Needle Exchange Surveillance Initiative.

2008-09 to 2017-18.

Prevalence of blood-borne viruses and injecting risk behaviours among people who inject drugs (PWID) attending injecting equipment provision (IEP) services in Scotland, 2008-09 to 2017-18
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Needle Exchange Surveillance Initiative (NESI)

2008-09 to 2017-18
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BBV</td>
<td>Blood-borne virus</td>
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<tr>
<td>DBS</td>
<td>Dried blood spot</td>
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<tr>
<td>HBV</td>
<td>Hepatitis B virus</td>
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<tr>
<td>HCV</td>
<td>Hepatitis C virus</td>
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<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
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<tr>
<td>IEP</td>
<td>Injecting Equipment Provision</td>
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<tr>
<td>IPED</td>
<td>Image and performance enhancing drugs</td>
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<tr>
<td>ISD</td>
<td>Information Services Division</td>
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<td>NESI</td>
<td>Needle Exchange Surveillance Initiative</td>
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<td>NPS</td>
<td>Novel Psychoactive Substances</td>
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<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<td>PWID</td>
<td>People who inject drugs</td>
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<td>RNA</td>
<td>Ribonucleic acid</td>
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<td>SSTI</td>
<td>Severe soft tissue infection</td>
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</table>
Key points

- The average age of NESI participants has increased year-on-year since 2008-09, suggesting an ageing cohort of people who inject drugs (PWID) in Scotland.

- Heroin remains the most prevalent drug injected, but there are signs that injection of psychostimulants, notably powder cocaine, have increased in recent years.

- Prevalence of needle/syringe and other injecting equipment (spoons/cookers, filters, water) sharing is low and stable, but reported re-use of one’s own needle/syringe is increasing.

- Uptake of HCV and HIV testing are at their highest levels since the NESI surveys began in 2008-09 with 61% and 49% tested within the previous 12 months respectively.

- The rate of HBV vaccination declined for the first time since 2010, with 71% reporting uptake of at least one dose of the vaccine.

- The prevalence of HCV antibodies (i.e. ever infection) in 2017-18 remains high at 57%.

- However, the prevalence of chronic HCV (i.e. active infection) has declined from 38% in 2015-16 to 31% in 2017-18, a change that is likely attributable to increased uptake of HCV therapy.

- The estimated incidence of HCV among PWID in 2017-18 is 14.1 per 100 person years. This, and other indicators of recently acquired infection (i.e. prevalence among recent onset injectors), suggest incidence of HCV may have increased since 2011-12.

- 60% of respondents with chronic HCV infection (on dried blood spot testing) in 2017-18 reported having ever been diagnosed, which has increased from 54% in 2010.

- Forty-five cases of HIV were detected in 2017-18, equating to a national prevalence of 2.3%. However, most of these cases (n=39) were among respondents interviewed in NHS Greater Glasgow & Clyde where an outbreak of HIV among PWID has been ongoing since 2015.

- Of those testing positive for HIV antibodies in 2017-18, around a third reported that they were unaware of their infection.
# 1. Introduction

The aim of the Needle Exchange Surveillance Initiative (NESI) is to measure and monitor the prevalence of the Hepatitis C virus (HCV) and injecting risk behaviours among people who inject drugs (PWID) in Scotland. The initiative was initially funded by the Scottish Government as part of the Hepatitis C Action Plan, which stated that efforts to prevent HCV in Scotland must focus on preventing transmission of the virus among PWID. More recently the initiative has been funded under the auspices of the Scottish Government’s Sexual Health and Blood Borne Virus Framework. NESI provides information to evaluate and better target interventions aimed at reducing the spread of infection amongst PWID.

This report presents the results, at the health board level, for the data collection period from July 2017 until October 2018, during which data were collected across the 11 mainland Scottish NHS Boards. These were Ayrshire & Arran (AA), Borders (BR), Dumfries & Galloway (DG), Fife (FF), Forth Valley (FV), Grampian (GR), Greater Glasgow & Clyde (GGC), Highland (HG), Lanarkshire (LN), Lothian (LO), and Tayside (TY).

This report also presents the findings of the NESI survey, at Scotland-wide level, from 2008-09 until the most recent survey, 2017-18.

# 2. Overview of methods

A cross-sectional, voluntary, anonymous, bio-behavioural survey approach was used to recruit and interview PWID. Trained interviewers recruited participants from selected agencies and pharmacies that provide injecting equipment; these settings may also provide other harm reduction services, such as prescribed methadone. Clients attending these services were invited to take part if they had injected drugs on at least one occasion either recently or in the past, and if it was the first time they had participated in the current survey. Recruitment of people who have ever injected in the past, but not in the previous six months, was limited to approximately 20-30% of participants during each survey. In addition, the number of individuals reporting injection of image and performance enhancing drugs (IPED) alone was capped at 5% of total recruitment at each site.

After providing informed consent, participants completed a short interviewer-administered questionnaire and then provided a voluntary blood spot sample for anonymous testing for blood-borne virus markers. Participants who wished to know their HCV or HIV status were directed to the appropriate services. More detailed methods are provided in Appendix 2.
3. Key findings

Demographics

An ageing cohort of PWID is evident in NESI over time with the proportion of those interviewed aged 25 years and under down from 14% (n=368) in 2008-09 to just 3% (n=57) in 2017-18 [Table 1.1 and Figure 1]. In contrast, the proportion of those aged over 35 years has increased from 34% (n=863) in 2008-09 to 73% (n=1,548) in 2017-18. Additionally, age at first injection has remained largely static over time, which suggests that the increasing average age is a result of an ageing cohort of users, rather than simply new PWID who are starting injecting at an older age.

![Figure 1: Proportion of NESI respondents by age group, 2008 to 2018.](image)

The proportion of male participants in NESI 2017-18 remained largely unchanged from previous surveys at 73% (n=1,549), as did the proportion who had been homeless at some point in the past six months (23%; n=499).
Drug trends

Heroin continues to be the most prevalent drug injected with over 90% of those interviewed in 2017-18 reporting injecting it in the past six months, similar to levels in previous NESI surveys [Table 1.1]. Reported injection of powder cocaine increased markedly from 9% in 2010 (n=217) to 29% (n=422) in 2017-18 [Figure 2], with levels highest in NHS GGC (49%; n=286) [Table 2.1]. Cocaine injecting has been linked to a recent outbreak of HIV among PWID in Glasgow city centre.4

![Figure 2: Proportion of NESI respondents reporting injection of various drugs in the last six months, 2008 to 2018 (among those who reported injecting in the last six months), excluding heroin](image)

The practice of injecting heroin and cocaine together, often referred to as ‘snowballing’, also showed signs of increase with prevalence up to 9% (n=128) in 2017-18, more than double that recorded in 2015-16 (4%; n=91). Again, rates were highest in NHS GGC (13%; n=76). Injection of ‘legal highs’ (i.e. novel psychoactive substances (NPS)), associated with increases in severe soft tissue infections (SSTIs) and HCV in parts of Scotland in recent years5,6, was rare within the 2017-18 survey, reported by less than 1% of participants.

### Table 1.1

<table>
<thead>
<tr>
<th>Year</th>
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<th>Amphetamines</th>
<th>Benzodiazepines</th>
<th>Legal highs</th>
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<td>2017-18</td>
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Injecting risk behaviour

The proportion of those interviewed reporting ‘daily or more’ injecting (45%; \(n=654\)) in the past six months remained relatively stable over time accounting for around half the sample each sweep [Table 1.1 and Figure 3]. However, trends in reported personal re-use of needles and syringes appear to be changing: the proportion of those interviewed reporting re-use of such equipment increased from 45% (\(n=805\)) in 2011-12 to 58% (\(n=848\)) in 2017-18 [Table 1.2 and Figure 3].

**Figure 3:** Proportion of NESI respondents who reported injecting daily / re-using equipment, 2008 to 2018 (among those who reported injecting in the last six months)
Levels of reported needle and syringe sharing in the past six months remained low in 2017-18 (10%; n=141) [Table 1.2 and Figure 4]. Reported sharing of injecting equipment (spoons/cookers, filters, water) in the past six months in 2017-18 (26%, n=380) was almost half the proportion reported in 2008-09 (48%, n=988).

**Figure 4**: Proportion of NESI respondents who reported sharing injecting equipment, 2008 to 2018 (among those who reported injecting in the last six months)

Almost half of participants who had injected in the previous six months reported mainly injecting into the groin area (45%; n=665) and around a third into their arms (35%; n=509) [Table 1.2]. Groin injecting was most prevalent in NHS Forth Valley (63%; n=50) and Tayside (59%; n=89) [Table 2.2].
Uptake of harm reduction services

Blood-borne virus vaccination and testing

Hepatitis B vaccination uptake fell in 2017-18 after a steady increase since 2010, with 71% of respondents in 2017-18 (n=1503) reporting having ever been vaccinated [Table 1.3 and Figure 5]. Of those who have been vaccinated, the proportion reporting having had at least three doses remained high at 75% (n=1134). Previously, high coverage was attributed to the introduction of universal prison vaccination in 1999 which has contributed to low levels of HBV infection among PWID in Scotland compared with other European countries.7

Uptake of HCV testing has increased consistently: the proportion of respondents who reported recent testing (i.e. in the last 12 months) increased from 35% in 2008-09 to 56% in 2017-18 [Table 1.3 and Figure 5]. When those who reported that they had been diagnosed with infection from a past test (that is, prior to 12 months ago) were excluded, the percentage of respondents who had been tested for hepatitis C in the last year increased to 61%; this figure compares to 40%, 45%, 49%, 52% and 55% in 2008-09, 2010, 2011-12, 2013-14 and 2015-16 respectively.

HCV testing rates were highest in NHS Tayside (68%) and lowest in Lanarkshire (48%) and Highland (46%) [Table 2.3] but may have been influenced by the sites used for NESI recruitment. For example, where NESI recruitment occurred at sites which routinely test for BBV, testing rates are likely to be higher. The sites undertaking the most testing were drug treatment centres (32% of respondents reported being tested here), followed by hospitals, GPs, and prisons (with 20%, 16% and 16% of respondents reporting receiving an HCV test in these locations, respectively). Notably, the proportion of the sample who reported receiving a test in ‘other’ settings increased three-fold between 2015-16 (5%) and 2017-18 (15%) [Table 1.3]. This increase is driven by testing in injecting equipment provision (IEP) services, in particular in NHS Tayside where it accounted for almost half of all recent tests (48%); NHS Tayside are currently involved in research initiatives aimed at testing and treating HCV within community pharmacies.8,9

Similarly, consistent increases in uptake were observed for HIV testing: the proportion of respondents who reported recent testing (i.e. in the last 12 months) increased from 30% (n=766) in 2008-09 to 49% (n=1,046) in 2017-18 [Table 1.3 and Figure 5]. When those who reported that they had been diagnosed with infection from a past test (that is, prior to 12 months ago) were excluded, the percentage of respondents who had been tested for HIV remained unchanged at 49%; this figure compares to 30%, 33%, 36%, 39% and 43% in 2008-09, 2010, 2011-12, 2013-14 and 2015-16 respectively. Testing rates were highest in NHS Lothian (57%) and lowest in Highland (41%) and Ayrshire and Arran (40%) [Table 2.3]. Again, HIV testing rates may have been influenced by the sites used for NESI recruitment.
Figure 5: Proportion of NESI respondents who reported HBV vaccination and HCV/HIV test uptake, 2008 to 2018

Opioid substitution therapy

Self-reported uptake of methadone has fluctuated, but remained high, over the six surveys, with 78% (n=1146) of participants in 2017-18 who were currently injecting (i.e. had injected in the last six months) reporting receipt of prescribed methadone in the last six months [Table 1.3]. When restricted to participants who were visiting the service to obtain sterile injecting equipment (on the occasion of their recruitment into the study), the proportion on prescribed methadone in the last six months decreased to 69%. Less than one in 20 participants (4%; n=53) reported being prescribed buprenorphine within the last six months.

Sterile injecting equipment

The fluctuating trend in reported average numbers of sterile needles/syringes accessed by participants continued with a mean of 17 per week in 2017-18, up from 15 per week in 2015-16, but similar to the average reported in 2010 [Table 1.3]. Proportionally more respondents reported any uptake of filters and spoons (93%, n=1361) in 2017-18 than in any other survey year; however, on average, respondents reported receiving fewer of these items per week in 2017-18 (19 each) as compared to 2013-14 (21 each). Notably, more than eight in ten participants (83%, n=1221) reported uptake of sterile water in 2017-18 (which has increased since 2 ml plastic ampoules were introduced from late 2012). These high rates were observed across all health boards with the exception of NHS Fife where just under a third of participants
(30%; n=19) had obtained sterile water in the past six months [Table 2.3]. There is also emerging evidence of increasing engagement with foil (for smoking drugs) since it was rolled out nationally from September 2016. In 2017-18, 35% of respondents (n=513) reported uptake of this item in the last six months, which is almost double what was reported in 2015-16 (18%, n=364). The lower rates in 2015-16 may be partly explained by partial roll-out of foil during the course of the NESI survey that year. Foil uptake in 2017-18 varied markedly between areas with the highest rates in NHS Highland (83%; n=24), Borders (68%; n=17) and Lanarkshire (58%; n=73), but much lower in Forth Valley (18%; n=14).

Take-home naloxone

The proportion of NESI participants who reported that they had been prescribed a take-home naloxone kit in the past year rose from 8% (n=175) in 2011-12 to 61% (n=1299) in 2017-18 [Table 1.3]. Naloxone prescribing rates were highest in NHS Borders (83%; n=25) and Forth Valley (79%; n=81) [Table 2.3]. In contrast, the carriage-rate (i.e. the proportion of people in possession of their naloxone at the time of their NESI interview) remained low at just 13% (n=172). Carriage may be less of an issue if most injecting (and overdose) takes place in a domestic setting, as is common.10

HCV therapy

In 2017-18, 50% (n=387) of those who self-reported as eligible for treatment, had ever received therapy for their HCV infection, which is a marked increase from 28% in 2015-16 [Table 1.4]. Of those who had ever received therapy, 44% (n=170) had received it in the last year; this compares to 36% in 2015-16. Self-reported treatment engagement (ever) among those self-reporting to be eligible was highest in NHS Tayside (77%; n=80) [Table 2.4]. Box 1 provides more information on HCV therapy and chronic HCV prevalence.

Blood-borne virus prevalence and incidence

HCV prevalence and incidence

In 2017-18, HCV antibody prevalence among PWID remained high at 57% (n=1130) [Table 1.5]. Rates were highest in GGC (68%; n=555) and Forth Valley (60%; n=59) [Table 2.5].

An indicator of recently acquired HCV infection is the HCV prevalence among those who had recently commenced injecting: in 2017-18, this was 17% (n=8), 23% (n=33) and 26% (n=56) among those who had been injecting for less than 1 year, 3 years and 5 years, respectively [Table 1.5]. However, as with the younger age groups, it is also notable that these PWID with recent onset are forming a declining proportion of all participants over time.

In 2017-18, 18 respondents were found to be HCV RNA positive and HCV antibody negative, another indicator for recent infection. This translates into an incidence rate of 14.1 new HCV infections per 100 person-years (see Appendix 2 for details on calculating this figure).

i i.e. answered they have HCV or had cleared HCV through treatment
HCV incidence reached a low point of 6.1 per 100 person-years in 2011-12, having declined from 13.3 in 2008-09; however, the rate now appears to be on the rise, with the 2017-18 figure similar to that observed in 2008-09 [Table 1.5, Figure 6]. These data should, however, be interpreted with caution as confidence intervals overlap [Figure 6]. Nevertheless, HCV incidence is consistent with trends in HCV prevalence among recent onset injectors.

**Figure 6:** Indicators of recently acquired HCV infection among NESI respondents, 2008 to 2018. The method for calculating HCV incidence is described in Appendix 2.

Diagnosed and undiagnosed HCV infection

Among people who had chronic infection (i.e. HCV antibody positive and RNA positive) on dried blood spot (DBS) testing, 60% (n=339) self-reported that they had ever been diagnosed in 2017-18 [Table 1.5], an increase from 54% and 56% in 2010 and 2015-16, respectively.
**Box 1: Prevalence of chronic HCV infection (i.e. active infection)**

The prevalence of HCV antibodies has not changed substantially over the six sweeps of the NESI study; however, it is only a marker of ever infection and provides no information about whether an individual has an active infection or has cleared their infection. In the 2015-16 and 2017-18 sweeps of NESI, we conducted RNA testing on the HCV antibody positive samples to determine how many individuals were chronically infected with HCV.

Between 2015-16 and 2017-18, there was an 18% reduction in the prevalence of chronic HCV in Scotland overall, from 38% (n=904) to 31% (n=566) [Table 1.5 and Figure 7]. Reductions in chronic prevalence of 29% and 18% were observed in Tayside and the rest of Scotland, respectively [Figure 7].

**Figure 7:** Proportion of NESI respondents with chronic and cleared HCV infection, 2015 to 2018. Percentage reductions in chronic prevalence between 2015-16 and 2017-18 are indicated in red.

This decline in chronic prevalence is likely attributable to the increase in uptake of HCV therapy, which has been seen across all NHS Boards [Figure 8]. The large decline in chronic prevalence seen in Tayside, in particular, is associated with efforts to increase treatment for HCV infection among people who are actively injecting drugs by offering it in community settings such as Injecting Equipment Provision (IEP) sites. In 2017-18, 77% of respondents (who self-reported as eligible for treatment) in Tayside reported ever having received therapy and 36% reported having received it in the past 12 months, an increase from 35% and 14%, respectively, in 2013-14 [Figure 8].

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ii i.e. said they were HCV positive or had cleared HCV through treatment
Box 1: Prevalence of chronic HCV infection (i.e. active infection) (cont.)

Figure 8: Proportion of NESI respondents who had received therapy ever / in the past 12 months, 2013 to 2018.

**Ever received therapy for HCV***

<table>
<thead>
<tr>
<th>Year</th>
<th>All Scotland</th>
<th>Tayside</th>
<th>Rest of Scotland</th>
</tr>
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<tbody>
<tr>
<td>2013-14</td>
<td>22%</td>
<td>35%</td>
<td>20%</td>
</tr>
<tr>
<td>2015-16</td>
<td>28%</td>
<td>45%</td>
<td>26%</td>
</tr>
<tr>
<td>2017-18</td>
<td>50%</td>
<td>77%</td>
<td>46%</td>
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</tbody>
</table>

**Received therapy for HCV in the past 12 months***

<table>
<thead>
<tr>
<th>Year</th>
<th>All Scotland</th>
<th>Tayside</th>
<th>Rest of Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>9%</td>
<td>14%</td>
<td>9%</td>
</tr>
<tr>
<td>2015-16</td>
<td>10%</td>
<td>27%</td>
<td>8%</td>
</tr>
<tr>
<td>2017-18</td>
<td>22%</td>
<td>36%</td>
<td>20%</td>
</tr>
</tbody>
</table>

* among respondents who were self-reported eligible for treatment (i.e. self-reported that they were HCV positive or had cleared HCV through therapy)
HIV prevalence

HIV prevalence has been measured from 2011-12 onwards and has increased over time from 0.3% (n=6) in 2011-12 to 2.3% (n=45) in 2017-18 [Table 1.5], driven primarily by an outbreak of HIV infection in Glasgow.\(^4\) In 2017-18, HIV prevalence in GGC was 4.8% and 10.8% in Glasgow city centre; HIV cases were also detected in Lothian, Lanarkshire, Tayside and Fife, with prevalence rates ranging from 0.6% to 1.2% [Table 2.5].

Diagnosed and undiagnosed HIV infection

Among people who were positive for HIV antibodies on DBS testing, 69% (n=31) self-reported that they were HIV positive, 24% (n=11) self-reported that they were HIV negative and a further 7% were unaware of their status. Thus, in total, 31% (n=14) reported that they were unaware of their HIV infection [Table 1.5]. All cases detected in Lothian, Lanarkshire, Tayside and Forth Valley had been diagnosed (i.e. self-reported that they were HIV positive), whereas 64% (n=25) of cases in GGC had been diagnosed [Table 2.5]. However, recruitment in GGC was undertaken in the early part of the 2017-18 sweep and it is likely that a large proportion of the remaining cases have been diagnosed since then as a result of measures put in place to respond to the HIV outbreak.

Other drug-related health harms

Severe soft tissue infections

In 2017-18, 20% (n=430) of respondents reported having a severe soft tissue infection (SSTI) in the last year; this compares with 17% in 2015-16 and 24% in 2013-14 [Table 1.6]. SSTI rates were highest in Borders (33%; n=10) and Lothian (27%; n=44) and lowest in Dumfries & Galloway (12%; n=6) [Table 2.6]. Medium to high uptake of IEP and opioid substitution therapy combined has been associated with lower risk of acquiring an SSTI compared to those with low uptake.\(^{12}\)

Overdose

In 2017-18, 15% (n=312) of respondents reported having overdosed to the point of losing consciousness in the last year [Table 1.6]. The highest rate of overdose was in Lothian, with 21% (n=44) reporting having overdosed in the last year [Table 2.6].
Acknowledgements

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**Lanarkshire**
Ross Millar, Harm Reduction Team Leader
Staff at all participating pharmacies and IEP sites in NHS Lanarkshire

**Lothian**
Jim Shanley Harm Reduction Team Leader
Staff at all participating pharmacies and IEP sites in NHS Lothian

**Tayside**
Karen Melville, Specialist Pharmacist in Substance Misuse
Staff at all participating pharmacies and IEP sites in NHS Tayside
Appendix 1: 2017-18 Questionnaire

The questionnaire is available at: https://www.hps.scot.nhs.uk/web-resources-container/needle-exchange-surveillance-initiative-nesi-2008-09-to-2017-18/
Appendix 2: Survey methods

Participants, eligibility and setting

Participants were recruited from selected agencies and pharmacies that provide injecting equipment. Services were selected if they were willing to take part in the initiative and if they had a private room in which interviews could be conducted. The 2017-18 survey was conducted from July 2017 through to October 2018 and participants were recruited from 105 pharmacies and 26 agencies providing fixed site, mobile or outreach injecting equipment provision service across the 11 mainland NHS Boards. This is similar to the number of recruitment sites that have been used in previous NESI surveys. In total, 47% of all services providing injecting equipment in mainland Scotland participated as recruitment sites in 2017-2018 (Table A1).13

Table A1: Number of recruitment sites included in the NESI survey, by NHS board

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayrshire &amp; Arran</td>
<td>11</td>
<td>7 (64%)</td>
<td>9</td>
<td>6 (67%)</td>
<td>20</td>
</tr>
<tr>
<td>Borders</td>
<td>7</td>
<td>2 (29%)</td>
<td>1</td>
<td>1 (100%)</td>
<td>8</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway</td>
<td>11</td>
<td>4 (36%)</td>
<td>2</td>
<td>1 (50%)</td>
<td>13</td>
</tr>
<tr>
<td>Fife</td>
<td>19</td>
<td>7 (37%)</td>
<td>1</td>
<td>3 (&gt;100%)</td>
<td>20</td>
</tr>
<tr>
<td>Forth Valley</td>
<td>16</td>
<td>8 (50%)</td>
<td>7</td>
<td>1 (14%)</td>
<td>23</td>
</tr>
<tr>
<td>Grampian</td>
<td>18</td>
<td>6 (33%)</td>
<td>6</td>
<td>4 (67%)</td>
<td>24</td>
</tr>
<tr>
<td>Greater Glasgow &amp; Clyde</td>
<td>59</td>
<td>29 (49%)</td>
<td>9</td>
<td>1 (11%)</td>
<td>68</td>
</tr>
<tr>
<td>Highland</td>
<td>19</td>
<td>4 (21%)</td>
<td>6</td>
<td>2 (33%)</td>
<td>25</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td>24</td>
<td>17 (71%)</td>
<td>1</td>
<td>1 (100%)</td>
<td>25</td>
</tr>
<tr>
<td>Lothian</td>
<td>19</td>
<td>12 (63%)</td>
<td>15</td>
<td>3 (20%)</td>
<td>34</td>
</tr>
<tr>
<td>Tayside</td>
<td>15</td>
<td>9 (60%)</td>
<td>5</td>
<td>3 (60%)</td>
<td>20</td>
</tr>
<tr>
<td>Scotland†</td>
<td>218</td>
<td>105 (48%)</td>
<td>62</td>
<td>26 (42%)</td>
<td>280</td>
</tr>
</tbody>
</table>

* See reference 13
† Excluding the island NHS boards
Clients attending the service were approached by trained interviewers and assessed for eligibility: participants were eligible if they had injected drugs on at least one occasion and if it was the first time that they had participated in the current survey year. All eligible participants were invited to take part in the survey: the interviewers first informed them about the purpose of the survey and explained that it was voluntary, anonymous and confidential. Upon giving informed consent, participants were then asked to complete a short interviewer-administered questionnaire to elicit key demographic and behavioural information and to supply a blood spot sample to be tested anonymously for HCV and other blood-borne viruses. An individual’s blood spot sample was linked to the corresponding questionnaire through an assigned study number. Participants who wished to find out their HCV status were referred to the appropriate services.

Ethical approval to conduct the study was obtained from West Glasgow NHS Ethics Committee (REC Ref: 08/S0709/46). NHS Research and Development approval was obtained from all participating NHS Boards.

**Participation**

Where individuals participated more than once in the survey, the responses and blood sample results from their first participation were retained for analysis. Any subsequent questionnaires and blood samples taken were excluded from all analyses. Duplicate responses were identified where participants’ initials, date of birth, sex and NHS Board of interview were identical. In the 2017-18 survey for example, while a total of 2,205 questionnaires were completed, 2,130 (97%) were completed by unique individuals and included in this report.

All respondents were asked the main reason for their visit to the service (recruitment site) on that day (Table A2). Overall, 34% of respondents reported attendance for the purpose of obtaining injecting equipment, 44% reported attending for methadone and a further 22% reported another reason. The ‘other’ reasons included: attending an appointment, to complete survey, using the drop-in service, to see harm reduction team, accompanying someone else or other prescription collection.
**Table A2: Self-reported reason for visit to service (recruitment site), 2017-18**

<table>
<thead>
<tr>
<th>NHS board</th>
<th>Injecting equipment</th>
<th>Methadone</th>
<th>Other</th>
<th>Not reported</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayrshire &amp; Arran</td>
<td>65 (37%)</td>
<td>82 (46%)</td>
<td>31 (17%)</td>
<td>0 (0%)</td>
<td>178 (100%)</td>
</tr>
<tr>
<td>Borders</td>
<td>10 (33%)</td>
<td>12 (40%)</td>
<td>8 (27%)</td>
<td>0 (0%)</td>
<td>30 (100%)</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway</td>
<td>18 (35%)</td>
<td>17 (33%)</td>
<td>17 (33%)</td>
<td>0 (0%)</td>
<td>52 (100%)</td>
</tr>
<tr>
<td>Fife</td>
<td>24 (26%)</td>
<td>50 (54%)</td>
<td>18 (20%)</td>
<td>0 (0%)</td>
<td>92 (100%)</td>
</tr>
<tr>
<td>Forth Valley</td>
<td>36 (35%)</td>
<td>54 (53%)</td>
<td>12 (12%)</td>
<td>0 (0%)</td>
<td>102 (100%)</td>
</tr>
<tr>
<td>Grampian</td>
<td>40 (25%)</td>
<td>75 (47%)</td>
<td>42 (27%)</td>
<td>1 (1%)</td>
<td>158 (100%)</td>
</tr>
<tr>
<td><strong>Greater Glasgow &amp; Clyde</strong></td>
<td><strong>283 (33%)</strong></td>
<td><strong>363 (43%)</strong></td>
<td><strong>200 (23%)</strong></td>
<td><strong>8 (1%)</strong></td>
<td><strong>854 (100%)</strong></td>
</tr>
<tr>
<td>Highland</td>
<td>4 (7%)</td>
<td>32 (57%)</td>
<td>20 (36%)</td>
<td>0 (0%)</td>
<td>56 (100%)</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td>70 (38%)</td>
<td>87 (47%)</td>
<td>27 (15%)</td>
<td>0 (0%)</td>
<td>184 (100%)</td>
</tr>
<tr>
<td>Lothian</td>
<td>93 (44%)</td>
<td>81 (38%)</td>
<td>38 (18%)</td>
<td>1 (0.5%)</td>
<td>213 (100%)</td>
</tr>
<tr>
<td>Tayside</td>
<td>80 (38%)</td>
<td>81 (38%)</td>
<td>49 (23%)</td>
<td>1 (0.5%)</td>
<td>211 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>723 (34%)</strong></td>
<td><strong>934 (44%)</strong></td>
<td><strong>462 (22%)</strong></td>
<td><strong>11 (1%)</strong></td>
<td><strong>2130 (100%)</strong></td>
</tr>
</tbody>
</table>

**Laboratory testing**

For the 2008-09 through 2013-14 surveys, dried blood spots (DBS) were extracted and tested in a modification of the Ortho Save 3.0 EIA, as described by Judd et al.\(^\text{14}\) Two 3mm discs were punched from DBS and eluted in 200µl of PBS/0.05% tween. Samples generating an optical density of <0.4, 0.4-0.79, and >0.8 were considered negative, weakly reactive and positive for HCV antibodies, respectively. The weak reactive samples were considered HCV antibody positive for this report. An aliquot of the eluted DBS was also tested on the Abbott Architect i2000sr using the Architect HIV Ag/Ab Combo assay. All HIV positives were confirmed by repeat testing on the Architect and by the ImmunoComb II HIV 1&2 BiSpot (Organics). The immunocomb detected antibody only and differentiated between HIV-1 and HIV-2.

In 2015-16 and 2017-18, a slightly different method for HCV and HIV antibody detection was applied. Two 1cm DBS spots were added to 0.75ml of PBS/tween 0.05% buffer; the spots were left to elute either overnight at room temperature or at 4°C for 48 hours. The eluate was then spun for 5 minutes at 13,000rpm and tested on the Abbott Architect i2000sr using the following assays: Architect Anti-HCV assay and Architect HIV Ag/Ab Combo assay. HIV positive samples were confirmed by re-testing the eluate on the Architect and by using a supplemental antibody assay. In 2015-16 the supplemental assay was ImmunoComb II HIV 1&2 BiSpot (Organics) and in 2017-18 it was the Geenius HIV 1/2 (Bio-Rad).

For all surveys, HCV RNA was tested using an ‘in house’ polymerase chain reaction (PCR) assay using the bioMerieux extraction protocol for DBS on the Easymag and a real-time PCR. The method of HCV RNA detection in DBS was described in Bennett et al.\(^\text{15}\) The assay detects to 1000 IU/ml in DBS. For participants who were HCV antibody negative, the PCR testing was carried out in pools of five and all positive pools were then tested individually.

**Needle Exchange Surveillance Initiative (NESI)**

2008-09 to 2017-18
Calculating HCV incidence

After an individual has been exposed to HCV, there is a “window period” wherein the virus (i.e. RNA) is detectable but the individual has not yet formed antibodies. Individuals in this window period, i.e. individuals with very recently acquired HCV infection, will therefore test HCV antibody negative and HCV RNA positive. An estimate of HCV incidence can then be derived using the formula:

\[
I = \frac{(365/T)n}{(N-n)+(365/T)n}
\]

where T is the estimated duration of the window period, n is the number of recently acquired infections and N is the number of susceptibles (i.e. HCV antibody negatives). An estimate of the duration of the window period (51 days) was derived from the literature.
### Appendix 3: Participating sites

#### Ayrshire and Arran NHS Board
- Ballot Road Clinic, Irvine
- Bentinck Centre, Kilmarnock
- Boots Pharmacy, Irvine
- Boots Pharmacy, Saltcoats
- Boots Pharmacy, Whitletts, Ayr
- Care & Share, Ayr
- Cumnock Health Centre
- Kilbirkine Health Centre
- Lloyds Pharmacy, Stevenston
- Lloyds Pharmacy, Wellington Square, Ayr
- Stevenson Health Centre
- Toll Pharmacy, Prestwick
- Townhead Pharmacy, Kilwinning

#### Borders NHS Board
- Addaction, Galashiels
- Lindsay & Gilmour Pharmacy, Hawick
- Lloyds Pharmacy, Galashiels

#### Dumfries & Galloway NHS Board
- Boots Pharmacy, Dumfries
- Co-Op Pharmacy, Lockerbie
- Gordons Pharmacy, Stranraer
- Outreach Nurse, NHS D&G
- William Murray Pharmacy, Dumfries

#### Fife NHS Board
- Addaction, Dunfermline
- Addaction Outreach Van, Fife
- Addaction, Leven
- Boots Pharmacy, Retail Complex, Kirkcaldy
- Boots Pharmacy, Glenrothes
- Boots Pharmacy, Cowdenbeath
- Boots Pharmacy, High St, Kirkcaldy
- Lloyds Pharmacy, Viceroy St, Kirkcaldy
- St Clair Pharmacy, Kirkcaldy
- Well Pharmacy, Lochgelly

#### Forth Valley NHS Board
- Cornton Pharmacy, Stirling
- Graeme Pharmacy, Falkirk
- Lindsay & Gilmour Pharmacy, Sauchie
- Lindsay & Gilmour Pharmacy, Bannockburn
- Lloyds Pharmacy, Falkirk
- Lloyds Pharmacy, Alloa
- Lloyds Pharmacy, Grangemouth
- Signpost Recovery, Falkirk
- Superdrug, Thistle Centre, Stirling

#### Grampian NHS Board
- Alcohol & Drugs Action, Aberdeen
- Buchanhaven Pharmacy, Peterhead
- Dickies Pharmacy, Torry, Aberdeen
- Holburn Pharmacy, Aberdeen
- Lloyds Pharmacy, Elgin
- Quarriers Arrows Service, Elgin
- Rowlands Pharmacy, Aberdeen
- Substance Misuse Service, Fraserburgh
- Tillydrone Pharmacy, Aberdeen
- Turning Point, Peterhead
Greater Glasgow & Clyde NHS Board
Abbey Pharmacy, Trongate, Glasgow
Abbey Pharmacy, Paisley
Boots Pharmacy, Alexandria
Boots Pharmacy, 200 Sauchiehall St, Glasgow
Boots Pharmacy, Central Station, Glasgow
Boots Pharmacy, Clydebank
Boots Pharmacy, Neilston Road, Paisley
Boots Pharmacy, Buchanan Galleries, Sauchiehall Street, Glasgow
Boots Pharmacy, Tollcross
Boots Pharmacy, Johnstone
Boots Pharmacy, Queen Margaret Drive, Glasgow
Boots Pharmacy, Shettleston Road, Glasgow
Boots Pharmacy, Victoria Rd, Glasgow
Boots Pharmacy, Duke Street, Glasgow
Drug Crisis Centre, Glasgow

Highland NHS Board
Boots Pharmacy, Eastgate, Inverness
Boots Pharmacy, Helensburgh
Boots Pharmacy, Oban

Harm Reduction Service, Inverness
Osprey House, Inverness
Well Pharmacy, Dunoon

Lanarkshire NHS Board
Boots Pharmacy, Hamilton
Boots Pharmacy, East Kilbride
Boots Pharmacy, Airdrie
Boots Pharmacy, Larkhall
Boots Pharmacy, Cambuslang
Boots Pharmacy, Coatbridge
Boots Pharmacy, Rutherglen
Dickson Pharmacy, Uddingston
Gilbride Pharmacy, Blantyre

Lanarkshire Outreach Van
Lloyds Pharmacy, Motherwell
Lloyds Pharmacy, Hamilton
Lloyds Pharmacy, Wishaw
M&D Green Pharmacy, Burnside
McIntyre Pharmacy, Wishaw
New Stevenston Pharmacy, Motherwell
Village Pharmacy, Cumbernauld

Dunnet Pharmacy, Glasgow
E.R. McAnearney Pharmacy, Greenock
Harmony Row Pharmacy, Govan
Houlihan Pharmacy, Possilpark
John Gilbride Pharmacy, Ibrox, Glasgow
Lloyds Pharmacy, Abercromby Street, Glasgow
Lloyds Pharmacy, Drumchapel Lloyds Pharmacy, Knightswood
Lloyds Pharmacy, Carmunnock Road, Glasgow
Lloyds Pharmacy, Easterhouse
Lloyds Pharmacy, Maryhill Road, Glasgow
M&D Green Pharmacy, Port Glasgow
Partick Pharmacy, Glasgow
Rowlands Pharmacy, Springburn
Simon Community Hub, Glasgow
**Lothian NHS Board**

- Boots Pharmacy, Shandwick Place, Edinburgh
- Lindsay & Gilmour Pharmacy, Craigmillar, Edinburgh
- Lindsay & Gilmour Pharmacy, Leith Walk, Edinburgh
- Lindsay & Gilmour Pharmacy, Crewe Road, Edinburgh
- Lloyds Pharmacy, Livingston
- Lloyds Pharmacy, Westerhailes, Edinburgh
- Lloyds Pharmacy, Ferniehill Road, Edinburgh
- Lothian Outreach Van
- MacKinnon Pharmacy, Calder Road, Edinburgh
- Newington Pharmacy, Clerk St, Edinburgh
- Omnicare Pharmacy, Springwell, Edinburgh
- Prestonpans Pharmacy
- Rowlands Pharmacy, Penicuik
- Spittal Street Centre, Edinburgh
- Turning Point, Leith

**Tayside NHS Board**

- Addaction, Dundee
- Boots Pharmacy, Whitfield, Dundee
- Cairn Centre, Dundee
- Central Healthcare, Perth
- Co-Op Pharmacy, Fisheracre, Arbroath
- Co-Op Pharmacy, High Street, Arbroath
- Davidsons Chemists, Perth
- Davidsons Chemists, Forfar
- J&K Richardson Pharmacy, Dundee
- Lloyds Pharmacy, Albert Street, Dundee
- Lloyds Pharmacy, Lochee, Dundee
- Lloyds Pharmacy, Glover Street, Perth
Appendix 4: Peer-reviewed publications arising from NESI


iii This list does not include papers which utilise NESI data indirectly e.g. to parameterise mathematical models.

## Appendix 5: NESI steering group membership

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Christopher Biggam</td>
<td>Glasgow Caledonian University</td>
</tr>
<tr>
<td>Mr John Campbell</td>
<td>NHS Greater Glasgow &amp; Clyde</td>
</tr>
<tr>
<td>Prof David Goldberg</td>
<td>Health Protection Scotland and Glasgow Caledonian University</td>
</tr>
<tr>
<td>Dr Rory Gunson</td>
<td>West of Scotland Specialist Virology Centre</td>
</tr>
<tr>
<td>Prof Sharon Hutchinson</td>
<td>Glasgow Caledonian University and Health Protection Scotland</td>
</tr>
<tr>
<td>Dr Andrew McAuley</td>
<td>Health Protection Scotland and Glasgow Caledonian University</td>
</tr>
<tr>
<td>Dr Duncan McCormick</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>Ms Shirley McLean</td>
<td>Health Protection Scotland</td>
</tr>
<tr>
<td>Dr Alison Munro</td>
<td>University of Dundee</td>
</tr>
<tr>
<td>Dr Norah Palmateer</td>
<td>Glasgow Caledonian University and Health Protection Scotland</td>
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<tr>
<td>Dr Duncan Stewart</td>
<td>NHS Lothian</td>
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<tr>
<td>Prof Avril Taylor</td>
<td>University of the West of Scotland</td>
</tr>
<tr>
<td>Mr Jason Wallace</td>
<td>Scottish Drugs Forum</td>
</tr>
<tr>
<td>Mr David Williams</td>
<td>Edinburgh ADP</td>
</tr>
<tr>
<td>Mr Leon Wylie</td>
<td>Hepatitis Scotland</td>
</tr>
</tbody>
</table>
References


