# Comparison between self-reported hepatitis B, hepatitis C, and HIV antibody status and oral fluid assay results in Irish prisoners

**L Thornton, J Barry, J Long, S Allwright, F Bradley, JV Parry**

**Summary:** *Self-reported hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV infection status was compared with the results of oral fluid assays of antibodies to these viruses in prisoners from nine of the 15 prisons in the Republic of Ireland. A total of 1205 out of 1366 prisoners completed a confidential questionnaire and 1193 provided analysable oral fluid specimens for testing for antibodies to HBV core antigen (anti-HBc), HCV (anti-HCV), and HIV (anti-HIV). The self-reported prevalence of hepatitis infection (hepatitis B: 5%; hepatitis C; 19%) was lower than that derived from oral fluid assays (anti-HBc: 9%; anti-HCV: 37%). The self-reported prevalence of HIV infection was similar to that found by oral fluid assay (2%). Many discrepancies were found between self-reported results and the results of oral fluid assays. Of those who reported being positive for HBV, HCV, or HIV, 4%, 5%, and 58%, respectively, tested negative on the oral fluid assay. Of those who reported a previous negative test result for HBV, HCV, or HIV, 10%, 37%, and 2%, respectively, had positive oral fluid assays. Self-reports of hepatitis and HIV infection status are unreliable and should not be used as a basis for planning preventive and treatment services for prisoners. All prisoners should have the opportunity to be tested for HBV, HCV, and HIV infection.*

**Key words:**
**bloodborne pathogens**
**prisoners**
**salivary diagnosis**

*Commun Dis Public Health* 2000; **3:** 253-5.

## Introduction

Prisoners are at increased risk of infection with hepatitis B virus (HBV), hepatitis C virus (HCV), and HIV[1-3]. The most important risk factor is injecting drug use[3-6]. Prisoners' knowledge of their infection status has implications for them, in terms of seeking and receiving treatment and prophylactic vaccination, and for others, in terms of preventing further transmission. Previous studies have shown that many of those infected are unaware of the fact[7-9].

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This paper describes a comparison of self-reported HBV, HCV, and HIV infection status with the results of oral fluid assays of antibodies to these viruses in the Irish prisoner population.

## Methods

The survey was carried out between September and November 1998 in nine of the 15 prisons in the Republic of Ireland. The method of selection of prisoners has been described in another paper[5]. The survey consisted of a self-completed questionnaire and provision of a specimen of oral fluid for testing for antibodies to HBV, HCV, and HIV. Participation was voluntary. The survey was anonymous, but individual questionnaires and specimens were linked.

The self-reported prevalence of infection was determined from responses to the questions: 'Have you ever had a blood test for hepatitis B? (yes/no/don't know)' and 'If yes, what was the result? (positive/ negative/don't know)'. Similar questions were asked about hepatitis C and HIV testing.

Oral fluid specimens were tested at the Virus Reference Division of the PHLS Central Public Health Laboratory in London. Each oral fluid specimen was tested for total IgG to check specimen quality. HIV antibody (anti-HIV) testing was performed using the Murex 1+2 GACELISA (VK61, Abbott Diagnostics, Maidenhead), according to the manufacturer's instructions[10,11] with positives confirmed using a

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**TABLE 1 Comparison of proportions antibody positive for hepatitis B, hepatitis C and HIV on oral fluid test with self-reported status: number (%)**

| Status | Oral fluid antibody test n=1193 | Self-reported status n=1193 |
|---|---|---|
| hepatitis B positive | 104 (9) | 63 (5) |
| hepatitis C positive | 442 (37) | 229 (19) |
| HIV positive | 24 (2) | 19 (2) |

modified Clonesystems EIA® (Biostat Diagnostics, Stockport). Antibodies to HBV core antigen (and-HBc) were tested for using Murex ICE (Abbott Diagnostics, Maidenhead), with positives confirmed with an 'in-house' radioimmunoassay[12]. Testing for HCV antibodies (anti-HCV) used a modified protocol for the Ortho HCV 3.0 SAVe ELISA® (product no. 940982, Ortho Diagnostics, Amersham); borderline reactives were further investigated using a modified Chiron RIBA® HCV 3.0 (product no. 930780, Ortho Diagnostics, Amersham).

For anti-HBc, the assay sensitivity was estimated to be 82%, and specificity to exceed 99%. For anti-HCV, the assay sensitivity was estimated to be 80%, and specificity 100%. For the anti-HIV assay, both sensitivity and specificity exceeded 99% (manufacturer's data).

**Results**

Eighty-eight per cent (1205) of the 1366 selected prisoners took part. The following analysis refers to the 1193 participants (87%) who provided analysable oral fluid. The self-reported prevalence for hepatitis infection in the survey population was lower than that derived from the oral fluid assays (table 1). The self-reported prevalence of HIV infection was similar to that derived from the oral fluid assay. Most respondents reported that they had not been tested previously (66% (769/1170) for HBV, 63% (724/1156) for HCV, and 59% (699/1178) for HIV.

Forty-three per cent (509/1178) of the respondents reported ever injecting drugs. The respondents who reported having had previous tests differed from the overall sample in that they were more likely to be injecting drug users (IDUs). Those who reported having had a test for HCV were eight times more likely to be IDUs: 59% (299/505) of IDUs said they had had a test compared with only 7% (45/643) of non-IDUs Those who reported having been tested for HBV or HIV were almost four times more likely to be IDUs; 50% (251/504) compared with 13% (83/657) for HBV and 65% (330/507) compared with 17% (114/661) for HIV. Consequently, the apparent prevalence (self-reported status) for all three infections in the previously tested group was considerably higher than in the total survey population, being 20% (63/321) for HBV, 68% (229/338) for HCV, and 4% (19/439) for HIV.

**TABLE 2 Oral fluid antibody test results and self-reported infection status**

| | Oral fluid antibody test | Self-reported status | |
|---|---|---|---|
| | | positive | negative |
| hepatitis B | positive | 33 | 21 |
| | negative | 30 | 187 |
| hepatitis C | positive | 218 | 28 |
| | negative | 11 | 47 |
| HIV | positive | 8 | 8 |
| | negative | 11 | 359 |

Of those who said they had been previously tested, a considerable number did not know the result of the testing: 16% (50 of 321) of those tested for HBV, 10% (34 of 338) of those tested for HCV, and 12% (53 of 439) of those tested for HIV did not know the result of testing.

The discrepancies between self-reports and oral fluid assay test results, in those previously tested who knew the result of the testing, are given in table 2. Over a third (37%) of those who claimed to have had a previous negative test result for HCV had a positive oral fluid test result. The proportions who reported a negative result but whose oral fluid specimens were positive were lower for HBV (10%) and for HIV (2%). Of those who reported being HIV positive, 58% tested negative on the oral fluid assay. Almost a half (48%) of those who reported being HBV positive tested negative. Of those who reported that they were HCV positive, 5% were negative on the oral fluid test.

**Discussion**

Testing for HBV, HCV, and HIV is targeted towards IDUs, but the majority of prisoners, many of whom were IDUs, said they had not previously been tested for these three viruses. Many of those who had been tested did not know their results. Among those who reported knowledge of their results, there were many discrepancies between their reported results and the results of the oral fluid assays.

Possible reasons for the discrepancies include: mistakes in filling out the questionnaire, misunderstanding the questions, deliberate misrepresentation, change in antibody status since the previous test, and test error (including discrepancies between different laboratories). The non-specific wording of the questions asked of the prisoners may have resulted in ambiguous answers, particularly in relation to HBV. Some of those who reported a positive blood test for HBV but who tested negative on oral fluid may have been referring to a positive test for antibody to HBV surface antigen (anti-HBs) following earlier vaccination. An additional reason for the discrepancies in the hepatitis results may the low assay sensitivity, around 80%, for both hepatitis B and C.

Almost half of those who self-reported a positive result for HBV were antibody negative on oral fluid testing. A similar result was found in IDUs in England, with 38% of those who reported past infection being negative for anti-HBc[9]. Unless previously vaccinated, these individuals remain susceptible to HBV but would be unlikely to avail themselves of, or perhaps

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be offered, vaccination in the belief that they have already been infected.

Thirty-seven per cent of those who thought they were negative for HCV were antibody positive on oral fluid testing. As infection persists in the majority of those with HCV antibodies[13,14], these prisoners unwittingly pose an infection risk to others if they engage in activities likely to transmit infection. Being unaware of their true infection status, they are also unlikely to be referred for specialist assessment and treatment as appropriate.

Eleven respondents reported they were infected with the HIV virus but had a negative oral fluid result. It would be of interest to study the psychological consequences of believing one is HIV positive when in fact one is negative for the infection.

The mismatch between self-reported prevalence and laboratory results thus has important implications for education and counselling programmes within the prison service/ and may have serious consequences for the public health. Prisoners who are unaware that they have been infected may continue to transmit infection through behaviours such as injecting drug use and unprotected sexual intercourse. Others, believing themselves already to have been infected when they are not, may indulge in more risky behaviour and as a result become infected. Knowledge of infection status, coupled with appropriate education and vaccination programmes, may result in risk behaviour modification and reduced risk of transmission.

The results of this study should be of value for those planning health services for prisoners. Self-reported infection status is unreliable and should not be used as a basis for planning preventive and treatment services. All prisoners should have the opportunity to request testing for HBV, HCV, and HIV directly from the prison doctor, with assurances that both the request and the result will be confidential. The test results should be provided to all those tested and the health professionals need to ensure that those tested understand the test results. Those whose tests are positive need to be advised about reducing the risk of transmission to others, and should be referred for further investigation and treatment as appropriate. If oral fluid rather than blood testing is used, an additional more sensitive test might be considered for whose tests for HBV and HCV are negative, as the sensitivities of the tests are estimated to be only 82% and 80%, respectively- All prisoners should be offered hepatitis B vaccination on committal to prison, with the exception of those with documented evidence of immunity.

**Acknowledgements**

We thank the governors and staff of all the prisons visited and especially the prisoners who took part in this study; Linda Donovan and Josephine Morris at the PHLS, London, for laboratory testing; and Noel Gill and Andrew Weild for their generous support and sharing of information.

This study was funded by the Department of Justice, Equality and Law Reform, Republic of Ireland. The opinions expressed in this paper are those of the authors and not necessarily the views of the Department of Justice/ Equality and Law Reform.

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