Needle Exchange Surveillance Initiative.

2008-09 to 2015-16.

NHS National Services Scotland

Health Protection Scotland

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Needle Exchange Surveillance Initiative: Prevalence of blood-borne viruses and injecting risk behaviours among people who inject drugs attending injecting equipment provision services in Scotland, 2008-09 to 2015-16.

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Abbreviations

DBS	Dried blood spot
GGC	Greater Glasgow and Clyde
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
IPED	Image and performance enhancing drugs
NESI	Needle Exchange Surveillance Initiative
PWID	People who inject drugs
RNA	Ribonucleic acid
SSTI	Severe soft tissue infection

Key points

- The average age of the Needle Exchange Surveillance Initiative (NESI) sample has increased year-on-year since 2008-09, suggesting an ageing cohort of people who inject drugs (PWID).
- Heroin remains the most prevalent drug injected, but there are signs that injection of psychostimulants, notably cocaine and 'legal highs', have increased in recent years.
- Sharing of needles/syringes and other equipment (spoons/cookers, filters, water) are stable but reported re-use of one's own needle/syringe has increased, especially among psychostimulant users.
- Uptake of hepatitis B virus (HBV) vaccination, and hepatitis C virus (HCV) and HIV testing are at their highest levels since the NESI surveys began in 2008-09.
- Over a quarter of respondents who self-reported as HCV positive (or who self-reported cleared after therapy) had received antiviral therapy for their infection.
- The prevalence of HCV antibodies in 2015-16 remains high at 58%.
- The estimated incidence of HCV among PWID in 2015-16 is 11.4 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.
- 63% of respondents accurately reported their HCV status (comparing self-reported with dried blood spot testing), the highest level since 2008-09, suggesting that an increasing proportion of the HCV-infected PWID population are being diagnosed.
- Over half of those testing positive for HIV antibodies in 2015-16 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 blood-borne viruses 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,[1] which stated that efforts to prevent hepatitis C virus (HCV) in Scotland must focus on preventing transmission of the virus among PWID. More recently, however, the initiative has been funded under the auspices of the Scottish Government's Sexual Health and Blood Borne Virus Framework.[2,3] 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 NHS board level, for the data collection period from February 2015 until March 2016, during which data were collected across the 11 mainland Scottish NHS Boards. These were Ayrshire and Arran, Borders, Dumfries and Galloway, Fife, Forth Valley, Grampian, Greater Glasgow and Clyde (GGC), Highland, Lanarkshire, Lothian, and Tayside.

This report also presents the findings of the NESI survey, at Scotland-wide level, from 2008-09 until the most recent survey, 2015-16.

2. Overview of methods

A cross-sectional voluntary anonymous 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. However, recruitment of people who have ever injected in the past, but not in the previous six months, was limited to approximately 20% 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.

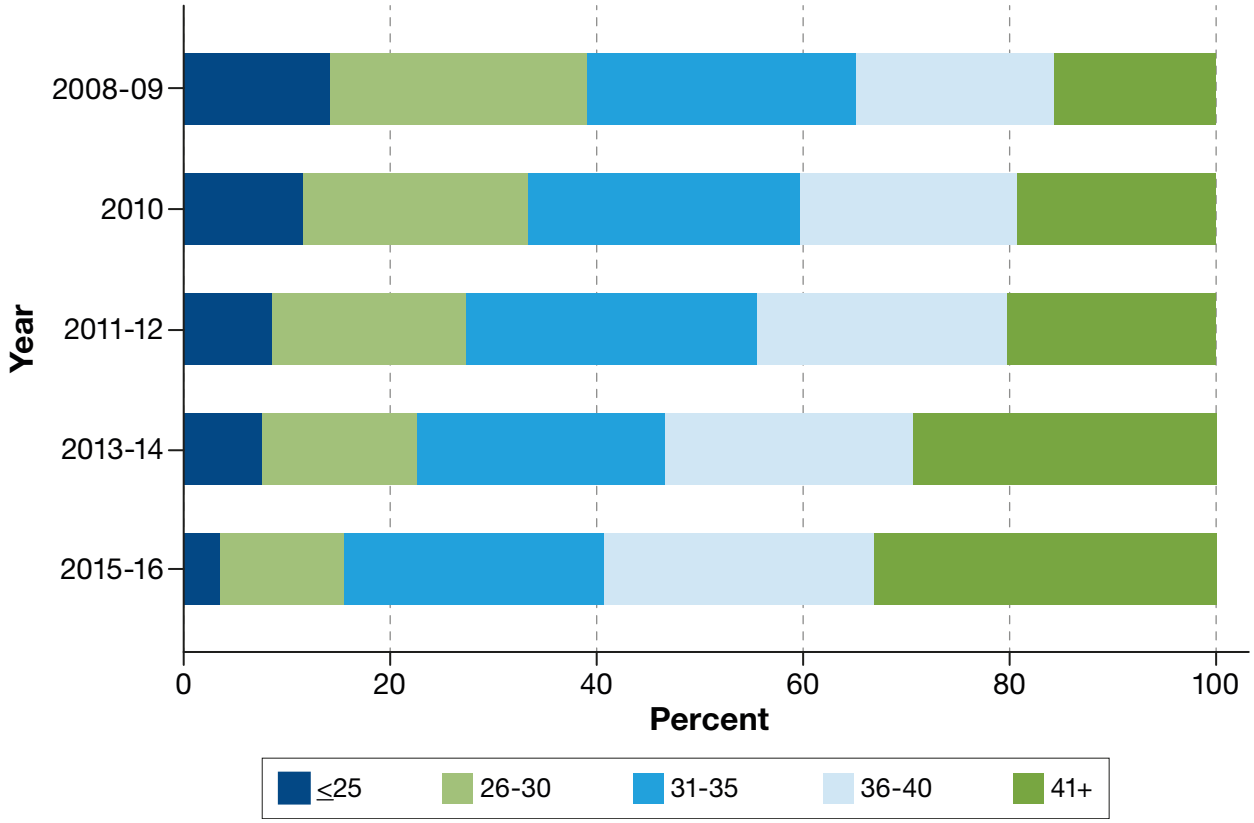
After providing informed consent, participants completed a short interviewer-administered questionnaire (Appendix 1) and then provided a voluntary blood spot sample for anonymous testing for blood-borne virus markers. Participants who wished to know their HCV or HIV status were directed to the appropriate 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=94) in 2015-16 [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 59% (n=1,596) in 2015-16.

Figure 1: Proportion of NESI respondents by age group, 2008 to 2016.

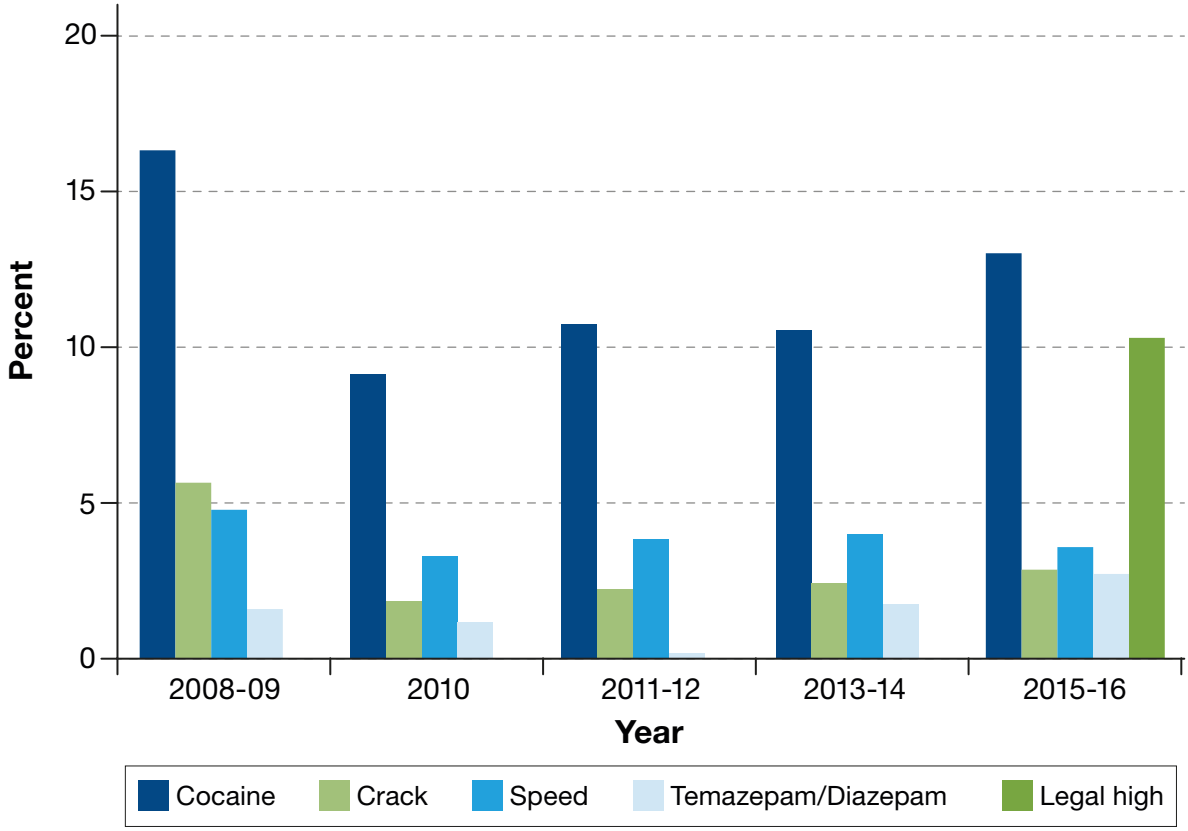


The proportion of male participants in NESI 2015-16 remained largely unchanged from previous surveys at 71% (n=1,910), as did the proportion who had been homeless at some point in the past six months (22%; n=584).

Drug trends

Heroin continues to be the most prevalent drug injected with over 90% of those interviewed in 2015-16 reporting use in the past six months, similar to levels in previous NESI surveys [Table 1.1]. Reported injecting of cocaine has increased in recent years from 9% in 2010 (n=217) to 13% (n=287) in 2015-16 [Figure 2], with levels highest in NHS GGC (24%; n=184). Heroin and cocaine injecting have both 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 2016 (among those who reported injecting in the last six months), excluding heroin.



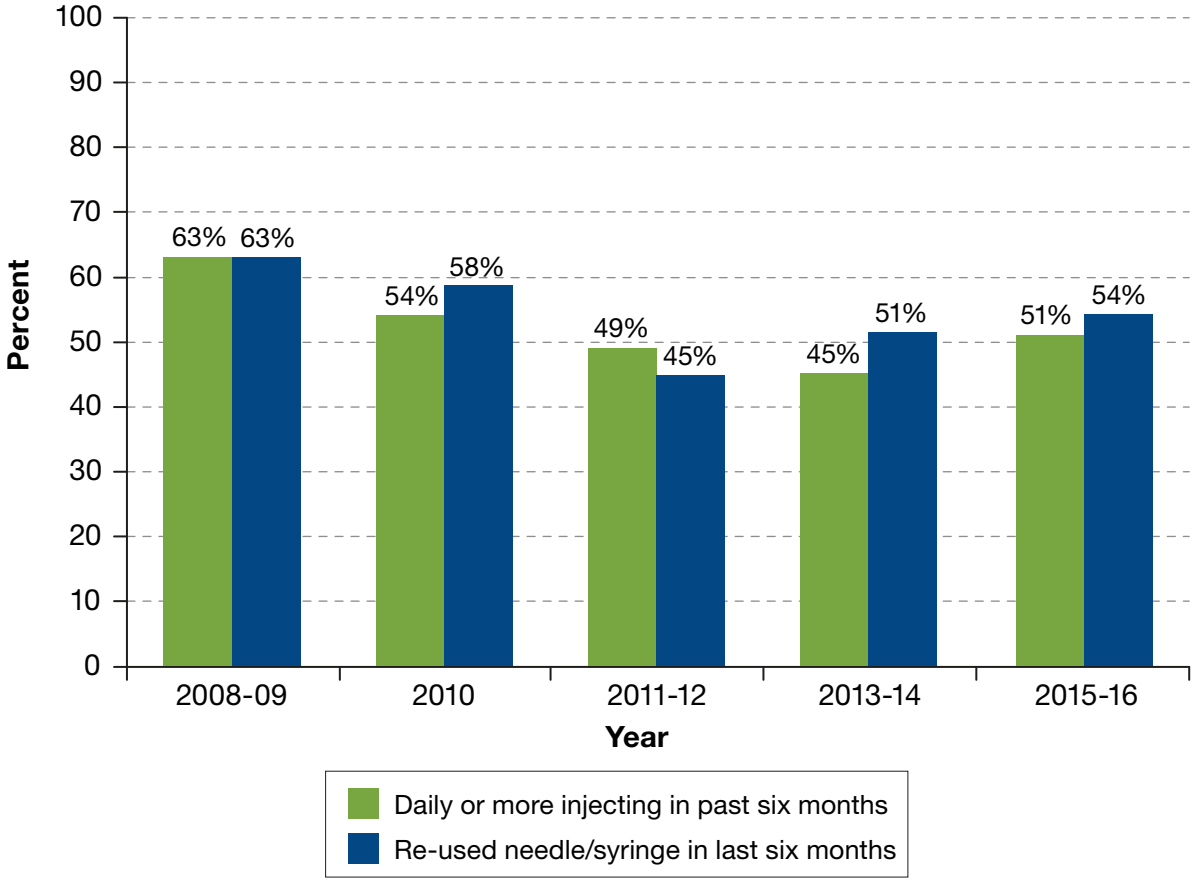
Injection of 'legal highs' (i.e. novel psychoactive substances) was included as an option for the first time in 2015-16: 10% (n=227) of those interviewed reported injection of these drugs in the past six months. Legal high injecting was much more prevalent in NHS Lothian than in any other health board (29%; n=126) [Table 2.1]. An outbreak of severe skin and soft tissue infection in Lothian in 2014-15 was linked to injection of ethylphenidate, a legal high initially prohibited under a temporary class drug order in April 2015 and since banned under the Psychoactive Substances Act enacted in May 2016.[5,6]

Injecting risk behaviour

There is emerging evidence of some change in injecting behaviours with the proportion of those interviewed reporting 'daily or more' injecting (51%; n=1,130) in the past six months increasing for the first time since 2013-14 [Table 1.1 and Figure 3]. Equivalently, the proportion of those identifying themselves as 'less than weekly' injectors (19%; n=417) fell for the first time since 2013-14. Frequent injecting episodes (i.e. daily or more) are a particular feature of stimulant users, notably those reporting use of cocaine (60%; n=172), legal highs (67%; n=153) and crack (75%; n=47).

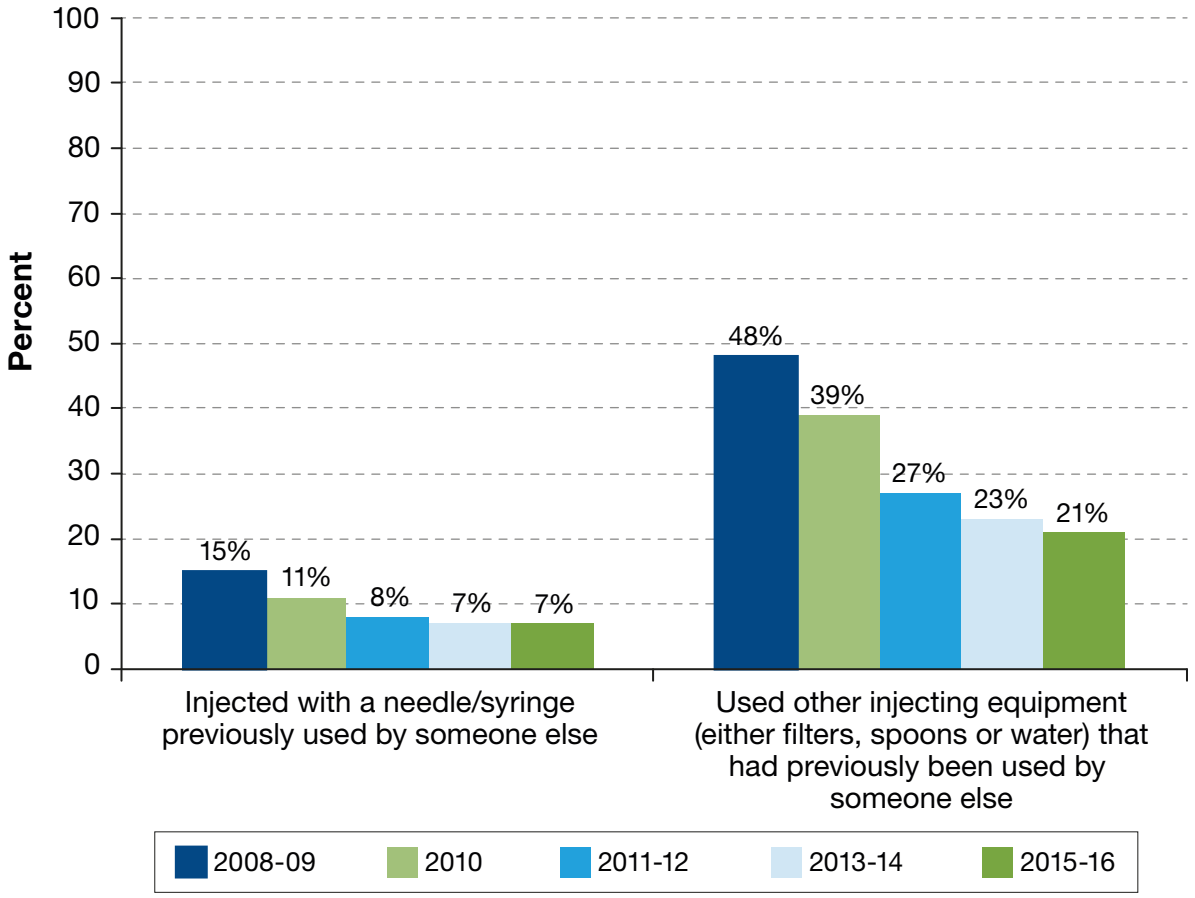
Trends in reported personal re-use of needles and syringes also appear to be changing: the proportion of those interviewed reporting re-use of such equipment in the last six months increased from 45% (N=805) in 2011-12 to 54% (N=1,196) in 2015-16 [Table 1.2 and Figure 3]. Again, levels of re-use in 2015-16 were particularly high among cocaine (66%; n=189), legal high (70%; n=158) and crack users (76%; n=48).

Figure 3: Proportion of NESI respondents who reported injecting daily / re-using needles/syringes in the last six months, 2008 to 2016 (among those who reported injecting in the last six months).



Levels of reported needle and syringe sharing in the past six months remained very low in 2015-16 (7%; n=147) and have now potentially reached a point of plateau [Table 1.2 and Figure 4]. Similarly, reported sharing of other injecting equipment (spoons/cookers, filters, and/or water) in the past six months has more than halved from 48% (n=988) in 2008-09 to 21% (n=458) in 2015-16.

Figure 4: Proportion of NESI respondents who reported sharing injecting equipment in the last six months, 2008 to 2016 (among those who reported injecting in the last six months).



Uptake of harm reduction services

Blood-borne virus vaccination and testing

Hepatitis B virus (HBV) vaccination uptake remains high, with 74% of respondents in 2015-16 (n=1,986) reporting having received at least 1 dose [Table 1.3 and Figure 5].

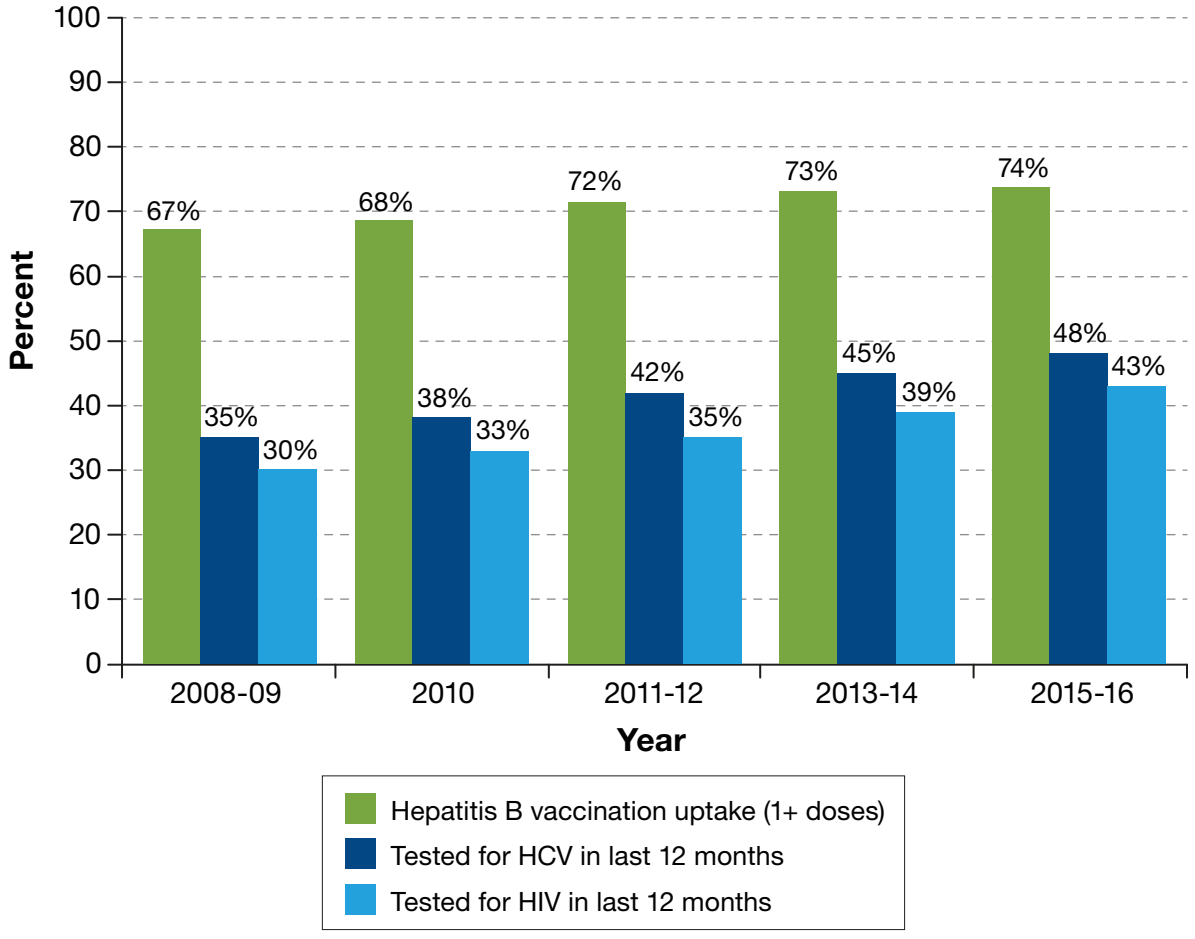
Uptake of HCV testing has increased slowly but steadily: the proportion of respondents who reported recent testing (i.e. in the last 12 months) increased from 35% in 2008-09 to 48% in 2015-16 [Table 1.3 and Figure 5]. When those who reported that they had been diagnosed with infection from a past test (that is, prior to 12 months ago) were excluded, the percentage of respondents who had been tested for HCV in the last year increased to 55%; this figure compares to 40%, 45%, 49% and 52% in 2008-09, 2010, 2011-12 and 2013-14, respectively[i].

i The rationale for excluding those diagnosed from a past test is that they would not be eligible for continued routine testing. From the NESI data it is however not possible to determine whether those who reported testing positive in the last 12 months had been diagnosed previously; therefore the figure of 55% may include some people who were ineligible for diagnostic testing in the last 12 months.

Testing rates were highest in NHS Tayside (62%), Dumfries and Galloway/Borders (60%), Lothian (59%), and lowest in NHS Forth Valley (42%), GGC (40%) and Fife (37%) [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 blood-borne viruses, testing rates are likely to be higher. The sites that were undertaking the most testing were drug treatment centres (37% of respondents reported being tested here), followed by hospitals, GPs, and prisons (with 21%, 18% and 18% of respondents reporting receiving an HCV test in these locations, respectively). Notably, the proportion of the sample who reported receiving a test in drug treatment centres increased between 2008-09 (21%) and 2015-16 (37%); this increase likely reflects the rollout of fingerprick blood sampling, which may be undertaken by non-clinical staff.[7]

Similarly, steady 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 43% (n=1,160) in 2015-16 [Table 1.3 and Figure 5]. Testing rates were again highest in NHS Lothian (57%), Dumfries and Galloway/Borders (57%) and Tayside (53%), and lowest in NHS GGC (36%), Lanarkshire (36%), Forth Valley (33%) and Fife (30%) [Table 2.3].

Figure 5: Proportion of NESI respondents who reported HBV vaccination and HCV/HIV test uptake, 2008 to 2016.



Opiate substitution therapy

Self-reported uptake of methadone has fluctuated, but remained high, over the five surveys, with 77% (n=1,699) of participants in 2015-16 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 65%. A high proportion of the sample (80%) reported having received another type of treatment for drug dependence in the last six months in 2015-16. Among the latter, the main type of 'other' treatment received was a 'drug worker' (82%, n=1,779); pharmacological treatments included antidepressants (26%, n=559), benzodiazepines (15%, n=326) and Suboxone (10%, n=210).

Sterile injecting equipment

The fluctuating trend in reported average numbers of sterile needles/syringes continued with a mean of 15 per week in 2015-16, down from 19 per week in 2013-14, but similar to the average reported in 2011-12 (14). Proportionally more respondents reported any uptake of filters and spoons (91% each) in 2015-16 than in any other survey year; however, on average, respondents reported receiving fewer of these items per week in 2015-16 (16 each) as compared to 2013-14 (21 each). Notably, three quarters of respondents (74%, n=1,628) reported uptake of sterile water in 2015-16, which has increased since 2 ml plastic ampoules were introduced from late 2012. The national rollout of foil (for smoking drugs) from September 2016 occurred after the 2015-16 survey; nevertheless, 18% of respondents (n=394) reported uptake of this item in the last six months, which may reflect local distribution policies at the time of recruitment.

Take-home naloxone

The proportion of NESI participants who reported that they had been prescribed a naloxone kit in the past year rose from 8% (175/2,154) in 2011-12 to 51% (1,383/2,696) in 2015-16. Naloxone prescribing rates were highest in Forth Valley (73%), Highland (70%) and Tayside (64%). In contrast, the carriage-rate (i.e. the proportion of people in possession of their naloxone at the time of their NESI interview) had fallen from 15% (27/175) in 2011-12 to 6% (85/1,383) [Table 1.3]. Carriage may be less of an issue if most injecting (and overdose) takes place in a domestic setting, as is common.[8]

Referral for HCV therapy

In 2015-16, 28% of those who self-reported they were HCV-positive (or who self-reported cleared after therapy) had ever received therapy for their HCV infection, 36% and 15% of whom had received treatment in the last year and were currently receiving treatment, respectively [Table 1.4]. Self-reported treatment engagement among those self-reporting to be HCV-positive (or cleared through therapy) was highest in NHS Tayside (45%) and lowest in NHS GGC (22%) [Table 2.4].

Blood-borne virus prevalence and incidence

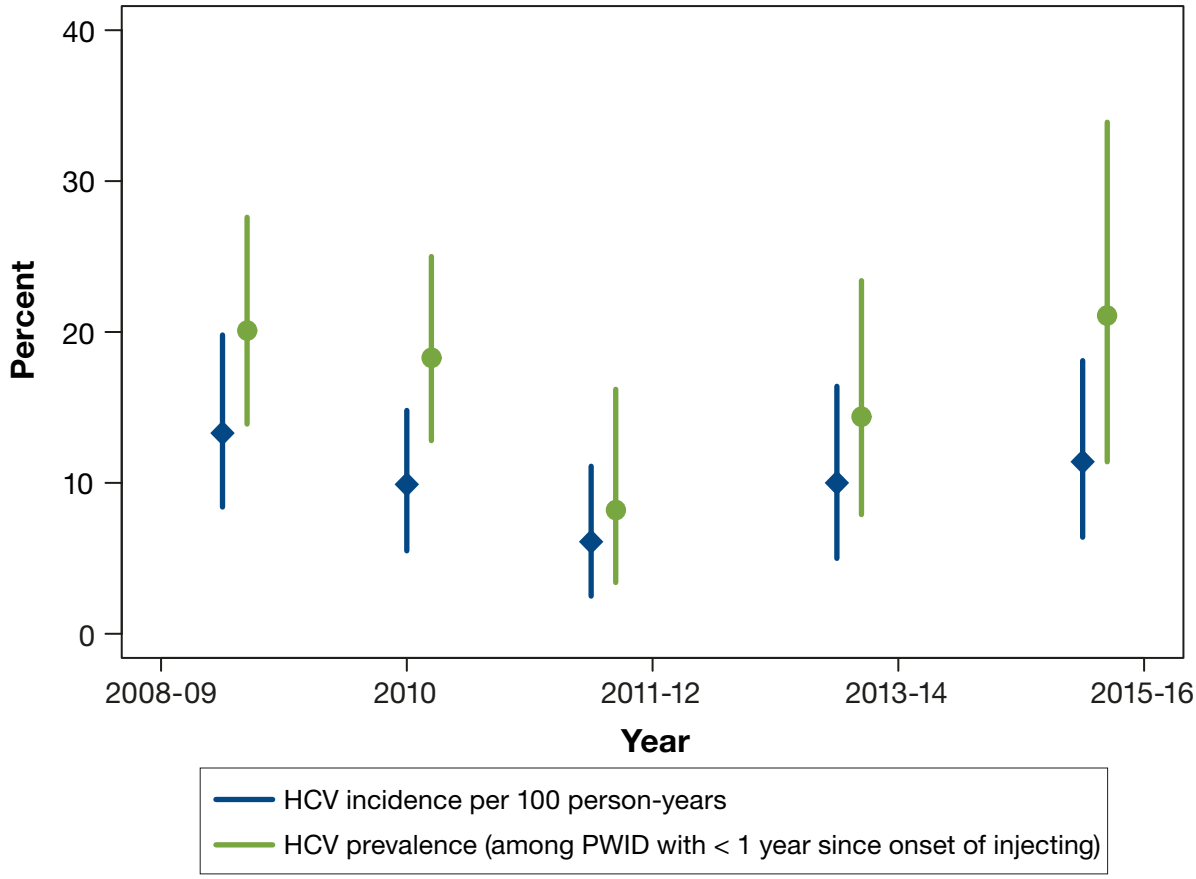
HCV

In 2015-16, HCV antibody prevalence among PWID remained high at 58% (1,508/2,622) [Table 1.5]. Rates were highest in GGC (65%), Forth Valley (64%) and Ayrshire and Arran (63%). There are no major differences in HCV prevalence by gender or age group over time, with rates in the younger (≤30 years) and older (>35 years) age groups stable at around 40% and 65%, respectively.

An indicator of recently acquired HCV infection is the HCV prevalence among those who had recently commenced injecting: this is slightly higher in 2015-16 than in previous surveys, with 21% (n=12), 30% (n=59) and 35% (n=129) prevalence 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 the whole sample over time.

In 2015-16, 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 11.4 new HCV infections per 100 person-years (see Appendix 2 for details on calculating this figure). This is higher than the HCV incidence of 6.1 per 100 person-years in 2011-12, although we cannot conclude that incidence is increasing as confidence intervals overlap. Nevertheless, HCV incidence is consistent with trends in HCV prevalence among recent onset injectors [Table 1.5 and Figure 6].

Figure 6: Indicators of recently acquired HCV infection among NESI respondents, 2008 to 2016. The method for calculating HCV incidence is described in Appendix 2.



Among people who were positive for HCV antibodies on dried blood spot (DBS) testing, 42% self-reported that they were HCV positive and a further 21% self-reported that they had cleared their HCV infection (the latter is compatible with an HCV antibody positive DBS). Thus, 63%, in total, reported that they were aware of their HCV status; this has increased from 56% in 2010 [Table 1.5].

HIV

HIV prevalence has been measured from 2011-12 onwards and has increased over time from 0.3% (6/2,146) in 2011-12 to 1.9% (26/1,390) in 2015-16 [Table 1.5], driven primarily by an outbreak of HIV infection in Glasgow.[4] In 2015-16, HIV testing was only undertaken on the samples from GGC and Lothian: HIV prevalence was 2.5% and 0.6% in these NHS Boards, respectively [Table 2.5].

Among people who were positive for HIV antibodies on DBS testing, 46% self-reported that they were HIV positive, 42% self-reported that they were HIV negative and a further 12% were unaware of their status. Thus, in total, over half (54%) reported that they were unaware of their HIV infection; this has increased from 33% in 2013-14 [Table 1.5].

Severe soft tissue infections

In 2015-16, 17% (n=464) of respondents reported having a severe soft tissue infection (SSTI) in the last year; this compares with 24% (n=564) in 2013-14 [Table 1.6]. SSTI rates were highest in Ayrshire and Arran (24%), Lothian (22%) and Grampian (22%), and lowest in Highland (4%) and Dumfries and Galloway/Borders (6%) [Table 2.6]. Three quarters (76%, n=921) of those who had ever had an SSTI had sought medical advice from doctor/nurse on the last occasion of having an SSTI. Among those who sought advice, 65% (n=597) sought it from an accident and emergency department and 44% (n=402) waited five or more days before seeking it.

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Appendix 1: NESI Questionnaire

The questionnaire is available at: http://www.hps.scot.nhs.uk/pubs/detail.aspx?id=3186.

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 2015-16 survey was conducted from February 2015 through to March 2016 and participants were recruited from 115 pharmacies and 15 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, 45% of all services providing injecting equipment in mainland Scotland participated as recruitment sites in 2015-2016 (Table A1).[9]

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

NHS Board	Pharmacy sites: Total (ISD survey 2014-15)[a]	Pharmacy sites: NESI recruitment sites, 2015-16 (% of total)	Agencies: Total (ISD survey 2014-15)[a]	Agencies: NESI recruitment sites, 2015-16 (% of total)	Total NESI recruitment sites, 2015-16
NHS Ayrshire and Arran	7	6 (86)	9	3 (33)	9
NHS Borders	7	2 (29)	1	0 (0)	2
NHS Dumfries and Galloway	11	5 (45)	2	0 (0)	5
NHS Fife	19	7 (37)	1	0 (0)	7
NHS Forth Valley	16	6 (38)	7	0 (0)	6
NHS Grampian	19	9 (47)	6	2 (33)	11
NHS Greater Glasgow and Clyde	60	28 (47)	10	2 (20)	30
NHS Highland	18	4 (22)	6	2 (33)	6
NHS Lanarkshire	23	16 (70)	1	2 (200)[c]	18
NHS Lothian	18	21 (117)[c]	19	3 (16)	24
NHS Tayside	15	11 (73)	11	1 (9)	12
Scotland[b]	213	115 (54)	73	15 (20)	130

a See reference 9.

b Excluding the island NHS Boards.

c Exceeds ISD total due to changes in service provision between ISD survey and NESI recruitment.

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 is voluntary, anonymous and confidential. Upon giving informed consent, participants were then asked to complete a short 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. NHS Research and Development approval was obtained from all participating NHS Boards.

Participation

Approximately 59% of the potentially eligible clients that were approached and had not already participated during the current survey, agreed to participate: this proportion ranged from 50% to 79% across NHS Boards. It should be noted that some individuals who initially refused to participate might have been included in the survey at a later visit.

Those who did and did not participate in the survey were very similar in terms of age and gender. For example, the mean age of those who participated was 38 years as compared to 37 years amongst those who did not participate, and 71% of those participated in the survey were males, as compared to 73% who did not participate. Caution should be taken when comparing the mean ages of non-participants because the age of those who do not take part is estimated by the researcher.

Additionally, it should be noted that, where individuals participated more than once in the survey, the responses and blood sample results from their first participation were retained for analyses. 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 2015-16 survey for example, while a total of 2,835 questionnaires were completed, 2,696 (95%) 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, 40% of respondents reported attendance for the purpose of obtaining injecting equipment, 39% reported collection or consumption of a methadone prescription and a further 19% reported another reason. The 'other' reasons included: attending an appointment, to complete the survey, using the drop-in service, to see harm reduction team, accompanying someone else or collecting another prescription.

Table A2: Self-reported reason for visit to service (recruitment site), 2015-16.

NHS Board	Injecting equipment	Methadone	Other	Not reported	Total
Ayrshire and Arran	50 (28%)	62 (35%)	62 (35%)	3 (2%)	177 (100%)
Borders	6 (24%)	12 (48%)	7 (28%)	0 (0%)	25 (100%)
Dumfries and Galloway	14 (26%)	29 (54%)	10 (19%)	1 (2%)	54 (100%)
Fife	44 (41%)	52 (49%)	8 (7%)	3 (3%)	107 (100%)
Forth Valley	29 (27%)	57 (53%)	19 (18%)	2 (2%)	107 (100%)
Grampian	95 (42%)	80 (35%)	50 (22%)	1 (0%)	226 (100%)
Greater Glasgow and Clyde	322 (34%)	427 (45%)	188 (20%)	7 (1%)	944 (100%)
Highland	35 (33%)	31 (29%)	41 (38%)	0 (0%)	107 (100%)
Lanarkshire	84 (38%)	96 (44%)	38 (17%)	1 (0%)	219 (100%)
Lothian	314 (66%)	111 (23%)	47 (10%)	3 (1%)	475 (100%)
Tayside	103 (40%)	104 (41%)	48 (19%)	0 (0%)	255 (100%)
Total	1,096 (41%)	1,061 (39%)	518 (19%)	21 (1%)	2,696 (100%)

Laboratory testing

For the 2008-09 through 2013-14 surveys, DBS were extracted and tested in a modification of the Ortho Save 3.0 EIA, as described by Judd et al.[10] 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 (Orgenics). The immunocomb detected antibody only and differentiated between HIV-1 and HIV-2.

In 2015-16, 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 4oC 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 ImmunoComb II HIV 1&2 BiSpot (Orgenics) as before with the previous elution method.

For all surveys, HCV RNA was tested using an 'in house' PCR (polymerase chain reaction) assay using the bioMerieux extraction protocol for DBS on the Easymag and a real-time PCR. The methods of HCV RNA detection in DBS are described in Bennett et al.[11] The assay detects to 1,000Iµ/ml in DBS. The testing was carried out in pools of 5 and all positive pools were then tested individually.

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).[12,13] An estimate of the duration of the window period (51 days) was derived from the literature.[14]

Appendix 3: Participating sites

Ayrshire and Arran NHS Board

Bentinck Centre, Kilmarnock
Cumnock Health Centre, Cumnock
Boots Pharmacy, Ayr
Boots Pharmacy, Irvine
Needle Exchange Outreach Network – Care and Share
Toll Pharmacy, Prestwick
Whitletts, Ayr

Borders NHS Board

Lloyds Pharmacy, Galashiels
Lindsay & Gilmour Pharmacy, Hawick

Dumfries and Galloway NHS Board

Boots Pharmacy, Newton Stewart
Boots Dumfries
Gordon's Chemist, Stranraer
Lloyds Pharmacy, Annan
William Murray Pharmacy, Dumfries

Fife NHS Board

Alderston's Pharmacy, Dunfermline
Boots Pharmacy, Glenrothes
Boots Pharmacy, Kirkcaldy
Boots Pharmacy, Methil
Boots Pharmacy, Cowdenbeath
Co-op Pharmacy, Dunfermline
Gordon's Pharmacy, Cowdenbeath
St Clair Pharmacy, Kirkcaldy

Forth Valley NHS Board

Cornton Pharmacy, Stirling
Graeme Pharmacy, Falkirk
Lloyds Pharmacy, Grahams Road, Falkirk
Lloyds Pharmacy, Marshill, Alloa
Lloyds Pharmacy, Grangemouth
Superdrug, Thistle Centre, Stirling

Grampian NHS Board

Boots, Elgin
Bishopmill Pharmacy, Elgin
Buckhaven Pharmacy, Peterhead
Drugs Action (Centre and Outreach), Aberdeen
Douglas Dickie Pharmacy, Aberdeen
Johnston's Chemist, Kincorth
Lloyds, Elgin
Rowlands Pharmacy, Aberdeen
Tillydrone Pharmacy, Aberdeen
Turning Point, Peterhead

Greater Glasgow and Clyde NHS Board

Abbey Chemist, Trongate
Abbey Chemist, Paisley
Apple Pharmacy, Craigend
Boots Pharmacy, Abercromby St
Boots Pharmacy, Bishopbriggs
Boots Pharmacy, Copeland St
Boots Pharmacy, Crown St
Boots Pharmacy, Duke St
Boots Pharmacy, Queen Street Station
Boots Pharmacy, Rutherglen
Boots Pharmacy, Shettleston
Boots Pharmacy, Sauciehall St
Boots Pharmacy, 200 Sauciehall St
Boots Pharmacy, Victoria Road
Catterson Chemist, Pollockshaws
Denis Houlihan Pharmacy, Possilpark
Dunnet Pharmacy, Dumbarton Road
ER McAnearney, Greenock
David Wyse, Port Glasgow
Dunnet Pharmacy, Dumbarton Road
Glasgow Drug Crisis Centre, West Street
Glenburn Pharmacy, Paisley
Harmony Row Pharmacist, Govan
Houlihans Pharmacy, Bishopbriggs
Hughes Pharmacy, Admiral Street
J Gilbride Pharmacy, Ibrox
Lennox Service, Dumbarton Joint Hospital
Lloyds Pharmacy, Carmunnock Rd
Lloyds Pharmacy, Drumchapel
Lloyds Pharmacy, Knightswood
Lloyds Pharmacy, Tannahill Centre, Paisley
Red Road Pharmacy, Glasgow
Renfrewshire Drug Service, Paisley
Rowlands, Springburn

Highland NHS Board

NHS Harm Reduction, Inverness
Market St, Oban
Boots Pharmacy, Eastgate Centre
Boots Pharmacy, Oban
Rowlands Pharmacy, (Hilton) Inverness
Well Pharmacy, Dunoon

Lanarkshire NHS Board

A&A Gilbride Pharmacy, High Blantyre
Boots Pharmacy, Airdrie
Boots Pharmacy, Cambuslang
Boots Pharmacy, Coatbridge
Boots Pharmacy, East Kilbride
Boots Pharmacy, Hamilton
Boots Pharmacy, Larkhall
Boots, Rutherglen
Crawford Pharmacy, Shotts
Dickson Chemist Ltd Pharmacies, Uddingston
DJ Coleman Pharmacy, Carnwath
Gilbride Pharmacy, High Blantyre
Lanarkshire Outreach Service
Lloyds Pharmacy, Motherwell
Lloyds Pharmacy, Wishaw
McIntyre & Cairns Chemists, Wishaw
Munro Pharmacy, Motherwell
New Stevenston Pharmacy, Motherwell
Sinclair Pharmacy, Coatbridge
Village Pharmacy, Cumbernauld

Lothian NHS Board

The Exchange – Lady Lawson/Spittal Street
Boots Pharmacy, Shandwick Place
Deans Pharmacy, Livingston
Lindsay & Gilmour, Leith Walk
Lindsay and Gilmour, Calder Rd
Lindsay & Gilmour, Crewe Rd North
Lloyds Pharmacy, Linlithgow
Lloyds Pharmacy, Livingston
Lloyds Pharmacy, WesterHailes Centre
Needle Exchange Outreach Network (Including outreach busses)
North Edinburgh Drug Advice Centre (NEDAC)
Prestonpans Pharmacy
Rowland's Pharmacy, Penicuik
Turning Point, Leith

Tayside NHS Board

Addaction, Dundee
Boots Pharmacy, Albert Street, Dundee
Boots Pharmacy, Whitfield Drive, Dundee
Cairns Centre, Dundee
Well Pharmacy, Fisheracre, Arbroath
Well Pharmacy, High Street, Arbroath
Davidson's Pharmacy, Blairgowrie
Davidson's Pharmacy, Perth
G.Jones Pharmacy, Dundee
Lloyds Pharmacy, Albert Street, Dundee
Lloyds Pharmacy, Macalpine Road, Ardler, Dundee
Lloyds Pharmacy, Whitfield Drive, Dundee
Lloyds Pharmacy, Glover St, Perth
Lloyds Pharmacy, High Street, Dundee

Appendix 4: Peer-reviewed publications arising from NESI[ii]

Allen EJ, Palmateer NE, Hutchinson SJ, Cameron S, Goldberg DJ, Taylor A. Association between harm reduction intervention uptake and recent hepatitis C infection among people who inject drugs attending sites that provide sterile injecting equipment in Scotland. Int J Drug Policy 2012;23(5):346-52.

Aspinall E, Hutchinson SJ, Taylor A, Palmateer N, Hellard M, Allen E, et al. Uptake of paraphernalia from injecting equipment provision services and its association with sharing of paraphernalia among injecting drug users in Scotland. Drug Alcohol Depend 2012;126(3):340-6.

Dunleavy K, Munro A, Roy K, Hutchinson S, Palmateer N, Knox T, et al. Association between harm reduction intervention uptake and skin and soft tissue infections among people who inject drugs. Drug Alcohol Depend 2017, in press.

McAuley, A., Munro, A., Bird, S. M., Hutchinson, S. J., Goldberg, D. J., and Taylor, A. Engagement in a National Naloxone Programme among people who inject drugs. Drug Alcohol Depend 2016; 162, 236-240. 1-5-2016.

McDonald SA, Hutchinson SJ, Palmateer NE, Allen E, Cameron SO, Goldberg DJ, et al. Decrease in health-related quality of life associated with awareness of hepatitis C virus infection among people who inject drugs in Scotland. J Hepatol 2013;58(3):460-6.

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Palmateer NE, Taylor A, Goldberg DJ, Munro A, Aitken C, Shepherd SJ, et al. Rapid decline in HCV incidence among people who inject drugs associated with national scale-up in coverage of a combination of harm reduction interventions. PLoS One 2014;9(8):e104515.

Turner KM, Hutchinson S, Vickerman P, Hope V, Craine N, Palmateer N, et al. The impact of needle and syringe provision and opiate substitution therapy on the incidence of hepatitis C virus in injecting drug users: pooling of UK evidence. Addiction 2011;106(11):1978-88.

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