Bloodborne virus infections among drug users in Ireland: a retrospective cross-sectional survey of screening, prevalence, incidence and hepatitis B immunisation uptake

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ABSTRACT

Background Injecting drug users are at high-risk of bloodborne virus infections including hepatitis C (HCV), hepatitis B (HBV) and HIV.

Aims To document screening for and immunisation against bloodborne viruses and to determine the known prevalence and incidence of these infections.

Methods A cross-sectional survey of clients attending 21 specialist addiction treatment clinics in one health board area in greater Dublin. Data collected on demographic characteristics, serology for HCV, HBV and HIV and immunisation against HBV.

Results A total of 316 (88%) had been tested for anti-HCV antibody, 244 (68%) had been tested for anti hepatitis B core antibody (anti-HBc), 299 (84%) had been tested for hepatitis B surface antigen (HBsAg) and 307 (86%) had been tested for anti-HIV antibody. The prevalence of anti-HCV, anti-HBc, HBsAg, and anti-HIV were: 66%, 17%, 2% and 11% respectively. The incidence of HCV, HBV and HIV infections were: 24.5, 9.0 and 3.4 per hundred person years respectively. Eighty-one per cent of those in whom it was indicated, had started a targeted HBV immunisation programme in the clinics.

Conclusion The proportion of clients screened for HCV, HBV and HIV infection has increased since the introduction of a screening protocol in 1998. Targeted vaccination for opiate users against hepatitis B is more successful than previously shown in Ireland. The prevalence and incidence of bloodborne viruses remains high among opiate users attending addiction treatment services, despite an increase in availability of harm reduction interventions.

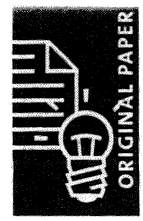
INTRODUCTION

Injecting drug users (IDUs) are at high risk of acquiring hepatitis C (HCV),[1] hepatitis B (HBV)[2] and human immunodeficiency virus (HIV)[3] infections. Harm reduction interventions have been advocated in order to prevent the spread of bloodborne virus infections.[4] Since 1992, the Irish Government has pursued a policy of harm reduction by providing methadone maintenance, needle exchange programmes and education through outreach programmes.[5]

Despite the increasing availability of harm reduction interventions, recent studies have estimated that between 52% and 80% of opiate users in Dublin are infected with HCV,[6-9] with the incidence of HCV in this population estimated to be higher than previously reported.[10] In addition, between 19% and 28% of opiate users are positive for anti hepatitis B core antibody (anti-HBc), while between 1% and 17% are infected with HIV.[6-8]

The World Health Organisation recommends universal childhood immunisation against HBV.[11] The recently published immunisation guidelines for Ireland recommend that HBV vaccine be given to those at risk of infection, as three doses at intervals of zero, one and six months and in cases at high risk of infection, at intervals of zero, one and three months with a booster dose at 12 months.[12]

While it has been suggested that specialist addiction treatment centres are an effective setting in which to deliver targeted immunisation programmes for opiate users,[13] a recent study in Dublin found only one-third of clients attending such centres had



evidence of immunity to HBV or evidence of having started an immunisation programme.[7] Following the low uptake of HBV immunisation highlighted in this report, recommendations were devised regarding a vaccination protocol and were subsequently implemented within the addiction services. Low rates of HBV immunisation uptake have also been reported elsewhere.[14]

It has been suggested that harm reduction interventions, in particular methadone maintenance, may not be effective in preventing the transmission of bloodborne viruses.[15,16] A recent study in Dublin reported continued high risk activity among drug users despite an increase in availability of harm reduction interventions.[17]

As a result, continued monitoring of care provided to drug users at risk of blood borne virus infections and epidemiological surveillance of blood borne virus infections among this population is important. The aims of this study, therefore, are to:

- document screening for bloodborne virus infections;
- determine the prevalence and incidence of these infections;
- describe current care processes regarding HBV immunisation.

METHODS

Setting

The Eastern Regional Health Authority (ERHA) area (with a catchment population of over 1.3 million people) is Ireland's largest health region.[18] It is estimated that at least 13000 people in the ERHA area are current or former, opiate users.[19] In 1998, over 5000 people (85% of the national total) were receiving methadone treatment in the region.[20] Methadone treatment services in the area are provided by: specialist addiction treatment centres, community based projects (satellite clinics) and General Practitioners (GPs).

Three local area health boards (Northern, South Western and East Coast area health boards) are responsible for the planning and delivery of health and social services in the ERHA. The area covered by the South Western Area Health Board (SWAHB) includes south-west County Dublin, County Kildare and the western part of County Wicklow. Of the six postal districts in the ERHA region with the highest prevalence of illicit opiate use, three are located in the SWAHB area.[19]

A total of 21 clinics provide methadone treatment in the SWAHB area. These clinics range from large centres staffed by a fulltime multidisciplinary team to smaller satellite clinics based in community centres or in local health centres. The larger clinics dispense methadone while the smaller clinics provide methadone prescriptions, which are filled in community pharmacies.

Subjects

A total of 1,459 current or former heroin users were attending specialist addiction treatment centres in the South Western Area Health Board in December 2001. A one-in-four consecutive sample was selected from a listing of clients attending treatment (held by the Department of Health and Children on a Central Treatment List) at the time.

Data collection

A member of the research team reviewed the medical records of the sample population. Anonymised data regarding demography, drug using history, blood borne virus status and blood borne virus related care was recorded. Data regarding bloodborne viruses was taken from laboratory results or documentation from outside agencies that were present in individual client records.

Following the sampling process six clients were excluded from the study owing to the absence of information regarding bloodborne viral status and related care in their medical records.

The survey was carried out over a six-week period between December 2001 and January 2002.

Data analysis

Data were analysed using Statistical Packages for the Social Sciences (SPSS) version 10.0. Analytical techniques included Pearson's chi squared test to determine the significance of associations between categorical variables (HCV or HIV serostatus and age). Student's t-test was used to compare means between groups.

The incidence of infections was measured using the persons year method, and is expressed as the number of seroconversions per hundred person years (HPY) at risk, with 95% confidence intervals (CI).[16,21,22] The date of the first negative test represented the starting point for all patients when calculating their person years at risk. The endpoint was the date of the last negative test for those who remained seronegative.

The estimated date of seroconversion was used as the endpoint for those who seroconverted and this was calculated by finding the midpoint between their negative and positive tests.

Viral markers

Testing for hepatitis C antibodies (anti-HCV) prior to 1993 in the Dublin area was with a second generation enzyme linked immunoadsorbent assays (EIA) and with a third generation EIA thereafter with positive assays confirmed by radioimmunoblot (RIBA) assay. Initial screening for HIV antibodies (anti-HIV) involves two EIAs, with positive assays confirmed by Western Blot assay. The screening test for both HBV surface antigen (HBsAg) and core antibody (anti-HBc) is an EIA.

RESULTS

Population characteristics

Of the 358 clients surveyed, 214 (60%) were male, the median age was 26 years (range 16-51) and the median length of time attending methadone treatment services was 24 months (range 1-221 months).

Screening for bloodborne viruses

A total of 316 (88%) had evidence of testing for HCV, 244 (68%) had evidence of testing for hepatitis B core antibody, 299 (84%) had evidence of testing for hepatitis B surface antigen and 307 (86%) had evidence of testing for HIV. The majority of clients had not been tested within the previous 12 months.

Of those who had been tested for exposure to bloodborne viruses, 207 (66%) tested positive for the presence of anti-HCV antibody, 42 (17%) tested positive for the presence of HBV core antibody, six (2%) tested positive for the presence of HBV surface antigen and 33 (11%) tested positive for the presence of anti-HIV antibody.

Clients aged 25 years or over were significantly more likely to test positive for the presence of anti-HCV antibody (75% compared to 47%, $p<0.001$), but not for anti-HBc antibody (19% compared to 13%, $p=0.211$), HBsAg (3% compared to 1%, $p=0.309$) or HIV (11% compared to 9%, $p=0.468$).

One hundred and twenty tested negative for the presence of anti-HCV antibody on initial testing. Of these, 27(23%) had at least one follow-up test, with 11 testing positive for the presence of anti-HCV at follow-up, giving an incidence of 24.5 (95% CI=12.2-43.8) per hundred person years at risk.

Two hundred and five tested negative for anti-HBc antibody on initial testing. Of these, 18 (9%) had at least one follow-up test, with three testing positive for the presence of anti-HBc antibody at follow-up, giving an incidence of 9.0 (95% CI=1.9-26.3) per hundred person years at risk.

Two hundred and seventy eight tested negative for the presence of anti-HIV antibody on initial testing. Of these, 59 (21%) had at least one follow-up test, with four testing positive for the presence of anti-HIV antibody, giving an incidence of 3.4 (95%CI=0.9-8.7) per hundred person years at risk.

The median intervals from testing negative to testing positive for anti-HCV antibody, anti-HBV core antibody and anti-HIV antibody were: 40 months (range 16-44), 34 months (range 19-44) and 26 months (range16-44) respectively.

The length of time a client was in treatment was associated with having a second test for anti-HCV antibody ($p=<0.001$), anti-HBc antibody ($p=<0.001$) and anti-HIV antibody ($p=<0.001$). Age was not significantly associated with having a repeat test for any of the three bloodborne viruses.

HBV immunisation

While 81% of clients in whom HBV immunisation was indicated had received at least one vaccine, with 69% of these completing the recommended schedule, 15% had never received a vaccine while in treatment and 4% had a documented refusal (see Figure 1). The median interval from entering treatment to receiving a first vaccine against HBV was 6 months (range 1-24 months). For those clients who entered treatment within the last 24 months, this interval was significantly shorter (three compared to 15 months, $p<0.001$).

Of the 177 clients who had received a completed course of HBV immunisation, 134 (76%) were tested for anti-HBs antibody (see Figure 3 for the distribution of anti-HBs titres). Twenty (15%) of these were found to have an anti-HBs antibody level of less than 10miu/ml, of whom 15 had been revaccinated (see Figure 2).

DISCUSSION

Methodological considerations

It is with some caution that these findings can be extrapolated to all drug users in treatment in Ireland.

This study presents data on a cross-section of clients receiving methadone treatment in one of Dublin's three health board areas in late 2001 and early 2002. The sample is older (36% compared to 58% aged under 25) and contains a smaller proportion of males (60% compared to 70%) than the most recently published data on the total population attending addiction treatment services in Ireland.[20] In addition, as data were extracted from clinical records, it is possible our findings may not accurately report the true process of care delivered.

Screening

The proportion of patients without documented evidence of testing was 12% for HCV, 32% for anti-HBc, 16% for HBsAg and 14% for HIV. It is difficult therefore to accurately determine prevalence of bloodborne virus infections in the study sample. Of greater importance, however, is the fact that the health status of those who have not been tested is unknown.

A review of bloodborne virus care among clients attending addiction treatment centres in the same area was conducted using a similar methodology in 1997.[7] As only 60% of clients had been screened for at least one bloodborne virus infection, a standardised written protocol for bloodborne virus screening was subsequently introduced to the service. Our findings indicate that uptake of screening for bloodborne viruses has increased since the introduction of this protocol.

Problems in ensuring complete uptake of testing for these viruses has been reported among drug users in other settings.[23,24] To date, few data exist on reasons why such difficulty is experienced in ensuring adequate screening for bloodborne viruses among this population. Previous work in the Dublin area has highlighted a deficiency in knowledge regarding HCV among drug users, particularly where primary prevention is concerned.[25] As well as incorporating primary prevention into education programmes aimed at drug users, it is possible healthcare professionals working with drug users also need to discuss the importance of secondary prevention, specifically the importance of screening for previous exposure to any of these viruses.

Prevalence

It is encouraging to find the prevalence of anti-HCV antibody (66%), anti-HBc antibody (17%), HBsAg (2%) and anti-HIV (11%) antibody to be lower than observed in a similar study in the same area four years ago.[7] It is possible these findings may be in part explained by the recent increase in availability of harm reduction facilities in the Dublin area.[9]

Age or length of injecting career are associated with testing positive for HCV, HBV or HIV.[6,26] While the finding that younger drug users have a significantly lower prevalence of HCV infection is reassuring, the similar prevalence of HIV infection among those aged under 25 is a source of some concern. Another recent study examining the epidemiology of HIV infection among IDUs in the Dublin area reported an increase in the number of new cases of HIV among young IDUs.[27]

The observed bloodborne virus prevalence is however, higher than reported in a large cross-sectional survey of new clients presenting to a specialist addiction clinic in Dublin between 1992 and 1997.[6] This difference is likely to be explained by the fact that our sample had been in treatment for longer and was older (36% compared to 73% aged under 25).

The prevalence and incidence rates of the bloodborne viruses reported in this study may be an under-representation of the rates among IDUs as the study sample included both parental and non-parental heroin users.

Incidence

The observed incidence of HCV infection (24.5 per hundred person years) provides further evidence that injecting drug users attending treatment have a high incidence of HCV infection.[16,28] The observed incidence of HCV among the sample reported in this paper is considerably lower than that reported recently among a cohort attending an addiction treatment centre in Dublin (66 per hundred person years).[10] This finding may be explained by the older age and longer contact with treatment services of the cohort reported in the sample described in this paper, and indeed may indicate the benefit of methadone maintenance treatment.

However, the observed incidence of HIV infection (3.4 per hundred person years) is considerably higher than a number of recently reported incidence figures among injecting drug users in environments in which harm reduction strategies would be similar to those employed in Dublin.[10,16,28] These are worrying finding for service planners in our area, as it perhaps

indicates that current harm reduction strategies and localised testing protocols, may not be effective in controlling the spread of HIV infection among this population, as has been previously suggested.[29]

The majority of clients tested for bloodborne virus infections in this sample had not been tested in the past year. Furthermore, a small proportion of those who tested negative for bloodborne viruses on initial testing had subsequent screening performed. The high incidence of HIV and HCV, allied to the continued high risk activity that has been reported among drug users in Dublin despite increased availability of harm reduction interventions,[17] highlights a clear need for a standardised protocol for follow-up testing of drug users.

We propose the introduction of a standardised risk assessment model that would be performed twelve months following a negative test. This will enable clients to be assessed for risk factors associated with the acquisition of the bloodborne viruses and for those who have put themselves at risk to be subsequently retested.

HBV immunisation

Immunisation against HBV is recommended for all injecting drug users. However there are a number of difficulties inherent in the process of conferring adequate immunity to HBV among drug users. Uptake of targeted or opportunistic immunisation programmes is often poor.[7,24] In addition, drug users are less likely to mount a protective antibody response to completed immunisation programmes.[30,31]

Among the sample studied here, 81% had commenced a course of vaccinations against HBV. While the uptake is not as high as recently reported in addiction treatment centres in Italy,[31] it compares quite favourably with uptake rates reported in earlier studies from Dublin.[7] This may be due the recent introduction of guidelines for HBV immunisation in addiction treatment services in the area,[32] or the regular sustained contact clients have with a multidisciplinary team of healthcare professionals in addiction treatment services in the area.

Fifteen per cent of the sample who had completed a course of vaccinations and had been tested for anti-HBs were found to have an antibody titre of less than 10 miu/ml, thereby supporting the evidence that injecting drug users are less likely to mount an adequate immune response to currently available HBV vaccines.[30,31] Checking for immunity to HBV and if necessary, revaccinating, should be considered an essential part of any HBV immunisation guidelines, therefore.

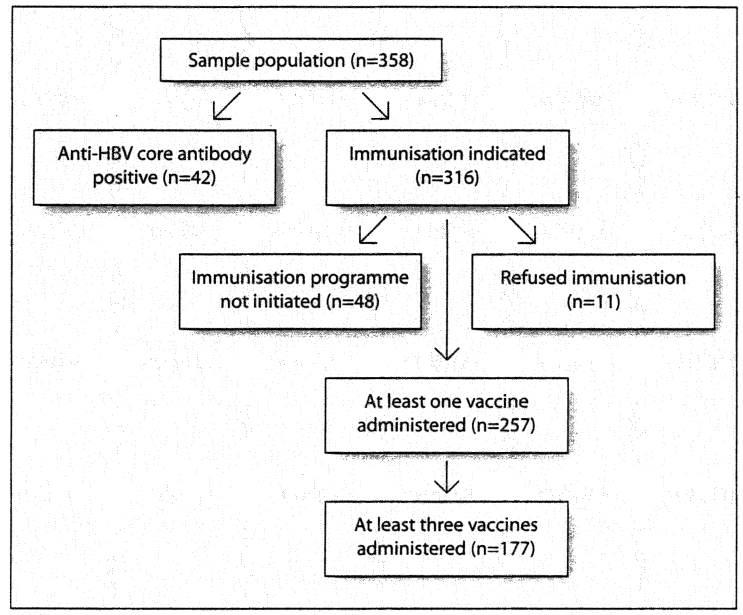


Figure 1. — PROCESS OF IMMUNISATION AGAINST HBV

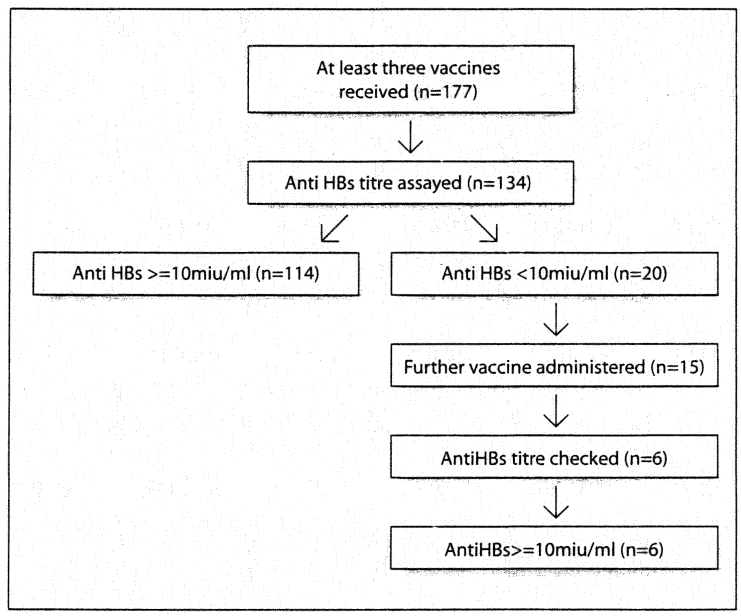


Figure 2. — IMMUNE RESPONSE TO COMPLETED HBV IMMUNISATION PROGRAMME AMONG STUDY SAMPLE.

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CONCLUSIONS

This study reports encouraging findings regarding uptake of testing for bloodborne viruses and an improvement in uptake of immunisation against HBV. The introduction of immunisation and screening protocols appear to have facilitated these improvements.

The findings regarding HIV incidence and HIV prevalence among younger drug users are a source of some concern. Levels of repeat testing for bloodborne viruses are also concerning. There was no evidence of a consistent policy regarding repeat testing following an initial negative test and the introduction of such a policy within addiction services is required.

Given the prevalence and incidence figures of HCV, HBV and HIV in Dublin we can conclude that the rate of risk behaviour among IDUs remains high. While existing harm reduction measures have had an important role in the response to the medical and social problems resulting from illicit drug use, it appears their availability may need to be expanded. Specifically the interception of young users, new onset users and those progressing to injecting is necessary if the spread of HCV, HBV and HIV is to be slowed or halted. In addition, a stronger emphasis needs to be placed on educating drug users to enable the behavioural changes that are necessary to halt transmission of the bloodborne viruses.

It has been suggested that "a rejuvenated and multidisciplinary approach emphasising both sexual and needle sharing risk practices" could be important in preventing HIV transmission.[27] It has also been suggested that a more sophisticated and individualised approach to harm reduction may be necessary.[17] Based on the findings presented in this paper, policy-makers may need to consider a reassessment of current strategies with a view to further expansion and the adoption of alternative educational strategies.

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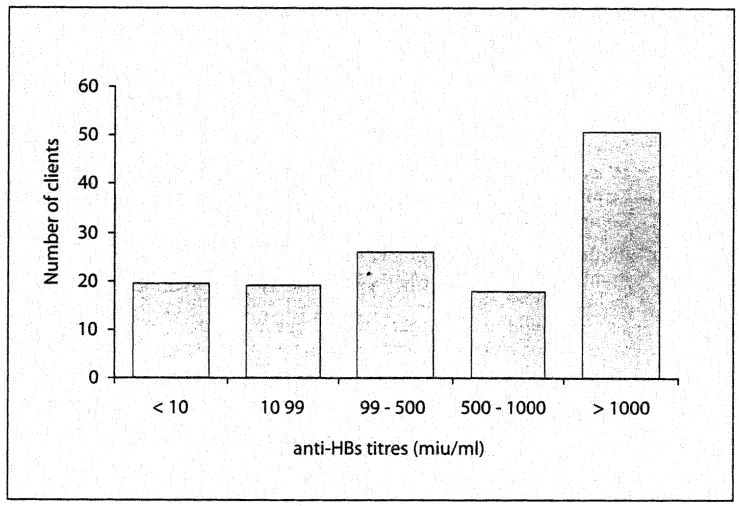

Figure 3. — DISTRIBUTION OF ANTI-HBS TITRES

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This study was commissioned by the Addiction Services of the South Western Area Health Board.

CONFLICT OF INTEREST

None.

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