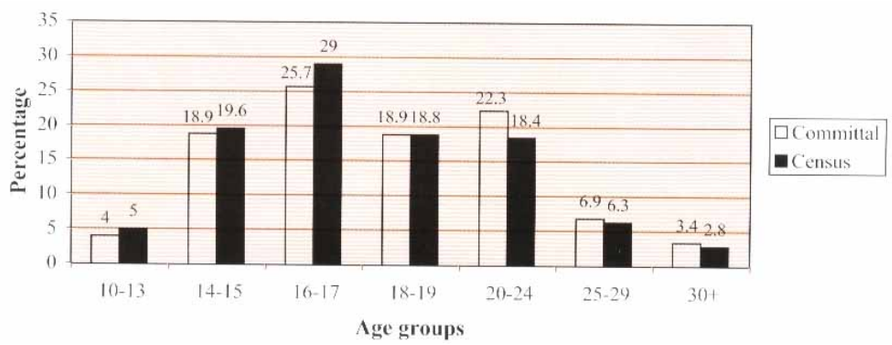
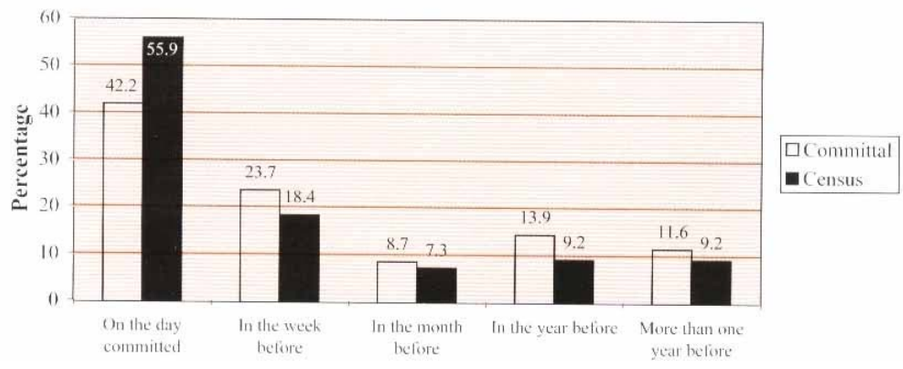


Figure 11 – Last time drug users injected before committal to prison by committal and census survey



Similar proportions of injecting drug users in both surveys reported starting injecting in prison: 17.3% (30/173) in the committal survey and 20.6% (104/506) in the census survey, (X2 = 0.8, df 1, p = 0.3594).

Injecting practices in the committal survey were significantly different from those reported in the census survey by respondents who had spent more than three months in prison. A higher proportion of the census population reported not injecting in the month prior to the survey (X2 = 72.6, df 2, p < 0.0001). (Figure 12) This suggests that some injecting drug users stopped injecting when in prison. However, compared to the committal population, respondents in the census survey reported higher rates of sharing injecting equipment both in the month prior to imprisonment (X^2 = 7.0, df 2, p = 0.0297), and in prison (X^2 = 55.9, df 2, p < 0.0001) (Figures 13a and b).

Figure 12 – Frequency of injecting in the month prior to the survey by committal and census (in prison more than 3 months) injecting drug users

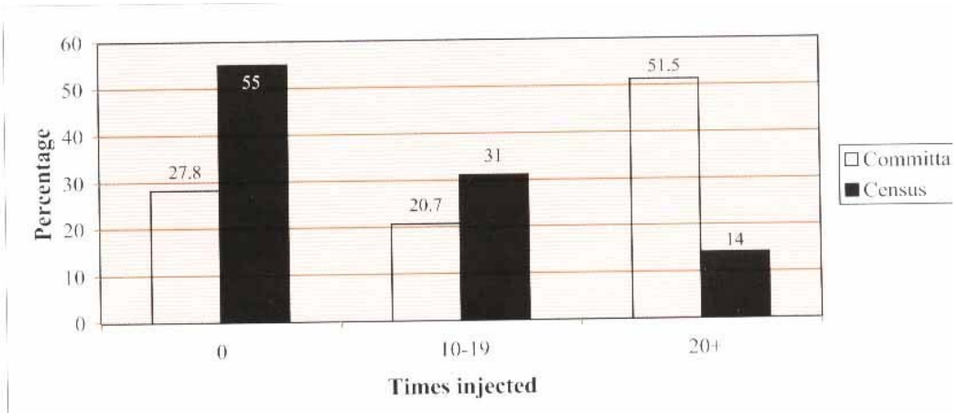


Figure 13a – Frequency of sharing injecting equipment in the month before imprisonment by committal and census survey

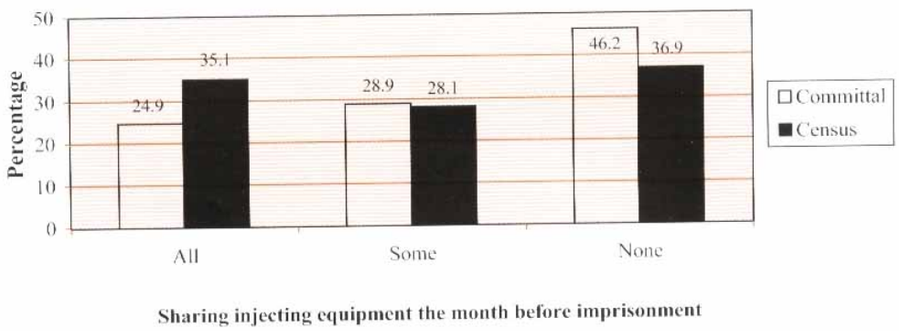
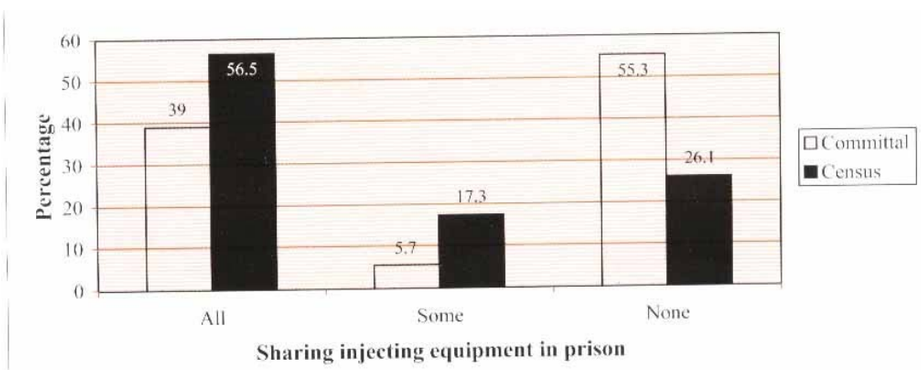


Figure 13b – Frequency of sharing injecting equipment in prison by committal and census survey



3.8.6 Sexual practices

The reported use of condoms was significantly higher in the committal survey (47.6%) than in the census survey (33.8%). ($X2 = 28.2$, df 1, $p = 0.0001$)

The proportion of respondents reporting treatment for a sexually transmitted infection was significantly higher in the census population (12.6% versus 7.3%) ($X2 = 11.5$, df 1, $p = 0.001$). In both surveys, reporting treatment for sexually transmitted infections was more common in injecting drug users than in non-drug users: 15.8% in the committal survey and 17.3% in the census survey. In the census survey, a history of treatment for sexually transmitted infections was more strongly associated with testing positive for hepatitis B and HIV than in the committal survey.

In the census survey men who reported anal sex with men were more likely to test positive for hepatitis B and HIV; this association was not found in the committal survey. This could be due to the small numbers of men reporting anal sex in the committal survey.

3.8.7 Risk factors for infection

Injecting drug use was a risk factor for hepatitis B in both surveys. Age over 29 years and treatment for sexually transmitted infections were additional risk factors in the census survey.

Infecting drug use and time spent in prison were significant risk factors for hepatitis C in both surveys, but age less than 30 years and smoking heroin were additional predictors in the census survey.

The risk factors for hepatitis B and hepatitis C in injecting drug users were similar in both surveys.

The predictors for testing positive for HIV in the committal survey (female gender, and time spent in prison) differed from those in the census survey (injecting drug use, ever treated for sexually transmitted infection and anal sex between men). The risk factors for HIV among drug users also differed in the two surveys. This lack of consistency is likely to be due to small numbers in both surveys.

3.9 Estimated numbers of cases of hepatitis B, hepatitis C and HIV in the Irish prison populations

3.9.1 Estimated numbers of cases among those residing in prison September to November 1998

In the census survey, just under 54% of high and medium risk prisoners were tested for hepatitis B, hepatitis C and HIV; 44.8 % of all prisoners were tested. The proportion of positive cases for each infection among the samples tested was applied to the prison population in the medium and high risk category at the time of the survey to estimate the total number of cases in these populations.

The total expected numbers of cases in the prison population at the time of the survey were calculated using the estimated numbers of cases in high and medium risk prisons, plus the expected number of cases in low risk prisons using relevant scenarios outlined in Appendix 9 (i.e. population prevalence and prevalence among non drug users in medium risk prisons).

The estimates of the numbers infected with hepatitis B and HIV using two different sets of assumptions were similar (Appendix 9). The estimated total number of people with hepatitis B infection residing in Irish prisons at the time of the census survey was between 204 and 215, and the estimated number of people with HIV infection was between 47 and 56. Using the single assumption available, the estimated number infected with hepatitis C was between 869 and 883.

3.9.2 Estimated numbers of cases among those committed to prison in 1998

Individuals may be committed to prison more than once in the year[1, 9] but the approximate number of re-committals for a given year is not available. The Department of Justice, Equality and law Reform were unable to provide the percentage of re-committals in 1998 and for reasons of confidentiality could not provide us with access to files. It is anticipated that the system will be computerised in 2000 and will then be able to provide estimates of re-committals annually. Until these estimates are available, it is not possible to provide realistic estimates of the numbers of infected persons entering Irish prisons.

4 Discussion

When compared with the resident population,[3] the committal population differed in that there was a higher proportion of younger prisoners, women, and respondents who have spent less than three months in the last 10 years in prison. The prevalence of injecting drug use was significantly lower, as was the overall prevalence of hepatitis B and hepatitis C.

The prevalence of these infections in injecting drug users was similar in both surveys and reflects the prevalence found in injecting drug users in the community (Dr. J. Barry, personal communication).

In the committal survey women were more likely than men to be hepatitis B and hepatitis C positive and to report injecting drug use. Even after taking account of the inter-linking risk factors and behaviours, women were three times more likely to test positive for hepatitis B (OR 2.7, CI 1.1-6.5), seven times more likely to test positive for hepatitis C (OR 7.3, CI 1.9-35.8) and almost 10 times more likely to test positive for HIV (OR 9.6, 2.3-37.4).

The numbers with HIV were very small which makes it difficult to draw conclusions about the risk behaviours associated with this infection. There were two undiagnosed cases of HIV among the respondents tested. The value of offering routine testing to high risk categories such as prisoners may be considered in the future as research has shown that current treatment regimes for HIV positive individuals, when commenced early, extend survival and prevent damage to the immune system.[10, 11] In both survey, a sizeable number of respondents were found who reported they were HIV positive when in fact they tested negative. On committal to prison, it may be advisable to offer any individual who thinks s/he is HIV positive a confidential test to confirm their HIV status. One should not underestimate the psychological effects of thinking one is HIV positive.

Between 30 and 60% of those with chronic liver disease as a result of hepatitis C infection will develop chronic active hepatitis and, of these, 5-20% will develop cirrhosis of the liver.[4] This will contribute to the future burden of disease within deprived communities in Ireland. In the USA, recent research into drug therapy for hepatitis C has yielded encouraging findings; during initial treatment using combination therapy, 31-38% had cleared the virus from their system when tested 24 weeks later,[12] while 49% of relapsed cases had a similar outcome.[13] It would be advisable for the prison health authorities to continue to review research and to consider proactive treatment as more effective protocols are developed.

The reported age distribution of starting to inject was similar in both the committal and census surveys, although injecting and sharing practices were different. Similar injecting habits and sharing practices among injecting drug users in the community and in prison have been reported elsewhere;[14] injecting drug users in the community tended to inject more frequently and shared less frequently than those imprisoned. Individuals who were imprisoned injected less frequently but had more harmful sharing practices.

In the committal survey, tattooing was associated with hepatitis C. When the links between injecting drug use and length of time in prison were accounted for, the association between tattooing and hepatitis C was no longer significant.

Also of note was that one sixth of injecting drug users reported treatment for sexually transmitted infections, and, in the committal survey, were more likely to sell six for income. The prevalence of sexually transmitted infections in the Irish prison population has not been assessed to date although the link with HIV and hepatitis B is well established. The presence of a sexually transmitted disease will accelerate the progression of HIV. Sexually transmitted infections can be easily treated in sentenced prison population.

In both surveys hepatitis B vaccination coverage was low, although due to the high proportion of first time prisoners, the coverage was even lower among the committal prisoners. The vaccine was targeted towards long term prisoners but not towards those who are hepatitis B negative. Vaccine completion rates were lower in the injecting drug users. This may be because the importance of competing the vaccine was not clear to the injecting drug users or because they do not think the vaccine is important or useful. In discussions with the prisoners many of the prisoners had misinformation about hepatitis B and hepatitis C that may influence their evaluation of the effectiveness of the vaccine. The purpose of, number of doses, and target group for the vaccine need to be clarified with all prisoners. Hepatitis B vaccine is considered very effective; prisoners and also injecting drug users are high risk populations for this disease. The vaccine is now available to medical card holders within the high risk population and therefore it would be advisable for all prisoners to have the vaccine on committal, regardless of their length of sentence, as follow up doses can be given by their GPs or in drug treatment centres.

Prisoners suffer from a range of sensitive and serious medical conditions. Confidentiality, counselling and education are required to deal with these conditions. The provision of these skills in the interests of prisoner health and well-being would require a multidisciplinary team, independent of the prison security function.

5 Recommendations

The findings in this survey support the recommendations made in the census survey in particular, the need for:

- Active infectious disease control and surveillance
- Provision of harm reduction measures for injecting drug users
- Health services provided by an independent multidisciplinary team.

Further recommendations are outlined below.

- As treatments for hepatitis C improve, the introduction of a proactive treatment regime for sentenced prisoners through referral to a hepatologist should be considered.
- A proactive approach to identifying HIV positive prisoners and commencing appropriate therapy.
- Confidential HIV testing for all prisoners who think they may have the infection should be provided.
- Prisoners, in particular drug users, should be offered screening for sexually transmitted infections on committal, and treatment if necessary.
- Prisoners need to be informed of the potential dangers of tattooing using non-sterile equipment.
- There is a strong case for the provision of more health information on hepatitis and its prevention to counteract misinformation that exists about hepatitis B and hepatitis C, and hepatitis B vaccination.

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Appendix 1

Request for Proposal

Department of Justice, Equality and Law Reform

PRISONS DIVISION RESEARCH PROGRAMME

REQUEST FOR PROPOSAL (RFP

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2. LEVEL OF HIV AND HEPATITIS INFECTION AMONG PRISONER POPULATION

1 Background

The Department of Justice, Equality and Law Reform is embarking on a research programme in relation to various matters within its area of responsibility. Several of these matters fall under the remit of the Prisons Division. Prisons Division has responsibility for the provision and maintenance of a secure, efficient and progressive system of containment and rehabilitation for offenders committed to custody. The Division aims to treat offenders while in custody with care, justice, dignity and respect with particular emphasis on health, education, training and offender welfare.

2 Project

In this context, the Prisons Division is seeking to establish levels of HIV and Hepatitis infection among the prisoner population. The project involves

- the design of an appropriate anonymous questionnaire;
- the organisation of the completion of this questionnaire across a wide representative sample of the prisoner population;
- the organisation of a complimentary programme of saliva testing;
- the compilation of the results of the questionnaire; and
- the study of those results and the production of a finished report on the findings.

Accordingly the Department hereby invites proposals for the provision of the above service. Proposals should include

- a detailed outline of the methodology
- timescale; and
- total cost of the research exercise

INVITATION TO TENDER

Appendix 2

Survey Team

Dr Shane Allwright	Senior Lecturer in Epidemiology*
Dr Joseph Barry	Public Health Doctor
Dr Fiona Bradley	General Practitioner
Ms Una Cronin	Research Nurse, MSc
Ms Carrie Garavan	Research Nurse, MPH
Ms Jean Long	Research Nurse, MSc*
Ms Geraldine McCullough	Research Nurse, MSc*
Ms Ailbhe Mealy	Executive Officer*
Ms Sheilagh Reaper-Reynolds	Research Officer, MSc*
Dr Leila Thornton	Public Health Doctor

*affiliated with the Department of Community Health and General Practice

Appendix 3a

Questionnaire for male respondents

ANONYMOUS SURVEY OF HIV & HEPATITIS SURVEY IN IRISH PRISONS

Please answer by filling in the circles like this ..... O

1 Have you taken part in this survey BEFORE?

Yes ..... O
No ..... O

If yes, how many times on committal_____
as an inmate_____

2 How OLD are you? (in years) _____

3 Are you

On remand ..... O
Sentenced ..... O
Other_____ O

4 How many TIMES have you been in prison?

Never ..... O
1-5 times..... O
More than 5 times..... O

5 How much of the last 10 YEARS have you spent in prison?_____

6 Do you have a tattoo?

Yes ..... O
No ..... O
If yes, did you have it done in prison..... O
outside ..... O
Who did it?……. Self..... O
Friend/Relative ..... O
Tattoo Artist ..... O

7 In the LAST YEAR have you smoked (chased) heroin?

Yes..... O
No ..... O

8 Have you EVER INJECTED drugs?

Yes..... O
No ..... O

***If YES*, please turn to next page**
***If NO*, please go to Question 16* on Page 3** ➔

9 How OLD were you when you first injected drugs? (in years) _____

09 How OLD were you when you first injected drugs? _____
(in years)

10 Were you in prison the FIRST time you ever injected?

Yes	.....	O
No	.....	O

11 How many TIMES have you injected in the last month? _____

12 When was the LAST time you injected BEFORE coming into prison?

On the day you came into prison	.....	O
In the week before	.....	O
In the month before	.....	O
In the year before	.....	O
More than 1 year before	.....	O

13 In the MONTH BEFORE coming into prison, had you SHARED any of these works with someone else:

- needles (spikes)?	Yes	.....	O
	No	.....	O
- syringes (barrels)?	Yes	.....	O
	No	.....	O
- others?	Yes	.....	O
- (filters, spoons etc.)	No	.....	O

14 Are you on a methadone programme?

Yes	.....	O
No	.....	O

15 If you were IN PRISON BEFORE did you ever SHARE any of these works with someone else during your sentence:

- needles (spikes)?	Yes	.....	O
	No	.....	O
- syringes (barrels)?	Yes	.....	O
	No	.....	O
- others?	Yes	.....	O
(filters, spoons etc.)	No	.....	O

HALF WAY THERE!!!

☺

16* **In the 12 MONTHS BEFORE coming into prison did you have vaginal sex with a women?**

Yes ..... O
No ..... O

If yes, with how many women

1-2 ..... O
3-9 ..... O
more than 9..... O

Did you use condoms?

Always/Sometimes ..... O
Never ..... O

17 Did you EVER have anal sex with another man?

Yes ..... O
No ..... O

If yes, did not use condoms?

Always/Sometimes ..... O
Never ..... O

18 Did you ever have anal sex IN PRISON with another man?

Yes ..... O
No ..... O
Does not apply ..... O

19 Have you ever you ever PAID money, goods or drugs for any type of sex?

Yes ..... O
No ..... O

20 Have you ever BEEN PAID money, goods or drugs for any type of sex?

Yes ..... O
No ..... O

21 Have you ever been treated for an STD? (sexually transmitted disease)

Yes ..... O
No ..... O

Please turn to last page ➔ ➔

22 Have you ever had a blood test of HIV?

Yes ..... O
No ..... O
Don't know ..... O

If yes, what was the result?

Positive (infected) ..... O
Negative (not infected) ..... O
Don't know ..... O

23 Have you ever had a blood test for hepatitis B?

Yes ..... O
No ..... O
Don't know ..... O

If yes, what was the result?

Positive (infected) ..... O
Negative (not infected) ..... O
Don't know ..... O

24 Have you been vaccinated against hepatitis B?

Yes ..... O
No ..... O
Don't know ..... O

If yes, were you vaccinated in prison?

Yes ..... O
No ..... O

If vaccinated, have you had the complete course of 3 injections?

Yes ..... O
No ..... O
Don't know ..... O

25 Have you ever had a blood test for hepatitis C?

Yes ..... O
No ..... O
Don't know ..... O

If yes, what was the result?

Positive (infected) ..... O
Negative (not infected) ..... O
Don't know ..... O

THANKS FOR TAKING PART

PLEASE PUT THE SALIVA AND QUESTIONNAIRE IN THE ENVELOPE

Appendix 3b

Questionnaire for male respondents

ANONYMOUS SURVEY OF HIV & HEPATITIS SURVEY IN IRISH PRISONS

Please answer by filling in the circles like this ..... O

1 Have you taken part in this survey BEFORE?

Yes ..... O
No ..... O

If yes, how many times on committal_____
as an inmate_____

2 How OLD are you? (in years) _____

3 Are you

On remand ..... O
Sentenced ..... O
Other_____ O

4 How many TIMES have you been in prison?

Never ..... O
1-5 times..... O
More than 5 times..... O

5 How much of the last 10 YEARS have you spent in prison?_____

6 Do you have a tattoo?

Yes ..... O
No ..... O
If yes, did you have it done in prison ..... O
outside ..... O
Who did it?..... Self..... O
Friend/Relative ..... O
Tattoo Artist ..... O

7 In the LAST YEAR have you smoked (chased) heroin?

Yes..... O
No ..... O

8 Have you EVER INJECTED drugs?

Yes..... O
No ..... O

***If YES*, please turn to next page**
***If NO*, please go to Question 16* on Page 3** ➔

9 How OLD were you when you first injected drugs? (in years) _____

10 Were you in prison the FIRST time you ever injected?

Yes	.....	O
No	.....	O

11 How many TIMES have you injected in the last month? _____

12 When was the LAST time you injected BEFORE coming into prison?

On the day you came into prison	.....	O
In the week before	.....	O
In the month before	.....	O
In the year before	.....	O
More than 1 year before	.....	O

13 In the MONTH BEFORE coming into prison, had you SHARED any of these works with someone else:

- needles (spikes)?	Yes	.....	O
	No	.....	O
- syringes (barrels)?	Yes	.....	O
	No	.....	O
- others?	Yes	.....	O
- (filters, spoons etc.)	No	.....	O

14 Are you on a methadone programme?

Yes	.....	O
No	.....	O

15 If you were IN PRISON BEFORE did you ever SHARE any of these works with someone else during your sentence:

- needles (spikes)?	Yes	.....	O
	No	.....	O
- syringes (barrels)?	Yes	.....	O
	No	.....	O
- others?	Yes	.....	O
(filters, spoons etc.)	No	.....	O

HALF WAY THERE!!!

☺

16* **In the 12 MONTHS BEFORE coming into prison did you have vaginal sex with a man?**

Yes ..... O
No ..... O

If yes, with how many men

1-2 ..... O
3-9 ..... O
More than 9..... O

Did you use condoms?

Always/Sometimes ..... O
Never ..... O

17 Have you ever BEEN PAID money, goods or drugs for any type of sex?

Yes ..... O
No ..... O

18 Have you ever been treated for an STD? (sexually transmitted disease)

Yes ..... O
No ..... O

Please turn to last page ➔ ➔

20 Have you ever had a blood test of HIV?

Yes ..... O
No ..... O
Don't know ..... O

If yes, what was the result?

Positive (infected) ..... O
Negative (not infected) ..... O
Don't know ..... O

21 Have you ever had a blood test for hepatitis B?

Yes ..... O
No ..... O
Don't know ..... O

If yes, what was the result?

Positive (infected) ..... O
Negative (not infected) ..... O
Don't know ..... O

22 Have you been vaccinated against hepatitis B?

Yes ..... O
No ..... O
Don't know ..... O

If yes, were you vaccinated in prison?

Yes ..... O
No ..... O

If vaccinated, have you had the complete course of 3 injections?

Yes ..... O
No ..... O
Don't know ..... O

23 Have you ever had a blood test for hepatitis C?

Yes ..... O
No ..... O
Don't know ..... O

If yes, what was the result?

Positive (infected) ..... O
Negative (not infected) ..... O
Don't know ..... O

THANKS FOR TAKING PART 

PLEASE PUT THE SALIVA AND QUESTIONNAIRE IN THE ENVELOPE 

Appendix 4

Laboratory analysis of oral fluid specimens

Each oral fluid specimen was tested for total IgG (to check specimen quality), anti-HIV, anti-HBc and anti-HCV antibodies.

- Anti-HIV testing was done using the Murex 1 + 2 GACELISA[15,16] (VK61, Abbott Diagnostics, Maidenhead, UK), according to the manufacturer's instructions, with positives confirmed using a modified protocol for the Clonesystems Detect-HIV FIA (Biostat Diagnostics, Stockport, UK).
- Anti-HBc testing used Murex HBc ICE (Abbott Diagnostics, Maidenhead, UK), with positives confirmed with an 'in-house' RIA.[17]
- Anti-HCV antibodies were sought employing a modified protocol for the Ortho HCV 3.0 SAVe ELISA (Product number 940982, Ortho Diagnostics, Amersham, UK). Borderline reactives (OD/CO 0.8 – 3.0) were further investigated using a modified Chiron RIBA, HCV 3.0 (Product number 930780, Ortho Diagnostics, Amersham, UK).

Appendix 5

Frequency distribution of questionnaire responses among committal prisoners by prison type and drug use

Demographics and prison history

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Age in years	15-17	74 (12.3)	71 (14.9)	3 (2.3)	12 (6.9)	62 (14.5)
	18-19	92 (15.2)	77 (16.2)	15 (11.6)	20 (11.6)	72 (16.8)
	20-24	172 (28.5)	134 (28.2)	38 (29.5)	74 (42.8)	98 (22.9)
	25-29	98 (16.2)	77 (16.2)	21 (16.3)	39 (22.5)	58 (13.5)
	30-34	62 (10.3)	43 (9.1)	19 (14.7)	17 (9.8)	44 (10.3)
	35-44	65 (10.8)	44 (9.3)	21 (16.3)	9 (5.2)	56 (13.1)
	45-54	35 (5.8)	26 (5.5)	9 (7.0)	2 (1.2)	32 (7.5)
	55-64	5 (0.8)	3 (0.6)	2 (1.5)		5 (1.2)
	65+	1 (0.2)		1 (0.8)		1 (0.2)
	n	604 (100)	475 (100)	129 (100)	173 (100)	428 (100)
	mean	26.3	25.5	29.1	24.5	27.0
	median	23	23	26	23	23
	range	15.73	15-63	15-73	16-54	15-73
Gender	Male	564 (92.9)	440 (92.0)	124 (96.1)	149 (85.1)	412 (96.0)
	Female	43 (7.1)	38 (8.0)	5 (3.9)	26 (14.9)	17 (4.0)
	n	607 (100)	478 (100)	129 (100)	175 (100)	429 (100)
Current prison sentence	Remand	315 (52.7)	270 (57.2)	45 (35.7)	107 (62.6)	207 (48.6)
	Sentence	260 (43.5)	196 (41.5)	64 (50.8)	64 (37.4)	196 (46.0)
	Warrant	22 (3.7)	5 (1.1)	17 (13.5)		22 (5.2)
	Extradition	1 (0.2)	1 (0.2)			1 (0.2)
	n	598 (100)	472 (100)	126 (100)	171 (100)	426 (100)
Number of times imprisoned	Never	201 (33.4)	162 (34.0)	39 (30.7)	14 (8.1)	187 (43.6)
	1-5 times	274 (45.5)	212 (44.5)	63 (49.6)	93 (53.7)	181 (42.2)
	more than 5 times	127 (21.1)	102 (21.4)	25 (19.7)	66 (38.1)	61 (14.2)
	n	602 (100)	476 (100)	127 (100)	173 (100)	429 (100)
Time during the last 10 yr. spent in prison	None	201 (38.0)	157 (37.5)	44 (40.0)	13 (8.2)	188 (50.8)
	1 day-3 months	66 (12.5)	54 (12.9)	12 (10.9)	16 (10.2)	50 (13.5)
	>3-<12 months	66 (12.5)	53 (12.6)	13 (11.8)	20 (12.6)	46 (12.4)
	1-3 years	108 (20.4)	84 (20.0)	24 (21.8)	51 (32.1)	57 (15.4)
	>3 years	88 (16.6)	71 (17.0)	17 (15.5)	59 (37.1)	29 (7.8)
	n	529 (100)	419 (100)	110 (100)	159 (100)	370 (100)

Drug use

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Smoked heroin in the last 12 months	Yes	186 (30.8)	173 (36.3)	13 (10.2)	146 (83.9)	40 (9.3)
	No	418 (69.2)	304 (63.7)	114 (89.8)	28 (16.1)	389 (90.7)
	n	604 (100)	477 (100)	127 (100)	174 (100)	249 (100)
Every injected drugs	Yes	175 (29.0)	173 (36.2)	2 (1.6)	175 (100)	0
	No	429 (71.0)	305 (63.8)	124 (98.4)		
	n	604 (100)	478 (100)	126 (100)		
Age when first injected drugs	10-13	7 (4.0)	7 (4.0)	0	7 (4.0)	0
	14-15	33 (18.9)	32 (18.5)	1 (50.0)	33 (18.9)	
	16-17	45 (25.7)	45 (26.0)	0	45 (25.7)	
	18-19	33 (18.9)	33 (19.1)	0	33 (18.9)	
	20-24	39 (22.3)	39 (22.5)	0	39 (22.3)	
	25-29	12 (6.9)	11 (6.4)	1 (50.0)	12 (6.9)	
	30+	6 (3.4)	6 (3.5)	0	6 (3.4)	
	n	175 (100)	173 (100)	2 (100)	175 (100)	
	mean	18.8	18.7	20.5	18.8	
	median	18	18	20.5	18	
	range	10-52	10-52	15-26	10-52	
No of years since first injection	<3 yrs	55 (31.8)	54 (31.6)	1 (50.0)	55 (31.8)	0
	3-5 yrs	49 (28.3)	49 (28.7)	0	49 (28.3)	
	6-8 yrs	32 (18.5)	32 (18.7)	0	32 (18.5)	
	9-14 yrs	25 (14.5)	25 (14.5)	0	25 (14.5)	
	15+	12 (6.9)	11 (6.4)	1 (50.0)	12 (6.9)	
	n	173 (100)	171 (100)	2 (100)	173 (100)	
	mean	5.7	5.7	9.5	5.7	
	median	4	4	9.5	4	
	range	0-29	0-29	2-17	0-29	
Last time injected before coming into prison	On the day committed	73 (42.2)	73 (42.4)	0	73 (42.2)	0
	In the week before	41 (23.7)	40 (23.3)	1 (50.0)	41 (23.7)	
	In the month before	15 (8.7)	15 (8.7)	0	15 (8.7)	
	In the year before	24 (13.9)	24 (14.5)	0	24 (13.9)	
	More than one year before	20 (11.6)	19 (11.1)	1 (50.0)	20 (11.6)	
	n	173 (100)	171 (100)	2 (100)	173 (100)	
Started injecting in prison	Yes	30 (17.3)	29 (17.0)	1 (50.0)	30 (17.3)	0
	No	143 (82.7)	142 (83.0)	1 (50.0)	143 (82.7)	
	n	173 (100)	171 (100)	2 (100)	173 (100)	
On methadone prior to committal	Yes	63 (32.6)	63 (33.0)	0 (0.0)	60 (34.7)	3 (15)
	No	130 (67.4)	128 (67.0)	2 (100)	113 (65.3)	17 (85)
	n	193 (100)	191 (100)	2 (100)	173 (100)	20 (100)

Sharing equipment among injecting drug users

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Sharing before						
Needles	Yes	53 (30.8)	53 (31.2)	0 (0.0)	53 (30.8)	0
	No	119 (69.2)	117 (68.8)	2 (100)	119 (69.2)	
	n	172 (100)	170 (100)	2 (100)	172 (100)	
Syringes	Yes	57 (33.1)	57 (33.5)	0 (0.0)	57 (33.1)	0
	No	115 (66.9)	113 (66.5)	2 (100)	115 (66.9)	
	n	172 (100)	170 (100)	2 (100)	172 (100)	
Filters and spoons etc	Yes	83 (48.8)	83 (49.4)	0 (0.0)	83 (48.8)	0
	No	87 (51.2)	85 (50.6)	2 (100)	87 (51.2)	
	n	170 (100)	168 (100)	2 (100)	170 (100)	
Share before	All	43 (24.9)	43 (25.2)	0 (0.0)	43 (24.9)	0
	Some	50 (28.9)	50 (29.2)	0 (0.0)	50 (28.9)	
	None	80 (46.2)	78 (45.6)	2 (100)	80 (46.2)	
		173 (100)	171 (100)	2 (100)	173 (100)	
Sharing inside						
Needles	Yes	64 (40.3)	63 (40.1)	1 (50.0)	64 (40.3)	0
	No	95 (59.7)	94 (59.9)	1 (50.0)	95 (59.7)	
	n	159 (100)	157 (100)	2 (100)	159 (100)	
Syringes	Yes	69 (43.4)	68 (43.3)	1 (50.0)	69 (43.4)	0
	No	90 (56.6)	89 (56.9)	1 (50.0)	90 (56.6)	
	n	159 (100)	157 (100)	2 (100)	159 (100)	
Filters and spoons etc.	Yes	67 (42.1)	66 (42.0)	1 (50.0)	67 (42.1)	0
	No	92 (57.9)	91 (58.0)	1 (50.0)	92 (57.9)	
	n	159 (100)	157 (100)	2 (100)	159 (100)	
Share in	All	62 (39.0)	61 (38.9)	1 (50.0)	62 (39.0)	0
	Some	9 (5.7)	9 (5.7)	0 (0.0)	9 (5.7)	
	None	88 (55.3)	87 (55.4)	1 (50.0)	88 (55.3)	
		159 (100)	157 (100)	2 (100)	159 (100)	
Times injected in the last months	0	47 (27.8)	46 (27.5)	150.0	47 (27.8)	0
	1-19	35 (20.7)	35 (21.0)	0 (0.0)	35 (20.7)	
	20+	87 (51.5)	86 (51.5)	1 (50.0)	87 (51.5)	
	n	169 (100)	167 (100)	2 (100)	169 (100)	

Sexual practices and precautions

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Sexual intercourse with the opposite gender in the 12 months prior to committal	Yes	539 (90.4)	427 (91.0)	112 (88.2)	159 (93.0)	380 (89.6)
	No	57 (9.6)	42 (9.0)	15 (11.8)	12 (7.0)	44 (10.4)
	n	596 (100)	469 (100)	127 (100)	171 (100)	424 (100)
Number of heterosexual partners	1-2	340 (63.4)	263 (62.0)	77 (68.8)	104 (66.2)	236 (62.2)
	3-9	149 (27.8)	124 (29.3)	25 (22.3)	43 (27.4)	106 (28.0)
	10+	47 (8.8)	37 (8.7)	10 (8.9)	10 (6.4)	37 (9.8)
	n	536 (100)	424 (100)	112 (100)	157 (100)	379 (100)
Use condoms during heterosexual intercourse	Yes	253 (47.6)	201 (47.7)	52 (47.3)	64 (41.3)	189 (50.3)
	No	278 (52.4)	220 (52.3)	58 (52.7)	91 (58.7)	187 (49.7)
	n	531 (100)	421 (100)	110 (100)	155 (100)	376 (100)
Men ever have anal sex with men	Yes	9 (1.6)	6 (1.4)	3 (2.5)	2 (1.4)	7 (1.7)
	No	551 (98.4)	433 (98.6)	118 (97.5)	146 (98.6)	404 (98.3)
	n	560 (100)	439 (100)	121 (100)	148 (100)	411 (100)
Use condoms during male homosexual intercourse	Yes	4 (50)	3 (50)	1 (50.0)	1 (50)	3 (50)
	No	4 (50)	3 (50)	1 (50.0)	1 (50)	3 (50)
	n	8 (100)	6 (100)	2 (100)	2 (100)	6 (100)
Men ever have anal sex with men in prison	Yes	3 (0.9)	1 (0.3)	2 (25.6)	1 (0.8)	2 (0.9)
	No	351 (99.1)	275 (99.6)	76 (97.4)	130 (99.2)	220 (99.1)
	n	354 (100)	276 (100)	78 (100)	131 (100)	222 (100)
Paid for any type of sex	Yes	26 (4.6)	24 (5.5)	2 (1.7)	8 (5.4)	18 (4.4)
	No	533 (95.3)	414 (94.5)	119 (98.3)	140 (94.6)	392 (95.6)
	n	559 (100)	438 (100)	121 (100)	148 (100)	410 (100)
Been paid for any type of sex	Yes	15 (2.5)	15 (3.2)	0 (0.0)	12 (7)	3 (0.7)
	No	586 (97.5)	460 (96.8)	126 (100)	159 (93.0)	426 (99.3)
	n	601 (100)	475 (100)	126 (100)	171 (100)	429 (100)
Ever treated for STI	Yes	44 (7.3)	42 (8.9)	2 (1.6)	27 (15.8)	17 (4.0)
	No	556 (92.7)	432 (91.1)	124 (98.4)	144 (84.2)	411 (96.0)
	n	600 (100)	474 (100)	126 (100)	171 (100)	428 (100)
Tattooing						
Tattoo	Yes	358 (59.4)	278 (58.3)	80 (63.0)	139 (79.9)	219 (51.0)
	No	245 (40.6)	199 (41.7)	47 (37.0)	35 (20.1)	210 (49.0)
	n	603 (100)	478 (100)	127 (100)	174 (100)	429 (100)
Tattoo in prison	Yes	89 (25.0)	70 (25.4)	19 (23.7)	42 (30.2)	47 (21.7)
	No	267 (75.0)	206 (74.6)	61 (76.3)	97 (69.8)	170 (78.3)
	n	356 (100)	276 (100)	80 (100)	139 (100)	217 (100)
Tattoo done by	Self	109 (30.8)	93 (33.8)	16 (20.2)	55 (39.6)	54 (25.1)
	Friend	112 (31.6)	82 (29.8)	30 (38.0)	43 (30.9)	69 (32.1)
	Artist	133 (37.6)	100 (36.4)	33 (41.8)	41 (29.5)	92 (42.8)
	n	354 (100)	275 (100)	79 (100)	139 (100)	215 (100)

Reported blood test results and vaccination coverage

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Ever have a blood test for HIV	Yes	172 (28.4)	154 (32.2)	18 (14.2)	116 (66.3)	56 (13.1)
	No	425 (70.2)	319 (66.7)	106 (83.5)	58 (33.1)	366 (85.3)
	Don't know	8 (1.3)	5 (1.1)	3 (2.3)	1 (0.6)	7 (1.6)
	n	605 (100)	478 (100)	127 (100)	175 (100)	429 (100)
Reported HIV result	Yes	11 (6.5)	9 (5.9)	2 (11.1)	10 (8.8)	1 (1.8)
	No	126 (74.1)	115 (75.7)	11 (61.1)	80 (70.2)	46 (82.1)
	Don't know	33 (19.4)	28 (18.4)	5 (27.8)	24 (21.0)	9 (16.1)
	n	170 (100)	152 (100)	18 (100)	114 (100)	56 (100)
Ever have a blood test for hepatitis B	Yes	123 (20.4)	112 (23.5)	11 (8.7)	100 (57.1)	23 (5.4)
	No	450 (74.5)	343 (71.9)	107 (84.3)	67 (38.3)	382 (89.2)
	Don't know	31 (5.1)	22 (4.6)	9 (7.1)	8 (4.6)	23 (5.4)
	n	604 (100)	477 (100)	127 (100)	175 (100)	428 (100)
Reported hepatitis B result	Yes	21 (17.3)	19 (17.1)	2 (20.0)	20 (20.2)	1 (4.5)
	No	84 (69.4)	78 (70.3)	6 (60.0)	67 (67.7)	17 (77.3)
	Don't know	16 (13.2)	14 (12.6)	2 (20.0)	12 (12.1)	4 (18.2)
	n	121 (100)	111 (100)	10 (100)	99 (100)	22 (100)
Ever have a blood test for hepatitis C	Yes	132 (21.8)	128 (26.8)	4 (3.1)	115 (65.7)	17 (4.0)
	No	448 (74.0)	333 (69.7)	115 (90.6)	55 (31.4)	392 (91.3)
	Don't know	25 (4.1)	17 (3.5)	8 (6.3)	5 (2.9)	20 (4.7)
	n	605 (100)	478 (100)	127 (100)	175 (100)	429 (100)
Reported hepatitis C result	Yes	89 (69.0)	88 (70.4)	1 (25.1)	88 (77.9)	1 (6.3)
	No	25 (19.4)	22 (17.6)	3 (75.0)	14 (12.4)	11 (68.7)
	Don't know	15 (11.6)	15 (12.0)	0 (0.0)	11 (9.7)	4 (25.0)
	n	129 (100)	125 (100)	4 (100)	113 (100)	16 (100)
Vaccinated against hepatitis B	Yes	121 (20.1)	113 (23.7)	8 (6.3)	79 (45.4)	42 (9.8)
	No	442 (73.3)	342 (71.9)	100 (78.7)	93 (53.4)	348 (81.3)
	Don't know	40 (6.6)	21 (4.4)	19 (15.0)	2 (1.2)	38 (8.9)
	n	603 (100)	476 (100)	127 (100)	174 (100)	428 (100)
Vaccinated in prison	Yes	91 (79.1)	87 (79.1)	4 (80.0)	61 (80.3)	30 (76.9)
	No	24 (20.9)	23 (20.9)	1 (20.0)	15 (19.7)	9 (23.1)
	n	115 (100)	110 (100)	5 (100)	76 (100)	39 (100)
Complete 3 doses of hepatitis B vaccine	Yes	55 (47.4)	52 (47.3)	3 (50.0)	41 (53.2)	14 (35.9)
	No	51 (44.0)	48 (43.6)	3 (50.0)	31 (40.3)	20 (51.3)
	Don't know	10 (8.6)	10 (9.1)	0 (100)	5 (6.5)	5 (12.8)
	n	116 (100)	110 (100)	6 (100)	77 (100)	39 (100)

Oral fluid test results

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Test HIV positive	Yes	12 (2.0)	10 (2.1)	2 (1.6)	10 (5.8)	2 (0.5)
	No	584 (98.0)	463 (97.9)	121 (98.4)	163 (94.2)	418 (99.5)
	n	596 (100)	473 (100)	123 (100)	173 (100)	420 (100)
Test hepatitis B positive	Yes	37 (6.2)	35 (7.4)	2 (1.6)	31 (17.9)	5 (1.2)
	No	559 (93.8)	438 (92.6)	121 (98.4)	142 (82.1)	415 (98.8)
	n	596 (100)	473 (100)	123 (100)	173 (100)	420 (100)
Test hepatitis C positive	Yes	130 (21.8)	129 (27.3))	1 (0.8)	124 (71.7)	6 (1.4)
	No	446 (78.2)	344 (72.7)	122 (99.2)	49 (28.3)	414 (98.6)
	n	596 (100)	473 (100)	123 (100)	173 (100)	420 (100)
Prison details						
Prison	St Patricks	151 (24.9)	151 (31.6)		34 (19.4)	117 (27.3)
	Cork	84 (13.8)		84 (65.1)	1 (0.6)	80 (18.6)
	Limerick Male	45 (7.4)		45 (34.9)	1 (0.6)	44 (10.2)
	Mountjoy	289 (47.6)	289 (60.5)		113 (64.6)	176 (41.0)
	Mountjoy Female	38 (6.3)	38 (7.9)		26 (14.8)	12 (2.8)
	n	607 (100)	478 (100)	129 (100)	175 (100)	429 (100)
Risk	High	478 (78.7)	478 (100)		173 (98.9)	305 (71.1)
	Medium	129 (21.2)		129 (100)	2 (1.1)	124 (28.9)
	n	607 (100)			175 (100)	429 (100)

Appendix 6

Frequency distributions of questionnaire responses in the census survey by prison type and injecting drug use

Demographics and prison history

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Age in years	16-17	40 (3.5)	28 (4.1)	12 (2.6)	10 (2)	29 (4.5)
	18-19	137 (11.9)	94 (13.8)	43 (9.2)	59 (12.1)	77 (11.9)
	20-24	369 (32.1)	219 (32.2)	150 (32.1)	192 (39.3)	170 (26.3)
	25-29	255 (22.2)	145 (21.3)	110 (23.6)	123 (25.1)	130 (20.1)
	30-34	151 (13.2)	91 (13.4)	60 (12.8)	63 (12.9)	87 (13.5)
	35-44	135 (11.8)	78 (11.5)	57 (12.2)	39 (8)	95 (14.7)
	45-54	45 (3.9)	17 (2.5)	28 (6)	2 (0.4)	43 (6.6)
	55-64	14 (1.2)	7 (1)	7 (1.5)	1 (0.2)	13 (2)
	65+	1 (0.9)	1 (0.2)	0	0	1 (0.2)
	n	1147 (100)	680 (100)	467 (100)	489 (100)	645 (100)
Gender	Male	1148 (95.2)	667 (93)	481 (98.6)	480 (93.4)	651 (96.6)
	Female	57 (4.7)	50 (7)	7 (1.4)	34 (6.6)	23 (3.4)
	n	1205 (100)	717 (100)	488 (100)	514 (100)	674 (100)
Length of prison sentence	Remand	157 (13.1)	120 (16.9)	37 (7.6)	65 (12.7)	92 (13.7)
	3 months or less	60 (5)	29 (4.1)	31 (6.4)	18 (3.5)	40 (5.9)
	> 3-<12 months	213 (17.8)	111 (15.6)	102 (21)	66 (12.9)	144 (21.4)
	1-3 years	308 (25.8)	170 (23.9)	138 (28.5)	124 (24.3)	179 (26.6)
	>3 years	458 (38.3)	281 (39.5)	177 (36.5)	238 (46.6)	218 (32.4)
	n	1196 (100)	711 (100)	485 (100)	511 (100)	673 (100)
Length in prison on this sentence	3 months or less	319 (27)	201 (28.5)	118 (24.8)	119 (23.3)	198 (30)
	> 3-<12 months	392 (33.2)	223 (31.6)	169 (35.5)	154 (30.2)	232 (35.2)
	1-3 years	319 (27)	195 (27.7)	124 (26)	164 (32.2)	152 (23)
	>3 years	151 (12.8)	86 (12.2)	65 (13.7)	73 (14.3)	78 (11.8)
	n	1181 (100)	705 (100)	476 (100)	510 (100)	660 (100)
Time during the last 10 yr. spent in prison	3 months or less	137 (11.6)	87 (12.3)	50 (10.5)	40 (7.8)	97 (14.7)
	> 3-<12 months	197 (16.7)	103 (14.6)	94 (19.8)	49 (9.6)	146 (22.1)
	1-3 years	300 (25.4)	167 (23.7)	133 (28.1)	121 (23.7)	175 (26.5)
	>3 years	546 (46.3)	349 (49.4)	197 (41.6)	300 (58.8)	242 (36.7)
	n	1180 (100)	706 (100)	474 (100)	510 (100)	660 (100)

Drug use

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Smoked heroin in the last 12 months	Yes	545 (45.9)	408 (57.4)	137 (28.8)	420 (82.5)	121 (18.1)
	No	642 (54.1)	303 (42.6)	339 (71.2)	89 (17.5)	549 (81.9)
	n	1187 (100)	711	476	509 (100)	670 (100)
Every injected drugs	Yes	514 (43.2)	414 (58.2)	100 (21)	514 (100)	
	No	674 (56.7)	297 (41.8)	377 (79)		674 (100)
	n	1188 (100)	711 (100)	477 (100)		
Age when first injected drugs	11-13	25 (5)	22 (5.4)	3 (3.3)	25 (5)	0
	14-15	97 (19.6)	78 (19.3)	19 (20.9)	97 (19.6)	
	16-17	144 (29)	118 (29.2)	26 (28.6)	144 (29)	
	18-19	93 (18.8)	79 (19.5)	14 (15.4)	93 (18.8)	
	20-24	91 (18.4)	68 (16.8)	23 (25.3)	91 (18.4)	
	25-29	31 (6.3)	28 (6.9)	3 (3.3)	31 (6.3)	
	30-38	14 (2.8)	11 (2.7)	3 (3.3)	14 (2.8)	
	n	495 (100)	404 (100)	91 (100)	495 (100)	
No of years since first injection	<3 yrs	85 (18)	68 (17.7)	17 (19.3)	85 (18)	0
	3-5 yrs	153 (32.3)	127 (33)	26 (29.5)	153 (32.3)	
	6-8 yrs	110 (23.2)	98 (25.4)	12 (13.6)	110 (23.2)	
	9-14 yrs	72 (15.2)	55 (14.3)	17 (19.3)	72 (15.2)	
	15+	53 (11.2)	37 (9.6)	16 (18.2)	53 (11.2)	
		473 (100)	385 (100)	88 (100)	473 (100)	
Last time injected before coming into prison	On the day committed	261 (52.3)	220 (54)	41 (44)	261 (52.3)	0
	In the week before	86 (17.2)	69 (16.9)	17 (18.3)	86 (17.2)	
	In the month before	34 (6.8)	29 (7.1)	5 (5.4)	34 (6.8)	
	In the year before	43 (8.6)	30 (7.4)	13 (14)	43 (8.6)	
	More than one year before	43 (8.6)	35 (8.6)	8 (8.6)	43 (8.6)	
	Does not apply	32 (6.4)	24 (5.9)	9 (97)	32 (6.4)	
	n	499 (100)	407 (100)	93 (100)	499 (100)	
Started injecting in prison	Yes	104 (20.5)	82 (20)	22 (23.2)	104 (20.5)	0
	No	402 (79.5)	329 (80)	73 (76.8)	402 (79.5)	
	n	506 (100)	411 (100)	95 (100)	506 (100)	
On methadone prior to committal	Yes	187 (37.3)	156 (38.3)	31 (33.3)	187 (37.3)	0
	No	315 (62.7)	253 (61.7)	62 (66.7)	315 (62.7)	
	n	502 (100)	409 (100)	93 (100)	502 (100)	

Sharing equipment among injecting drug users

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Sharing before						
Needles	Yes	225 (46)	184 (46.1)	41 (45.6)	225 (46)	0
	No	264 (54)	215 (53.8)	49 (54.4)	264 (54)	
	n	489 (100)	399 (100)	90 (100)	489 (100)	
Syringes	Yes	232 (51.4)	192 (51.9)	40 (49.4)	232 (51.4)	0
	No	219 (48.6)	178 (48.1)	41 (50.6)	219 (48.6)	
	n	451 (100)	370 (100)	81 (100)	451	
Filters and spoons etc	Yes	263 (58.6)	220 (60)	43 (52.4)	263 (58.6)	0
	No	186 (41.4)	147 (40)	39 (47.6)	186 (41.4)	
	n	449 (100)	367 (100)	82	449 (100)	
Share before	All	175 (35.1)	144 (36.9)	31 (35.2)	175 (36.6)	
	Some	140 (28)	117 (30)	23 (26.1)	140 (29.3)	
	Zero	184 (36.9)	129 (33.1)	34 (38.6)	163 (34.1)	
		499 (100)	390 (100)	88 (100)	478 (100)	
Sharing inside						
Needles	Yes	351 (70.6)	295 (72.5)	56 (62.2)	351 (70.6)	0
	No	146 (29.4)	112 (27.5)	34 (37.8)	146 (29.4)	
	n	497 (100)	407 (100)	90 (100)	497 (100)	
Syringes	Yes	335 (72.2)	283 (73.9)	52 (64.2)	334 (72.1)	0
	No	129 (27.8)	100 (26.1)	29 (35.8)	129 (27.9)	
	n	464 (100)	383 (100)	81 (100)	463 (100)	
Filters and spoons etc.	Yes	304 (67.4)	255 (68.7)	49 (61.2)	304 (67.4)	0
	No	147 (32.6)	116 (31.3)	31 (38.8)	147 (32.6)	
	n	451 (100)	371 (100)	80 (100)	451 (100)	
Share in	All	285 (56.5)	241 (59.8)	44 (49.4)	285 (58)	
	Some	87 (17.3)	69 (17.1)	18 (20.2)	86 (17.5)	
	Zero	120 (26.1)	93 (23.1)	27 (30.3)	120 (24.4)	
		504 (100)	403 (100)	89 (100)	491 (100)	
Times injected in the last	0	221 (50.5)	154 (42.9)	67 (84.8)	221 (50.5)	0
month	1-19	141 (32.2)	133 (37)	8 (10.1)	141 (32.2)	
	20+	76 (17.3)	72 (20.1)	4 (5.1)	76 (17.3)	
	n	438 (100)	359 (100)	79 (100)	438 (100)	

Sexual practices and precautions

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Sexual intercourse with the opposite gender in the 12 months prior to committal	Yes	1088 (92)	662 (93.1)	426 (90.4)	483 (94.5)	596 (90.2)
	No	94 (8)	49 (6.9)	45 (9.6)	28 (5.5)	65 (9.8)
	n	1182 (100)	711 (100)	471 (100)	511 (100)	661 (100)
Use condoms during heterosexual intercourse	Yes	347 (33.8)	211 (33.9)	136 (33.7)	138 (30.6)	205 (36.2)
	No	679 (66.2)	412 (66.1)	267 (66.2)	313 (69.4)	361 (63.8)
	n	1026 (100)	623 (100)	403 (100)	451 (100)	566 (100)
Men ever have anal sex with men	Yes	28 (2.5)	14 (2.1)	14 (3)	15 (3.4)	12 (1.9)
	No	1088 (97.5)	639 (97.9)	449 (97)	459 (96.6)	621 (98.1)
	n	1116 (100)	653 (100)	463 (100)	474 (100)	633 (100)
Use condoms during male homosexual intercourse	Yes	4 (19)	3 (27.3)	1 (10)	1 (7.1)	3 (42.9)
	No	17 (81)	8 (72.7)	9 (90)	13 (92.9)	4 (57.1)
	n	21 (100)	11 (100)	10 (100)	14 (100)	7 (100)
Men ever have anal sex with men in prison	Yes	20 (1.8)	7 (1.1)	13 (2.9)	9 (2)	10 (1.6)
	No	1067 (98.2)	629 (98.9)	438 (97.1)	455 (98)	605 (98.5)
	n	1087 (100)	636 (100)	451 (100)	464 (100)	615 (100)
Ever treated for STD	Yes	147 (12.6)	103 (14.6)	44 (9.5)	87 (17.3)	60 (9.2)
	No	1018 (87.4)	600 (85.4)	418 (90.5)	416 (82.7)	593 (90.8)
	n	1165 (100)	703 (100)	462 (100)	503 (100)	653 (100)

Reported blood test results and vaccination coverage

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Ever have a blood test for HIV	Yes	449 (37.8)	328 (46.2)	121 (25.4)	332 (65)	116 (17.4)
	No	703 (59.3)	366 (51.5)	337 (70.8)	172 (33.6)	524 (78.8)
	Don't know	34 (2.9)	16 (2.2)	18 (3.8)	7 (1.4)	25 (3.8)
	n	1186 (100)	710 (100)	476 (100)	511 (100)	665 (100)
Reported HIV result	Yes	20 (4.5)	16 (4.9)	4 (3.4)	18 (5.5)	2 (1.7)
	No	370 (83.5)	269 (82.8)	101 (85.6)	274 (83.8)	95 (82.6)
	Don't know	53 (12)	40 (12.3)	13 (11)	35 (10.7)	18 (15.7)
	n	443 (100)	325 (100)	118 (100)	327 (100)	115 (100)
Ever have a blood test for hepatitis B	Yes	335 (28.5)	260 (36.8)	75 (16)	252 (49.6)	83 (12.6)
	No	773 (65.7)	411 (58.1)	362 (77)	231 (45.5)	534 (80.9)
	Don't know	69 (5.9)	36 (5.1)	33 (7)	25 (4.9)	43 (6.5)
	n	1177 (100)	707 (100)	470 (100)	508 (100)	660 (100)
Reported hepatitis B result	Yes	63 (19.6)	48 (19.2)	15 (20.8)	58 (24)	5 (6.3)
	No	209 (64.9)	164 (65.6)	45 (62.5)	152 (62.8)	57 (71.2)
	Don't know	50 (15.5)	38 (15.2)	12 (1.7)	32 (13.2)	18 (22.5)
	n	322 (100)	250 (100)	72 (100)	242 (100)	80 (100)
Ever have a blood test for hepatitis C	Yes	348 (29.9)	278 (39.6)	70 (15.2)	302 (59.3)	46 (7.1)
	No	725 (62.3)	382 (54.4)	343 (74.2)	188 (36.9)	530 (81.9)
	Don't know	91 (7.8)	42 (6)	49 (10.6)	19 (3.7)	71 (11)
	n	1164 (100)	702 (100)	462 (100)	509 (100)	647 (100)
Reported hepatitis C result	Yes	232 (67.8)	189 (69.5)	43 (61.4)	229 (76.6)	3 (7)
	No	76 (22.2)	56 (20.6)	20 (25.6)	44 (14.7)	32 (74.4)
	Don't know	34 (9.9)	27 (9.9)	7 (10)	26 (8.7)	8 (18.6)
	n	342 (100)	272 (100)	70 (100)	299 (100)	43 (100)
Vaccinated against hepatitis B	Yes	504 (43.5)	381 (54.7)	123 (26.6)	300 (59.6)	202 (31.2)
	No	547 (47.1)	272 (39)	275 (59.4)	180 (35.8)	361 (55.7)
	Don't know	109 (9.4)	44 (6.3)	65 (14)	23 (4.6)	85 (13.1)
	n	1160 (100)	697 (100)	463 (100)	503 (100)	648 (100)
Vaccinated in prison	Yes	446 (90.8)	334 (90.5)	112 (91.8)	266 (91.1)	179 (90.9)
	No	45 (9.2)	35 (9.5)	10 (8.2)	26 (8.9)	18 (9.1)
	n	491 (100)	369 (100)	122 (100)	292 (100)	197 (100)
Complete 3 doses of hepatitis B vaccine	Yes	304 (60.4)	230 (61.2)	74 (58.3)	184 (61.7)	118 (58)
	No	180 (35.8)	132 (35.1)	48 (37.8)	101 (33.9)	79 (39)
	Don't know	19 (3.8)	14 (3.7)	5 (3.9)	13 (4.4)	6 (3)
	n	503 (100)	376 (100)	127 (100)	298 (100)	203 (100)

Oral fluid test results

		All n (%)	High n (%)	Medium n (%)	IDU n (%)	Non IDU n (%)
Test HIV positive	Yes	24 (2)	20 (2.8)	4 (0.8)	18 (3.5)	6 (0.9)
	No	1169 (98)	693 (97.2)	476 (99.2)	491 (96.5)	663 (99.1)
	n	1193 (100)	713 (100)	480 (100)	509 (100)	669 (100)
Test hepatitis B positive	Yes	104 (8.7)	87 (12.2)	17 (3.5)	94 (18.5)	10 (1.5)
	No	1089 (91.3)	626 (87.8)	463 (96.5)	415 (81.5)	659 (98.5)
	n	1193 (100)	713 (100)	480 (100)	509 (100)	669 (100)
Test hepatitis C positive	Yes	442 (37)	363 (50.9)	79 (16.5)	414 (81.3)	25 (3.7)
	No	751 (63)	350 (49.1)	401 (83.5)	95 (18.7)	644 (96.3)
	n	1193 (100)	713 (100)	480 (100)	509 (100)	669 (100)
Prison details						
Prison	Limerick Female	7 (0.6)		7 (1.4)	2 (0.4)	5 (0.7)
	Mountjoy Female	50 (4.1)	50 (7)		32 (6.2)	18 (2.7)
	Portlaoise	80 (6.6)		80 (16.3)	33 (6.4)	47 (7)
	Shelton Abbey	38 (3.2)		38 (7.8)	10 (2)	24 (3.6)
	St Patricks	88 (7.3)	88 (12.3)		44 (8.6)	43 (6.4)
	Mountjoy Training	77 (6.4)	77 (10.7)		36 (7)	40 (5.9)
	Cork	228 (18.9)		228 (46.7)	37 (7.2)	187 (27.7)
	Limerick Male	135 (11.2)		135 (27.7)	18 (3.5)	114 (16.9)
	Mountjoy	359 (29.8)	359 (50.1)		222 (43.2)	136 (20.2)
	Wheat Field	143 (11.9)	143 (19.9)		80 (15.5)	60 (8.9)
	n	1205 (100)	717 (100)	488 (100)	514 (100)	674 (100)
Risk	High	717 (59.5)	717 (100)		414 (80.5)	297 (44.1)
	Medium	488 (40.5)		488 (100)	100 (19.5)	377 (55.9)
	n	1205 (100)			514 (100)	674 (100)

Appendix 7

Reported sexual risk factors for each infection

7A – Reported sexual behaviour and risk factors for hepatitis B in committal prisoners

	Hepatitis B		Test of association
	Positive No./Total (%)	Negative No./Total (%)	
Use condoms during heterosexual intercourse	12/32 (37.5)	236/492 (48.0)	Pearson X2 = 1.3, df = 1, p = 0.25 NS
Number of heterosexual partners in the last year 1-2 3-9 10+	22/32 (68.7) 6/32 (18.7) 4/32 (12.5)	313/496 (63.1) 141/496 (28.4) 42/496 (8.5)	Fisher's exact test p = 0.09 NS
Men ever have anal sex with men	0/28 (0.0)	9/524 (1.7)	Fisher's exact test p = 1.0 NS
Men ever have anal sex with men in prison	0/24 (0.)	2/235 (0.6)	Fisher's exact test p = 1.0 NS
Ever paid for any type of sex	1/28 (3.6)	25/523 (4.8)	Fisher's exact test p = 1.0 NS
Ever been paid for any type of sex	4/35 (11.4)	11/556 (2.0)	Respondents who tested positive for hepatitis B were more likely to report having been paid for sex Fisher's exact test p = 0.009
Ever treated for STI*	8/35 (22.8)	36/555 (6.5)	Respondents who tested positive for hepatitis B were more likely to report having treated for STI Pearson X2 = 12.8, df = 1, p = 0.0003

*Sexually transmitted infection
NS = Not significant

7B – Reported sexual behaviour and risk factors for hepatitis C in committal prisoners

	Hepatitis C		Test of association
	Positive No./Total (%)	Negative No./Total (%)	
Use condoms during heterosexual intercourse	45/117 (38.5)	203/407 (49.9)	Respondents who tested positive for hepatitis C were more likely to report using condoms during heterosexual intercourse Pearson X2 = 4.7, df = 1, p = 0.03
Number of heterosexual partners in the last year 1-2 3-9 10+	76/119 (63.8) 33/119 (27.7) 10/119 (8.4)	259/409 (63.3) 114/409 (27.9) 36/409 (8.8)	Pearson X2 = 0.0, df = 1, p = 0.99 NS
Men ever have anal sex with men	0/107 (0.0)	9/445 (2.0)	Fisher's exact test p = 0.2 NS
Men ever have anal sex with men in prison	0/100 (0.0)	2/249 (0.8)	Fisher's exact test p = 1.0 NS
Ever paid for any type of sex	8/107 (7.5)	18/444 (4.0)	Fisher's exact test p = 1.0 NS
Ever been paid for any type of sex	9/127 (7.1)	6/464 (1.3)	Respondents who tested positive for hepatitis C were more likely to report having been paid for sex Pearson X2 = 13.5, df = 0.0002
Ever treated for STI*	26/127 (20.5)	18/463 (3.9)	Respondents who tested positive for hepatitis C were more likely to report having treated for STI Pearson X2 =39.7, df = 1, p <0.0001

*Sexually transmitted infection
NS = Not significant

7C – Reported sexual behaviour and risk factors for HIV in committal prisoners

	HIV		Test of association
	Positive No./Total (%)	**Negative No./Total (%)**	
Use condoms during heterosexual intercourse	5/11 (45.4)	243/513 (47.4)	Pearson X2 = 0.0, df = 1, p = 0.9 NS
Number of heterosexual partners in the last year **1-2** **3-9** **10+**	7/12 (58.3) 4/12 (33.3) 1/12 (8.3)	328/516 (63.6) 143/516 (27.7) 45/516 (8.7)	Fisher's exact test p = 0.9 NS
Men ever have anal sex with men	0/8 (0.0)	9/544 (1.6)	Fisher's exact test p = 1.0 NS
Men ever have anal sex with men in prison	0/6 (0.0)	2/343 (0.6)	Fisher's exact test p = 1.0 NS
Ever paid for any type of sex	0/8 (0.0)	26/543 (4.8)	Fisher's exact test p = 0.6 NS
Ever been paid for any type of sex	212 (16.7)	13/579 (2.2)	Respondents who tested positive for hepatitis HIV were more likely to report having been paid for sex Fisher's exact test p = 0.03
Ever treated for STI*	1/12 (8.3)	43/578 (7.4)	Fisher's exact test p = 0.6 NS

*Sexually transmitted infection
NS = Not significant

Appendix 8

Logistic regression models to identify the determinates of each infection in the drug using population

8A – Logistic regression model to identify independence association with hepatitis B infection among injecting drug users in the committal survey

	Total sample 173 No.	**Hepatitis B negative 142 No.**	**Hepatitis B positive 31 No.**	**Prevalence of hepatitis B %**	**Odds ratio**	**95% CI**	**p-value**
Age							
<30 yrs	143	122	21	14.7	1		
≥30 yrs	28	19	9	32.1	4.8	1.6-14.1	0.004
Missing	2						
No. of heterosexual partners in the last year							
1-2	103	86	17	16.5	1	0.4-3.2	0.84
3-10	42	36	6	14.3	1.1	1.2-22.3	0.02
10+	10	6	4	40	5.3		
Missing	18						

Whole model $X^2 = 11.2$ $R^2 = .8$ $p = 0.0107$

8B – Logistic regression model to identify independence association with hepatitis C infection among injecting drug users in the committal survey

	Total sample 173 No.	**Hepatitis C negative 49 No.**	**Hepatitis C positive 124 No.**	**Prevalence of hepatitis C %**	**Odds ratio**	**95% CI**	**p-value**
Time injected in the last month							
0	48	24	24	50.0	1	1.0-8.9	0.0525
1-19	35	11	24	68.6	2.9	2.4-15.8	0.0002
20+	85	13	72	84.7	5.9		
Missing	4						
Shared needles in prison							
No	102	40	62	60.8	1		
Yes	63	5	58	92.1	5.9	2.2-18.8	0.0009
Missing	8						

Whole model $X^2 = 31.6$ $R^2 = .18$ $p < 0.001$

Appendix 9

Methods employed to estimate the total numbers of cases.

All the low risk prisons were excluded from the survey. It may be assumed that the prevalence of the three infections among prisoners in the low risk prisons would be higher than the national community prevalence but lower than the prevalence in non-drug users in medium risk prisons. These prevalence rates can be used to estimate prevalence in the low risk prisons.

National prevalence:

- The national population prevalence for hepatitis B, based on a postal survey in 18 District Electoral Divisions using a multi-stage stratified cluster sampling technique, was 0.51% (95% CI 0.0-1.8).[18] The required sample size was based on an expected prevalence of 1% $\pm$ 0.5% in the survey population (n = 2,640, the response rate was 60.4% (1,793)). The author acknowledged that as this population was selected from the electoral register, on average 14% of those eligible had not registered to vote. The registered population is likely to under-represent the high risk drug users.
- There is no national prevalence estimate available for hepatitis C.
- The Irish population prevalence for HIV, based on unlinked anonymous tests in antenatal women, was 0.02%.[19] This is a cumulative prevalence and may slightly overestimate the prevalence in the population.

Prevalence in non drug users in medium risk prisons

- The prevalence of hepatitis B among those residing in medium risk prisons and who also reported never injecting drugs was 1.1% (4/372), 95% CI 0.29-2.7.
- The prevalence of hepatitis C among those residing in medium risk prisons and who also reported never injecting drugs was 2.7% (10/372), 95% CI 0.17-2.3.

The above two sets of assumptions were applied to the numbers in the low risk prisons to estimate the numbers of infected persons in these prisons.

The estimated number of cases in low risk prisons based on the above assumptions were for:

- Hepatitis B, between 2 and 9 cases
- Hepatitis C, between 5 and 19 cases
- HIV, between 0 and 9 cases

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