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# BMJ Open

## Health programs and services addressing the prevention and management of infectious diseases in people who inject drugs in Canada: a systematic integrative review

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-047511
Article Type:	Original research
Date Submitted by the Author:	30-Nov-2020
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Keywords:	PUBLIC HEALTH, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Substance misuse < PSYCHIATRY

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4 **2 diseases in people who inject drugs in Canada: a systematic integrative review**  
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44 87 **WORD COUNT** - Abstract: 249, Body of text: 4000

45 88

46 89 **Health programs and services addressing the prevention and management of infectious**  
47 90 **diseases in people who inject drugs in Canada: a systematic integrative review**

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3 **92 ABSTRACT**  
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5 **93 Objectives:** People who inject drugs (PWID) experience a high burden of injection drug use-  
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8 **94** related infectious disease and challenges in accessing adequate care. This study sought to  
9  
10 **95** identify programs and services in Canada addressing the prevention and management of  
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12 **96** infectious disease in PWID.  
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14 **97 Design:** This study employed a systematic integrative review methodology. Electronic databases  
15  
16 **98** (PubMed, CINAHL, Web of Science Core Collection) and relevant websites were searched for  
17  
18  
19 **99** literature published between 2008 and 2019. Eligible articles and documents were required to  
20  
21 **100** address injection or intravenous drug use and health programs or services relating to the  
22  
23  
24 **101** prevention or management of infectious diseases in Canada.  
25

26 **102 Results:** This study identified 835 unique articles and 97 were included in this study. The  
27  
28 **103** majority of health programs and services addressed testing and management of HIV and HCV.  
29  
30  
31 **104** Studies addressed harm reduction programs, including safe injection facilities, needle exchange  
32  
33 **105** programs and opioid agonist treatment. Interdisciplinary health programs, involving medical  
34  
35 **106** treatment, social support and harm reduction, were shown to provide comprehensive care to  
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37  
38 **107** PWID. Peer-delivered services, such as testing and counselling, and mobile care initiatives  
39  
40 **108** removed barriers to care for PWID. Few studies addressed care for IDU-related bacterial  
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42 **109** infections or hospital care.  
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44 **110 Conclusions:** These results demonstrate the need for expanded services across a variety of  
45  
46 **111** settings and populations. Our study emphasizes the importance of addressing social and  
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49 **112** structural factors which impede infectious disease care for PWID. Further research is needed to  
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51 **113** improve evaluation of health programs and services and contextual factors surrounding accessing  
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54 **114** services or returning to care.  
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3 115 **PROSPERO registration number** – CRD42020142947  
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5 116 **STRENGTHS AND LIMITATIONS OF THIS STUDY**  
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8 117 • A systematic integrative review allowed for the inclusion of empirical, non-empirical and  
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10 118 grey literature and enabled a broad overview of health programs and services available  
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12 119 for PWID in Canada.  
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14  
15 120 • Article screening, data extraction and quality assessment was performed independently  
16  
17 121 by two reviewers, improving reproducibility and limiting bias.  
18  
19 122 • This review is limited to published literature, which may exclude programs or services  
20  
21 123 not published.  
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23  
24 124 • This review was limited to Canada, reducing the generalizability of these results,  
25  
26 125 however improving the specificity of policy and practice recommendations derived from  
27  
28 126 these results.  
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30

31 127 **KEYWORDS**  
32

33 128 Infectious diseases, people who inject drugs, substance misuse, public health, organization of  
34  
35 129 health services  
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37

38 130 **BACKGROUND**  
39

40 131 Injection drug use (IDU) and intravenous drug use (IVDU) are major public health  
41  
42 132 problems in Canada, with the number of people who inject drugs (PWID) increasing over the last  
43  
44 133 decade (1). IDU is associated with adverse health and social outcomes including overdoses, poor  
45  
46 134 access to medical care and social support, and spread of infectious disease (2). PWID are at  
47  
48 135 increased risk for viral blood-borne infections, such as human immunodeficiency virus (HIV)  
49  
50 136 and hepatitis C virus (HCV), bacterial infections, including endocarditis and skin and soft tissue  
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52 137 infections, and fungal infections. According to the Public Health Agency of Canada (PHAC),  
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3 138 68% of PWID in Canada have been infected or are currently infected with HCV (3).  
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5 139 Additionally, PWID are 59 times more likely to contract HIV than people who do not use  
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7 140 injection drugs (4).  
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10 141 The high incidence of infectious disease amongst PWID, and other adverse health  
11  
12 142 outcomes, have resulted in increased emphasis on harm reduction efforts. These include  
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14 143 supervised injection facilities (SIFs) and needle exchange programs (NEPs). The use of opioid  
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16 144 agonist therapy (OAT) as management for opioid use disorder has been associated with a  
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18 145 reduction in IDU (5–7). These harm reduction efforts are well-established methods of preventing  
19  
20 146 infectious disease in PWID (8–10). Additionally, guidelines are well established for the  
21  
22 147 treatment of infectious diseases commonly associated with IDU, such as anti-retroviral therapy  
23  
24 148 (ART) for HIV or direct-acting antivirals (DAA) for HCV (11–14).  
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28 149 PWID may experience a range of healthcare trajectories, barriers to care and  
29  
30 150 fragmentation between social and health systems, which impede infectious disease prevention or  
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32 151 management (2). PWID are frequently hospitalized, have higher rates of patient-initiated  
33  
34 152 discharge, generally against medical advice (AMA), and face system barriers that make it  
35  
36 153 difficult to assess clinical outcomes (15,16). The scope of health care services and programs  
37  
38 154 across Canada that aim to prevent and treat infectious diseases in PWID remains unclear. The  
39  
40 155 purpose of this study is to describe key features of health programs and services in Canada  
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42 156 relating to the prevention and management of infectious diseases in PWID, with the hope of  
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44 157 informing policy, practice and future research. This research employed an integrative systematic  
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46 158 review methodology, allowing for the inclusion of a variety of study designs, including  
47  
48 159 experimental and non-experimental research. The diversity and broadness of studies included in  
49  
50 160 this type of review is well-suited to informing evidence-based policy and practices (17).  
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## 161 **METHODS**

162 This research followed an integrative systematic review as outlined by Whitemore and  
163 Knafl (17) and has been previously described elsewhere (18). This manuscript follows the  
164 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines  
165 adapted for scoping reviews (19).

### 166 *Literature search*

167 PubMed, CINAHL and Web of Science Core Collection electronic databases were  
168 searched for empirical literature between 2008 and June 6, 2019 (one additional year from that  
169 indicated in the published protocol paper (18) to include studies from at least 10 years).  
170 Additionally, PHAC, the Canadian Institute for Substance Use Research, and Canadian Centre  
171 on Substance Use and Addiction websites were searched. The search strategy included terms for  
172 infectious diseases, drug use and geography. References of included articles were hand-searched  
173 for additional relevant articles.

### 174 *Inclusion/exclusion*

175 For eligibility, articles and documents were required to address injection or intravenous  
176 drug use and health programs or services relating to the prevention or management of infectious  
177 diseases in Canada. Articles or documents reporting drug efficacy trials, published prior to 2008,  
178 or not in English or French were excluded.

179 More than 55 articles (over 5%) were reviewed for inclusion/exclusion by the entire data  
180 collection team to ensure consistency. Titles and abstracts were screened independently by two  
181 reviewers. Conflicts were resolved by consensus or a third reviewer when necessary. Full-text  
182 screening for remaining articles was conducted by two independent reviewers with consensus or  
183 review by a third individual when necessary.

### 184 *Data extraction*

185 A data extraction form was used to collect the following: bibliographic data, type of  
186 research study and design, location, site of health program or service (community, clinic,  
187 hospital, etc.), infection(s) discussed, description of health program or service, population of  
188 study within PWID, description of cohort (if part of a cohort study), purpose of study, outcomes  
189 measured, summary of findings, implications for policy, practice or research and gaps according  
190 to authors. Data extraction was performed by a primary data collector, followed by independent  
191 review by a secondary data collector.

### 192 *Data analysis and quality appraisal*

193 Data were organized in tables to categorize certain characteristics, such as, the study  
194 design, types of health programs or services, infectious diseases, locations, and PWID sub-  
195 populations. Implications for policy and practice, and areas for future research were identified.  
196 There was too much diversity in study types and outcomes to conduct a meta-analysis, therefore  
197 narrative descriptions are provided.

198 Quality appraisal was performed according to the Quality Assessment Tool for Studies  
199 with Diverse Designs (QATSDD) (20). This tool was chosen due to its applicability to diverse  
200 study types, including quantitative and qualitative methodologies. The tool was validated by  
201 health service researchers, increasing the reliability of its use in this study (20). Each included  
202 empirical study was appraised by two reviewers and a final score was determined by consensus.

## 203 **RESULTS**

### 204 *Characteristics of included studies*

205 We identified 1142 citations from the database searches and 112 citations from manually  
206 searching the references of included documents and other sources (Figure 1). Of the 1254

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3 207 citations identified, 419 duplicates were removed, leaving 835 studies for potential inclusion.

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5 208 Articles were excluded through title and abstract screening (694 documents) or full text

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8 209 screening (44 documents). A total of 97 studies were included in the study for data extraction.

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10 210 Empirical studies, non-empirical studies and grey literature were included, resulting in a

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12 211 variety of methodologies and study designs (Table 1). Forty-five (46%) were cohort studies,

13  
14 212 either retrospective or prospective. Other study designs included qualitative studies (n=12, 12%),

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16 213 cost-benefit and cost-effectiveness analysis studies (n=7, 7%), mathematical modelling of

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18 214 disease transmission (n=5, 5%), randomized controlled trials (RCTs) (n=3, 3%), surveys (n=3,

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20 215 3%), chart reviews (n=2, 2%), mixed methods (n=2, 2%), systematic reviews (n=2, 2%),

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22 216 interventional studies (n=1, 1%) and case series (n=1, 1%). Additionally, commentaries, reports

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24 217 and non-systematic reviews comprised 14% of included studies (n=14). QATSDD scores of

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26 218 empirical studies ranged from 31% - 83.3%.

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30 219 The majority of studies addressed prevention and/or management of HIV (n=43, 44%),

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32 220 HCV (n=21, 21%) or both HIV and HCV (n=22, 22%) (Table 1). The remaining studies

33  
34 221 addressed a range of IDU related infections along with HIV, including skin infections, abscesses,

35  
36 222 cellulitis, HBV and sexually transmitted infections (n=9, 9%). Only two studies specifically

37  
38 223 addressed infective endocarditis. Represented groups of PWID included those who were HIV-

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40 224 positive (n=18, 18%), HCV-positive (n=6, 6%), incarcerated (n=4, 4%), Indigenous (n=2, 2%),

41  
42 225 hard-to-reach street youth and adults (n=2, 2%), female sex workers (n=2, 2%) and PWID

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44 226 leaving hospital AMA (n=1, 1%). Study sizes ranged from 11 to 36,077 participants. The

45  
46 227 majority of the studies discussed health programs or services in British Columbia (BC) (n=63,

47  
48 228 65%), with particular emphasis on the city of Vancouver (n=58, 59%). Ontario (ON) (n=11,

49  
50 229 11%), Quebec (QB) (n=9, 9%), Alberta (AB) (n=2, 2%) and Saskatchewan (SK) (n=2, 2%) were

230 also represented, specifically in the major cities of Montreal, Quebec City, Ottawa, Toronto,  
 231 London, Kingston, Edmonton, Drumheller and Saskatoon. Five studies addressed health  
 232 programs or services across Canada, and five studies addressed multiple countries.

233

234 **Table 1.** Description of included studies (study design, infectious disease, health program or  
 235 service, jurisdiction and population).

	Description	Total studies: 97 n (%)
Study Design	Cohort	45 (46%) 28 prospective, 17 retrospective
	Commentary, report, non-systematic literature review, roundtable discussion	14 (14%)
	Qualitative (ethno-epidemiological, ethnographic, interviews, participatory research)	12 (12%)
	Cost-benefit and cost-effectiveness analysis	7 (7%)
	Mathematical modelling of disease transmission	5 (5%)
	Randomized controlled trial (RCT) / protocol for RCT	3 (3%)
	Survey	3 (3%)
	Chart review - retrospective	2 (2%)
	Mixed methods	2 (2%)
	Systematic review	2 (2%)
	Case series	1 (1%)
	Interventional	1 (1%)
Infections Discussed	HIV	43 (44%)
	HCV	21 (21%)
	HIV and HCV	22 (22%)

	Combinations of infectious diseases (HIV, HCV, HBV, cellulitis, bloodborne pathogens, STIs)	9 (9%)
	Infective endocarditis	2 (2%)
Health Program / Service	Services providing testing for and prevention or treatment with antivirals for HIV or HCV (ART / DAA / HAART / PEP / Seek and Treat Initiatives / TasP / POCT / PrEP)	27 (28%)
	Supervised injection facilities / safe injection facility / safe injection site	19 (19%)
	Opioid Agonist Therapy (MMT / OST / OAT / HAT / MAT)	12 (12%)
	Integrated infectious disease and addiction programs	10 (10%)
	Needle exchange programs / Syringe exchange programs / Kit distribution programs	9 (9%)
	Broad harm reduction strategies	6 (6%)
	Mobile care initiatives / Telehealth	5 (5%)
	Other (motivational interviewing for high risk IDU behaviours, pharmacies as providers of expanded health services, PWID emergency department use, hospital providing acute care for addiction related infectious conditions)	4 (4%)
	Peer delivered services	3 (3%)
	Infective endocarditis surgical vs. medical management	2 (2%)
Jurisdiction	Multi-country	5 (5%)
	Canada	5 (5%)
	British Columbia	63 (64%)
	Ontario	11 (11%)
	Quebec	9 (9%)
	Alberta	2 (2%)
	Saskatchewan	2 (2%)
Population within PWID	All PWID	48 (49%)
	HIV-positive	18 (18%)

HCV-positive	6 (6%)
Prisoners	4 (4%)
PWID using specific health services (including NEP, SIF, OAT, pharmacies)	4 (4%)
Not applicable	3 (3%)
HIV and HCV-positive	2 (2%)
HIV-negative	2 (2%)
Indigenous	2 (2%)
PWID with infective endocarditis	2 (2%)
Hard to reach street youth and adults	2 (2%)
Female sex workers	2 (2%)
PWID leaving hospital AMA	1 (1%)
Vancouver Area Network of Drug Users volunteers	1 (1%)

236 Abbreviations: ART, antiretroviral treatment; DAA, direct-acting antivirals; HAART, highly  
 237 active antiretroviral treatment; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human  
 238 immunodeficiency virus; IDU, injection drug use, NEP, needle exchange program; OAT, opioid  
 239 agonist therapy; PEP, post-exposure prophylaxis; PrEP, pre- exposure prophylaxis; PWID,  
 240 people who inject drugs; RCT, randomized controlled trial; SIF, supervised injection facility;  
 241 STI, sexually transmitted infection; TasP, treatment as prevention

#### 243 *Health programs and services*

244 Included studies were categorized by health programs and services discussed to analyze  
 245 their relevant features (data extracted from articles is available upon request). Findings for each  
 246 program or service type are presented with a description of included studies and main outcome  
 247 measures.

#### 248 Services providing testing, prevention or treatment with antivirals for HIV or HCV

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3 249 Many studies addressed the provision of antiviral treatment and testing (n=27, 28%). The  
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5 250 programs and services all addressed treatment and prevention of HIV (n=17), HCV (n=7) or both  
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7 251 (n=3). Treatments provided through these programs and services included ART or highly active  
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9 252 antiretroviral treatment (HAART) (n=13), HCV treatment (including cascade of care) or DAA  
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11 253 (n=9), post-exposure prophylaxis (n=1), pre-exposure prophylaxis (n=1), and antiretroviral  
12  
13 254 treatment as prevention (TasP) (n=1). Services included HIV and HCV testing, including seek  
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15 255 and treat initiatives (n=2) and peer-administered point-of-care testing (POCT) (n=1). When  
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17 256 indicated, the majority of health services were situated in the community (n=17).

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21 257 Some of the main outcome measures for these studies included experiences of PWID  
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23 258 receiving ART; factors related to testing, ART initiation, treatment adherence or discontinuation;  
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25 259 self-reported difficulties with taking ART; and plasma viral load. As with ART, adherence and  
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27 260 willingness to use DAA was examined. Other studies examined patterns of mortality for HIV-  
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29 261 positive PWID, initiation of post-exposure prophylaxis when delivered by registered nurses,  
30  
31 262 uptake of point-of-care testing in the community, ART initiation during a community wide TasP  
32  
33 263 initiative, and the use of a seek-and-treat program to improve testing and treatment for  
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35 264 marginalized PWID. The post-exposure prophylaxis intervention was community-based and  
36  
37 265 offered counselling, testing and prophylaxis to PWID with potential HIV exposure (21).  
38  
39 266 Similarly, point-of-care testing and seek-and-treat initiatives included diagnosis, counselling and  
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41 267 treatment delivery (22,23). TasP involves the delivery of ART as a method of HIV prevention,  
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43 268 and findings showed an improvement in ART uptake for PWID (24).

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45 269 Included articles also discussed HCV care. Studies aimed to characterize the HCV  
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47 270 cascade of care, and examined outcomes of HCV treatment when received via physician or self-  
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49 271 referral. Mathematical modelling studies were conducted to determine the burden of HCV in a  
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3 272 variety of care scenarios, including increased testing and antiviral regimens (n=3). Two survey  
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5 273 studies examined HCV care behaviors of physicians, where the main outcome was physician  
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8 274 provision of HCV care to PWID.

### 9 10 275 Supervised injection facilities

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12 276 Supervised injection facilities (SIFs), also known as safe injection facilities, or safe  
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14 277 injection sites (SIS), were also represented in our sample as an important health program  
15  
16 278 addressing the prevention of infectious disease in PWID (n=19, 19%). Studies addressed the  
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18 279 prevention of HIV (n=10), HCV (n=1) or both (n=6), with only two studies mentioning skin  
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20 280 infections or abscesses in combination with HIV and HCV. Main outcome measures for cost-  
21  
22 281 effectiveness and cost-benefit studies included prevented number of HIV and/or HCV infections  
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24 282 and overdose deaths, and others, such as quality adjusted life years (QALYs) and life years  
25  
26 283 gained. Considerations used in these models ranged from IDU population factors (e.g., number  
27  
28 284 of IDU in populations, prevalence of HIV infection), injection-related factors (e.g., injections per  
29  
30 285 IDU per year, injections with shared equipment), and facility factors (e.g., annual operating cost,  
31  
32 286 number of injections per year at site). Other outcome measures involved self-reported use or  
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34 287 potential use of SIFs by IDU, perspectives on use of and access to SIFs, and benefits and  
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36 288 acceptability of SIFs.

### 37 38 289 Opioid Agonist Therapy

39  
40 290 A number of studies (n=12, 12%) addressed the provision of opioid agonist therapy  
41  
42 291 (OAT), sometimes referred to as opioid substitution therapy (OST) or medication assisted  
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44 292 treatment (MAT), with seven studies focused specifically on methadone maintenance therapy  
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46 293 (MMT) and one on heroin-assisted treatment (HAT). Five studies addressed HCV, four  
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48 294 addressed HIV, and three addressed both HCV and HIV. Community provision of MMT in BC  
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3 295 was specifically discussed as methadone is readily available through primary care physicians and  
4  
5 296 dispensed through community pharmacies in this jurisdiction (25). These programs were  
6  
7 297 examined as a protective factor for limiting HIV and HCV transmission. Authors examined the  
8  
9 298 effect of these programs on HIV and HCV care, including access to a regular physician. Studies  
10  
11 299 also examined eligibility of PWID for HAT in the local community, perceptions of HCV care  
12  
13 300 among physicians working in OAT clinics, and use of prescription opioids in hospitals to prevent  
14  
15 301 patient-initiated discharge. Studies found that these types of programs improved regularity of  
16  
17 302 access to care and antiviral treatment outcomes, and reduced risk of infection and other IDU-  
18  
19 303 related harms.

#### 24 304 Integrated infectious disease and addictions services

26 305 Programs (n=10) incorporated infectious disease treatment with addictions treatment or  
27  
28 306 other services, such as counseling. Studies addressed HIV (n=3), HCV (n=5), or HIV and HCV  
29  
30 307 (n=2). Main outcome measures can be classified as use of services (n=5), such as documented or  
31  
32 308 self-reported use of existing integrated services, and how use of services shaped access to and  
33  
34 309 engagement with other supportive care services, behavior change (n=2), and treatment response  
35  
36 310 (n=3). Treatment completion, post-treatment follow-up and re-infection were other outcomes  
37  
38 311 used.

42 312 Authors stated that concurrent mental health and nonprescribed drug use may act as  
43  
44 313 barriers to adequate HIV care, and changes to the structural-environmental context of services  
45  
46 314 (such as incorporating nonprescribed drug use within a harm reduction approach) can improve  
47  
48 315 engagement with care among people living with human immunodeficiency virus (PLHIV) who  
49  
50 316 use drugs.

#### 54 317 Needle Exchange Programs

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2  
3 318 Needle exchange programs (NEPs) (also known as clean needle programs, syringe  
4  
5 319 exchange programs) and harm reduction kit distribution programs were also identified (n=9,  
6  
7 320 9%). Studies addressed HIV (n=3), or both HIV and HCV (n=4), with the remaining studies  
8  
9 321 broadly addressing blood-borne infections and cellulitis. These studies described NEPs (n=8),  
10  
11 322 implementation of a kit distribution program (n=1) and introduction of NEPs in prisons (n=3).  
12  
13 323 We included two prospective cohort studies, which examined the relationship between NEP use,  
14  
15 324 HIV seroconversion, and rates of syringe borrowing and lending. One RCT was included, which  
16  
17 325 evaluated a theory-based intervention to increase NEP use. Participants in the experimental  
18  
19 326 group used fewer borrowed syringes compared to the control group (RR: 0.47 CI95% 0.28–0.79;  
20  
21 327 P = .004) (26). This effect was no longer present three months later. Studies also included  
22  
23 328 inmates' experience with IDU in federal prisons (27) and staff experiences with a hospital-based  
24  
25 329 kit distribution program (28).

### 30 330 Broad harm reduction strategies

31  
32  
33 331 We identified six studies which provided reviews, recommendations or assessments of a  
34  
35 332 range of harm reduction services. Studies focused on HIV (n=2), HCV (n=2), or both +/- HBV  
36  
37 333 (n=2). One mathematical modelling study created a community model to simulate the effect of  
38  
39 334 strategies on HIV prevalence, including providing clean syringes, introduction of SIFs,  
40  
41 335 introduction of TasP to improve treatment initiation and retention and increased HIV testing  
42  
43 336 (29). One qualitative study examined factors influencing injection and perceived barriers to  
44  
45 337 injection cessation among marginalized youth, focusing on HIV (30). The study mentioned  
46  
47 338 health programs and harm reduction services, including OAT, drug treatment programs, and  
48  
49 339 social support programs (30). The remaining articles included one literature review, one  
50  
51 340 systematic evidence review, one report and one synopsis of a roundtable discussion at a harm  
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3 341 reduction conference. These studies discussed HIV, HCV and HBV and highlighted efforts,  
4  
5 342 recommendations and challenges to improving harm reduction efforts. One of these studies  
6  
7 343 specifically discussed community-driven programs to improve HCV testing and care in  
8  
9 344 Indigenous communities who are at greater risk for adverse IDU-related health outcomes (31).

### 12 345 Mobile care initiatives and Telehealth

14 346 Mobile care initiatives and telehealth seek to expand the reach of traditional programs.  
15  
16 347 Studies included mobile care initiatives (n=3) and telehealth (n=2) and focused on HIV (n=1),  
17  
18 348 HCV (n=1), HIV and HCV (n=1), or STIs in addition to HIV (n=2). Two of the three mobile  
19  
20 349 care initiatives were peer-led. Mobile care initiatives used peer volunteers to distribute sterile  
21  
22 350 injection equipment and to provide harm reduction education and outreach (32,33). Another  
23  
24 351 mobile care initiative deployed nurses to provide medical attention in addition to equipment and  
25  
26 352 education (34). Main outcomes measured for mobile care initiatives included use of the program  
27  
28 353 in the previous six months and description of roles and contributions of healthcare staff  
29  
30 354 delivering the program

31  
32  
33 355 Mobile health and telemedicine initiatives included efforts to support HCV and HIV care  
34  
35 356 remotely for those with difficulty accessing care. The telehealth programs measured HIV  
36  
37 357 propensity scores at six months and sustained viral response as their main outcome measures.  
38  
39 358 These studies also evaluated secondary drug treatment outcomes and use of related health  
40  
41 359 services.

### 42 360 Peer-delivered services

43  
44 361 Studies discussed peer delivered services such as counselling and testing (n=2) and peer-  
45  
46 362 delivered injections (n=1). These addressed HIV (n=1) or both HIV and HCV (n=2). The studies  
47  
48 363 explored experiences as a peer injection drug user with the Vancouver Area Network of Drug  
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3 364 Users (VANDU), how VANDU shaped the social context and injection practices in that  
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5 365 community, and willingness to receive peer-delivered services (35–37).

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8 366 Treatment of Infective Endocarditis

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10 367 Only two studies (2%) addressed the treatment of infective endocarditis in a hospital  
11  
12 368 setting, comparing mortality associated with surgical versus medical management. The main  
13  
14 369 outcomes of these studies were the incidence of death two years following diagnosis or all-cause  
15  
16 370 mortality. Rodger and authors additionally collected data related to site of infection,  
17  
18 371 complications and referral to addiction treatment services (38). This study showed that surgery  
19  
20 372 was related to lower mortality (38), while the other found no difference (39).

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24 373 Other health programs and services

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26 374 One study included a randomized controlled trial in QB on motivational interviewing  
27  
28 375 (MI) for high risk IDU behaviors, which showed that both MI and educational interviewing  
29  
30 376 decreased risk behaviors, but individuals in the MI group had lower odds of risk behaviors at six  
31  
32 377 months (40). A cohort study in BC evaluated first time emergency department use by PWID  
33  
34 378 along with most common diagnoses, admissions and discharge data (41). A mixed methods study  
35  
36 379 provided a qualitative description of laws, policies, attitudes, practices, and behaviors  
37  
38 380 surrounding the possibility of expanding pharmacy services for PWID in six countries (42).  
39  
40 381 Lastly, (43) performed a chart review to describe trends in admission in a dedicated HIV/AIDS  
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42 382 ward in a tertiary hospital in BC, which was repurposed in 2014 and expanded to include HIV-  
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44 383 negative individuals with infectious conditions arising from addictions comorbidities.

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49 384 *Implications for Policy, Practice and Research*

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51 385 Authors repeatedly highlighted implications for policy and practice (Table 2). There is a  
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53 386 need to address social and structural factors which impede continued care for PWID. These

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3 387 factors relate to the social determinants of health, and include criminalization of IDU, stigma and  
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5 388 discrimination of PWID when accessing health programs or services, and lack of funding for  
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7 389 harm reduction services. Multidisciplinary or integrated care models for infectious disease  
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10 390 treatment also provide PWID with more comprehensive care, addressing medical, social and  
11  
12 391 mental health challenges. These models pair infectious disease testing and treatment with  
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14 392 addiction treatment, OAT and counselling or peer-based support groups.

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17 393 Targeted programs and services for marginalized groups of PWID, such as street-  
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19 394 involved adults and youth, sex workers, and Indigenous peoples are needed. NEPs, mobile care  
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21 395 initiatives, telehealth and peer-delivered services improve access to care for these more  
22  
23 396 marginalized groups. Advancing peer models of care may decrease the stigmatization  
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25  
26 397 experienced by PWID and reduce barriers to accessing care. This is a prominent and promising  
27  
28 398 area for further research and implementation.

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31 399 A pressing consideration for further research is improved evaluation and monitoring of  
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33 400 health programs and services using more robust research designs. Further research is needed to  
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35 401 understand specific needs of PWID across settings and cultural contexts. These may elucidate  
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37 402 reasons for not accessing services or returning to care and ideas of PWID regarding health  
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40 403 programs and services.

**Table 2.** Policy, practice and research implications indicated in included studies and organized by health program or service.

Health Program/Service	Policy and Practice Implications	Gaps and Research Implications
Services providing testing, prevention or treatment with antivirals for HIV or HCV	<ul style="list-style-type: none"> <li>• Address social and structural factors which impede HIV and HCV testing, treatment initiation and adherence</li> </ul> <p>Suggested strategies to improve treatment adherence include:</p> <ol style="list-style-type: none"> <li>(1) Improved housing stability for PWID, supportive housing models with harm reduction services</li> <li>(2) Integrated, multidisciplinary care to manage comorbid conditions and reduce barriers</li> </ol> <ul style="list-style-type: none"> <li>• Scale up ART, TasP, testing and care linkages</li> <li>• Increase targeted approaches to reach marginalized PWID (e.g. females and sex workers)</li> <li>• Create policies to support OAT services to promote inclusive HIV treatment and to improve HCV adherence</li> </ul>	<ul style="list-style-type: none"> <li>• Research reasons for treatment discontinuation, factors associated with adherence, and the effect of incarceration on HIV treatment adherence and access</li> <li>• Understand how stigma and marginalization create barriers in accessing treatment</li> <li>• Evaluate interventions like integrated, multidisciplinary HIV and HCV care, supportive housing models and addiction treatments</li> <li>• Determine the optimal timing of treatment for PWID receiving OAT, and how these programs affect antiviral treatment and access</li> <li>• Develop community-based testing initiatives which use peers to reach PWID who may not seek testing and treatment in conventional health care settings</li> </ul>
Supervised injection facilities	<ul style="list-style-type: none"> <li>• Use of SIFs to deliver a wider range of services (e.g. HIV testing and treatment)</li> <li>• Consider risk perceptions and priorities of PWID when designing harm reduction interventions</li> <li>• Amend legislation to create a more enabling environment for SIFs</li> <li>• Community support is fundamental for sustaining a SIF operation</li> </ul>	<ul style="list-style-type: none"> <li>• Collect geographically specific and up-to-date data to inform policy</li> <li>• Understand harm reduction needs of PWID in private residences and social determinants of IDU</li> <li>• Research individual or context-specific barriers and reasons for not accessing SIF services</li> <li>• Research social and behavioral effects of SIFs (e.g., sharing practices)</li> <li>• Gap in understanding needs and use of SIFs by street-involved youth</li> <li>• Further evaluation of SIFs: <ol style="list-style-type: none"> <li>(1) Develop and implement monitoring and evaluation programs for SIFs</li> <li>(2) Consider more potential benefits in cost-benefit analysis (e.g. diagnostics, immunization, referral to detoxification facilities, decreased use of other medical services, expansion of services, increased operating hours)</li> <li>(3) Consider intermediate outcomes (e.g. changes in injecting practices) with epidemiological data due to challenge in evaluating an intervention without a traditional control group</li> </ol> </li> </ul>

Opioid Agonist Therapy	<ul style="list-style-type: none"> <li>• Expansion of OAT and harm reduction services by addressing system-level factors:               <ol style="list-style-type: none"> <li>(1) decriminalization policies</li> <li>(2) accessibility and funding</li> <li>(3) decrease barriers which limit physicians' ability to prescribe these medications</li> <li>(4) enhance physician education in providing these services</li> <li>(5) improve referral systems</li> <li>(6) develop new pharmacotherapies for opioid use disorder</li> </ol> </li> <li>• Integrate OAT services with infectious disease care and addiction treatment</li> <li>• Include PWID in policy-making surrounding the availability and delivery of OAT services, including the expansion of these services as harm reduction in hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the impact of OAT in combination with other harm reduction services and counseling, effects on infectious disease care</li> <li>• Need experimental designs</li> <li>• Studies need to assess impact of OAT for certain population groups (e.g. women)</li> <li>• Explore perspectives of hospital staff regarding care of PWID and integration of harm reduction services into hospitals</li> </ul>
Integrated infectious disease and addictions services	<ul style="list-style-type: none"> <li>• Collaborative, multidisciplinary models, which include counseling and/or peer-based support groups extend beyond virological outcomes to improve social determinants of health</li> </ul>	<ul style="list-style-type: none"> <li>• Examine the impact of policy change on uptake of HCV and/or HIV treatment and care among PWID</li> <li>• Research the impact of diverse, innovative, integrated delivery strategies to improve uptake of HCV and/or HIV care in PWID</li> <li>• Investigate which aspects of care are likely to support changes in drug use patterns</li> <li>• Include individual's ideas, beliefs and feelings after HCV treatment and reasons for not returning for care, or PWID experiences of effects of integrated care models on health and social inequities</li> </ul>
Needle Exchange Programs	<ul style="list-style-type: none"> <li>• Expansion of NEPs and kit distribution programs, particularly in prisons and hospitals</li> <li>• Decentralize NEPs, promoting peer-run initiatives, and diversify distribution methods to reach more marginalized PWID</li> <li>• Include PWID and community members in programmatic decision-making and consider local context when initiating NEPs</li> </ul>	<ul style="list-style-type: none"> <li>• Gaps in evaluation of NEPs</li> <li>• Implement ongoing evaluation and monitoring of programs</li> <li>• Examine different models of distribution across settings and cultural contexts</li> </ul>
Broad harm reduction strategies	<ul style="list-style-type: none"> <li>• Expansion of harm reduction services, increased financial support for these services and their combination with HIV and HCV testing and treatment strategies, equity of access</li> <li>• Advance peer-based models of care</li> <li>• Re-assess punitive drug policies</li> <li>• Improve evaluation and monitoring for harm reduction programs</li> </ul>	<ul style="list-style-type: none"> <li>• Indigenous people in Canada may lack access to primary care and HCV testing</li> <li>• Since many provinces do not collect ethnicity data, national data on HCV prevalence does not extend to Indigenous communities</li> <li>• Understand HCV prevalence and determinants related to HCV transmission amongst Indigenous PWID</li> </ul>



	<ul style="list-style-type: none"> <li>• Support initiatives which address social harms affecting PWID and the social determinants of health</li> <li>• Involve marginalized groups of PWID (e.g. youth and Indigenous) in program planning</li> </ul>	<ul style="list-style-type: none"> <li>• Understand youth engagement and access to harm reduction services</li> <li>• Examine injection equipment distribution policies and coverage, understand the risks from sharing injection equipment using robust study designs</li> </ul>
Mobile care initiatives and Telehealth	<ul style="list-style-type: none"> <li>• Peer-led mobile initiatives play an important role in extending the reach of conventional public health programs</li> <li>• Important to empower clients to make changes, by providing resources within an atmosphere of mutual respect, education, support, participation, commitment, power-sharing</li> <li>• Multidisciplinary telehealth approaches can engage and retain patients in remote areas in the treatment of HCV</li> <li>• Culturally safe interventions that address the barriers to HIV prevention while supporting the strength of populations (e.g. young Indigenous people) are urgently needed</li> </ul>	<ul style="list-style-type: none"> <li>• How specific characteristics of mobile outreach programs may facilitate entry into inpatient addiction treatment or connect women to other services.</li> <li>• Methods of including and evaluating community partnering, collaborating in healthcare delivery models for PWID</li> </ul>
Peer-delivered services	<ul style="list-style-type: none"> <li>• Improve delivery of care for PWID and address lack of trust and unfamiliarity with the healthcare system and healthcare professionals (36)(37)</li> <li>• Enable delivery of care and infectious disease prevention efforts to harder-to-reach, more marginalized PWID</li> <li>• Legal and regulatory frameworks need to accommodate assisted injections and consideration for peer-based delivery models</li> </ul>	<ul style="list-style-type: none"> <li>• Need for harm reduction initiatives to assess their accessibility to less autonomous PWID</li> </ul>
Treatment of Infective Endocarditis	<ul style="list-style-type: none"> <li>• Integrate addiction treatment with infectious disease care</li> </ul>	<ul style="list-style-type: none"> <li>• Gaps in understanding factors associated with PWID mortality</li> </ul>
Other health programs and services	<ul style="list-style-type: none"> <li>• Increased access to harm reduction and addictions services, urgent primary care, immunizations, ambulatory and integrated care, and stable housing are needed to optimize health outcomes, reduce substance use-related deaths, and decrease hospital utilization</li> <li>• Incorporate mental health interventions with harm reduction services to support behavior changes</li> </ul>	<ul style="list-style-type: none"> <li>• Further studies on reasons for hospital admissions and ER use in PWID/PLHIV</li> <li>• Determine effectiveness of mental health interventions in the community</li> <li>• Determine effectiveness of interventions in ER settings to prevent further ER visits and admissions</li> </ul>



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404 Abbreviations: ART, antiretroviral treatment; ER, emergency room; HCV, hepatitis C virus; HIV, human immunodeficiency virus;  
405 IDU, injection drug use, NEP, needle exchange program; OAT, opioid agonist therapy; PLHIV, People living with human  
406 immunodeficiency virus; PWID, people who inject drugs; SIF, supervised injection facility; TasP, treatment as prevention

For peer review only

## DISCUSSION

### *Main findings*

Our search provided 835 unique articles and 97 were included in this study. A broad range of study types and grey literature were included. Discussion of HIV and HCV infections far outweighed other IDU-related infectious diseases. The majority of the health programs and services included in our study addressed the provision of antiviral treatment and viral testing. Harm reduction programs, including SIFs, NEP and OAT, were also included in the study. Studies addressed the cost-benefit and cost-effectiveness of SIFs. OAT programs were shown to reduce risk of infection and improve antiviral treatment outcomes. Studies discussed harm reduction services broadly, calling for the expansion and combination of these services with HIV and HCV treatment strategies. Interdisciplinary or integrated health programs were shown to provide comprehensive care to PWID. Additionally, we found health programs that attempted to reach more marginalized PWID through telehealth and mobile care initiatives. Peer-delivered services, such as testing, counselling and assisted injections, removed barriers to care for PWID who distrust healthcare providers or require assistance injecting. Only two included studies addressed treatment of infective endocarditis.

### *Strengths and limitations of study*

This study employed a systematic integrative review design which allowed for the inclusion of empirical, non-empirical and grey literature. Using this study design enabled a broad overview of health programs and services available for PWID in Canada. Additionally, documents were screened independently by two reviewers, improving reproducibility and limiting bias. Similarly, data extraction and quality assessment of included studies were performed independently by two data collectors.

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3 Despite these strengths, this study has some limitations. An integrative review limits our  
4 study to published literature, which may exclude programs or services not published.  
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7 Additionally, our study sought to provide an overview of health programs and services for PWID  
8 in Canada, but did not formally evaluate the effectiveness of the included programs and services  
9 in preventing or treating infectious disease in PWID. Our review was limited to Canada,  
10 reducing the generalizability of these results, however improving the specificity of policy and  
11 practice recommendations derived from these results. Limitations were quite diverse due to the  
12 range of study types included in this review. Many of the cohort studies indicated that their  
13 sample was not random due to the use of previously established cohorts and, therefore, may not  
14 be generalizable to larger populations. Similarly, qualitative studies indicated a lack of  
15 generalizability, since experiences are specific to the PWID included in the study. Studies which  
16 relied on PWID self-report indicated limitations in the validity of the data due to social  
17 desirability bias. Cost-benefit analysis and mathematical modelling studies were limited by the  
18 assumptions, which cannot be verified, necessary for mathematical calculations, which may  
19 result in over or under-estimations of disease transmission or cost-savings.  
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### 37 *Fit within literature and implications for practice and research*

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40 This study provides an overview of health programs and services relating to infectious  
41 disease care for PWID in Canada. While there are a number of systematic reviews examining  
42 interventions to treat HIV and HCV in PWID (5,6,8,44,45), our study is unique by focusing on  
43 the Canadian context, including all IDU-related infectious diseases, and including a variety of  
44 study designs. Other reviews examining the prevention and treatment of infectious disease in  
45 PWID found an emphasis on harm reduction efforts and HIV or HCV care (6). The included  
46 studies indicate the benefits of harm reduction efforts and support their increased use in  
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3 communities and across other sites, including hospitals and prisons. Most studies in Canada are  
4 also from Vancouver, BC, which has a long history of empowering and working with PWID.  
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6 While other jurisdictions in Canada can learn from Vancouver's work, it is important to conduct  
7  
8 research in other cities and provinces to account for contextual differences.  
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11  
12 The majority of studies addressed HIV and HCV, which are mainly managed in  
13 outpatient settings, given the advancements in treatment for these two infectious diseases. A  
14 related project by this group is a chart review of PWID admitted to hospital to assess the types of  
15 infectious diseases and concerns around patient-initiated discharges, or leaving AMA.  
16  
17 Preliminary findings show there is little overlap in these two studies, highlighting the disconnect  
18 between community and hospital-based initiatives which ensure continuity of care in this  
19 population. There are few included studies addressing IDU-related bacterial infections, despite  
20 their prevalence amongst PWID and leading cause of long-term hospitalizations and emergency  
21 department use (41,46,47). This gap indicates the need for further research on PWID care in  
22 hospital and health programs which link the community and hospital settings.  
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35 The included studies indicate the advantages of multi-faceted care programs for PWID,  
36 which include harm reduction, medical and pharmaceutical treatments, social support and  
37 education. These programs target the social determinants of health, improving the underlying  
38 social and structural barriers which prevent PWID from accessing and adhering to treatments or  
39 health programs (48–51). Notably, the included studies call for exploratory work in facilitators  
40 and barriers to treatment and care, more robust study designs, and attention to contextual factors  
41 and more complex interventions. There is tension between developing person-centered strategies  
42 to tackle complex health and social issues and simplifying attributes of programs that affect  
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3 outcomes. Improving outcomes at the individual and systems levels should drive the research  
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5 process.  
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## 7 **CONCLUSIONS**

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10 Programs and services should be expanded across geographic settings, healthcare settings  
11 and populations of PWID, specifically more marginalized PWID. Improving infectious disease  
12 care for PWID requires attention to social and structural barriers and inclusion of PWID in  
13 programmatic decision-making.  
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## 19 **SUPPLEMENTARY DATA**

### 20 21 Supplementary Table 1

- 22 • File format: .xls
- 23 • Title of data: Data Extraction Form
- 24 • Description: Data extraction form including bibliographic data (author, year, journal),  
25 type of research study and design, location, site of health program or service (community,  
26 clinic, hospital, etc.), infection(s) discussed, description of health program or service,  
27 population of study within PWID, description of cohort (if part of a cohort study),  
28 purpose of study, outcomes or indicators measured, summary of findings, implications  
29 for policy, practice or research according to authors and gaps identified by authors and  
30 quality appraisal scores. Data is organized by health program or service.  
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### 36 37 Supplementary Table 2

- 38 • File format: .csv
- 39 • Title of data: Excluded Studies
- 40 • Description: List of excluded studies from full-text screening  
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## 44 **DECLARATIONS**

### 45 46 **Ethics Approval and consent to participate**

47  
48 Not applicable.  
49

### 50 51 **Availability of Data and Materials**

52  
53 All data generated or analyzed during this study are included in this published article.  
54  
55

### 56 57 **Conflicts of Interest**

1  
2  
3 The authors have no conflicts of interest.  
4

### 5 **Patient and Public Involvement Statement**

6  
7  
8 Patients and the public were not involved in the design or conduct of this study.  
9

### 10 **Funding**

11  
12 No funding was received for this research project from any funding agency in the public,  
13  
14 commercial or not-for-profit sectors. All data collectors either receive course credit at McMaster  
15  
16 University or volunteer their time for this project.  
17  
18

### 19 **Author's contributions**

20  
21 EA conceived of the topic. CL, LM, ML, RL, J-ET and DK helped develop the research question  
22  
23 and methods. KB, SJ, SP, YQ, HS, MQ and AH helped develop the search strategy and  
24  
25 conducted data collection. KB and EA conducted data analysis and wrote the initial manuscript.  
26  
27  
28 All authors provided substantive comments and approved the final manuscript.  
29  
30

### 31 **Acknowledgements**

32  
33 Annie Wang was involved in the initial discussions of the methods for this study.  
34  
35

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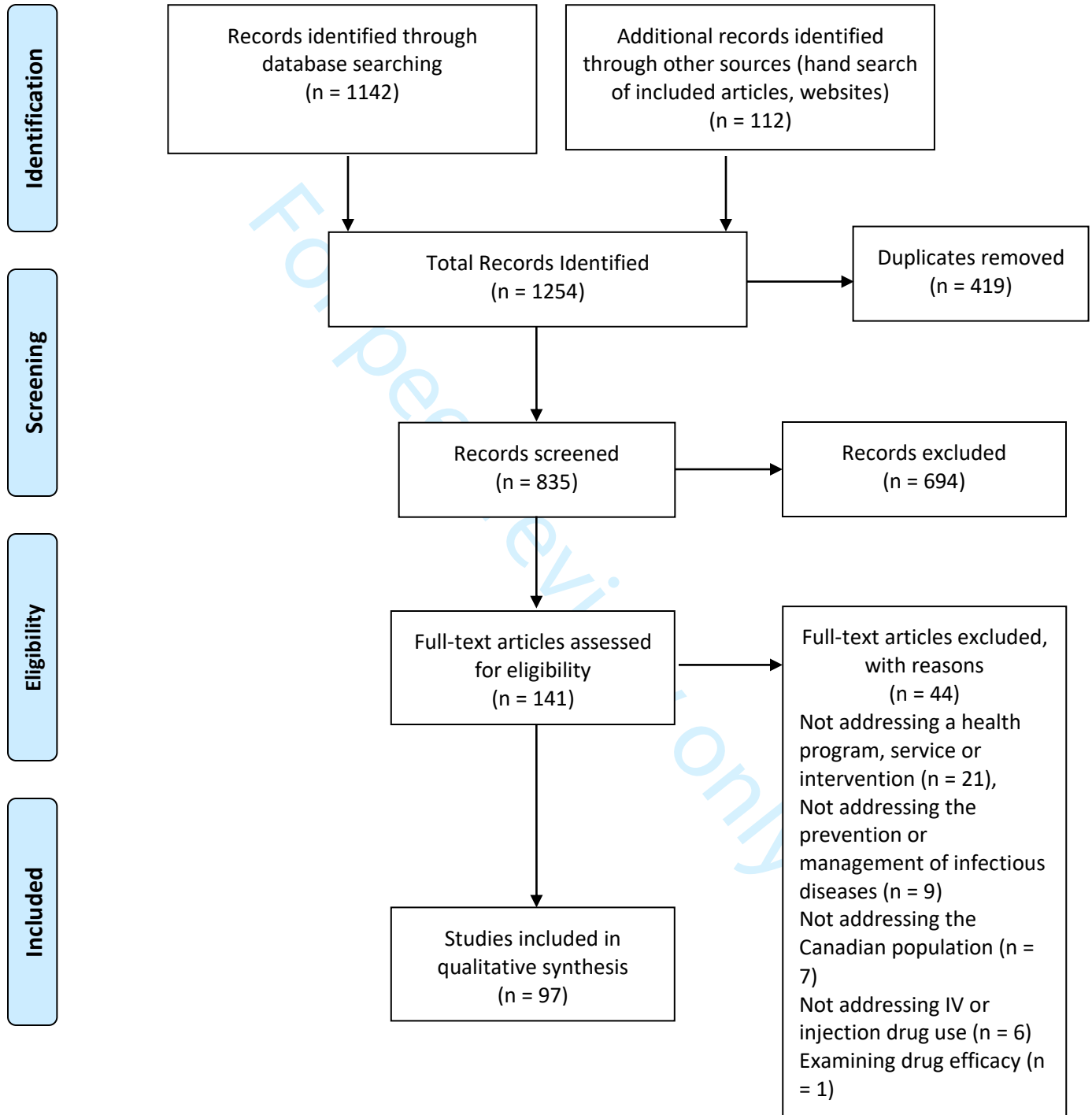
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## 12 FIGURES

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14 **Figure 1.** Flowchart demonstrating identification, screening and inclusion of studies.  
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## PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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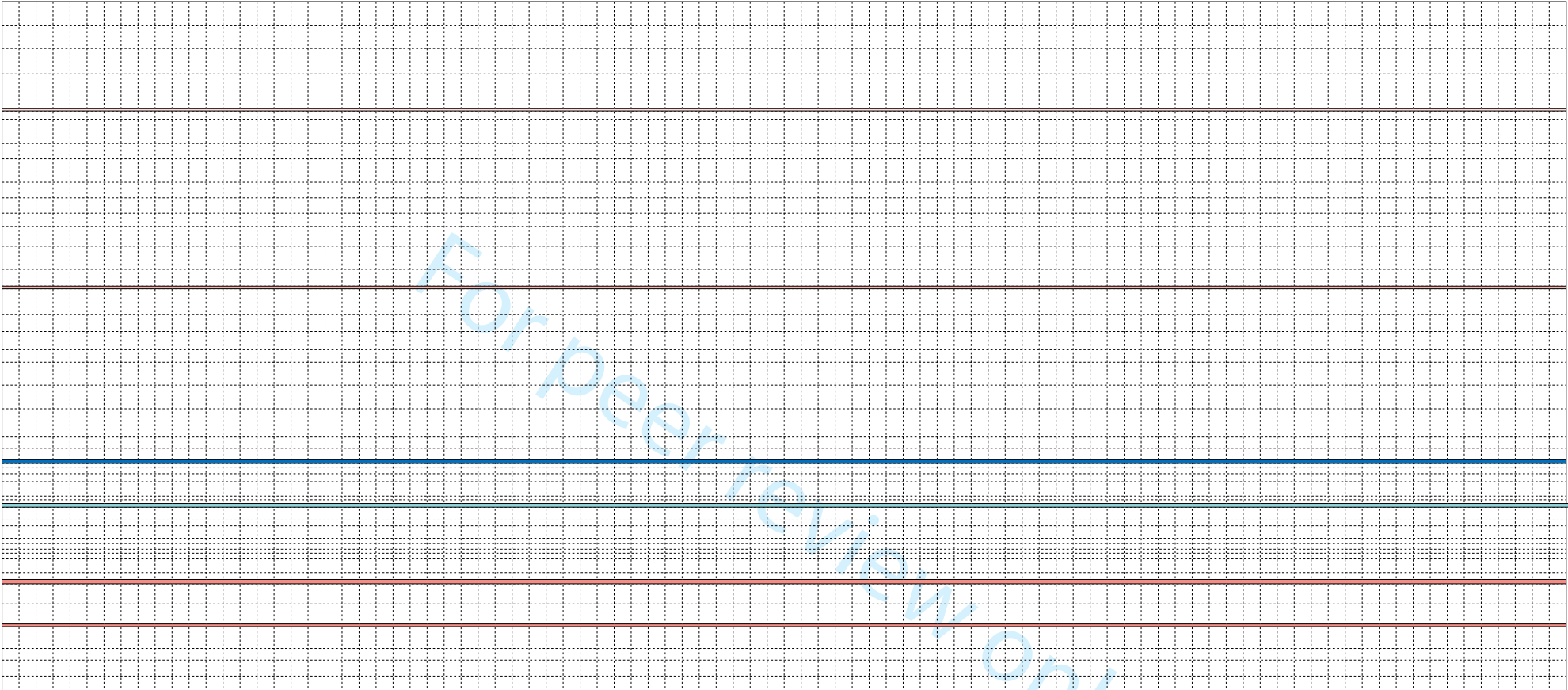
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Recent incarceration	Milloy, M.-J.; Cutaneous inj	2010	J Community	35
Antiretroviral	McNeil, Ryan; HIV Treatmer	2017	AIDS Behav	21

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Issue	Pages	Accession Nu	DOI	Ref	Covidence #	Study
	6 442-444				#75	Shoveller 201
	3 136-144		10.1177/070674371663250		#995	Roy 2016
	1	16	10.1186/s12954-017-0143-		#1022	Kendall 2017
	11	1105	10.1503/cmaj.081678		#1165	DesJarlais 200
	6 1067-1072		10.2105/AJPH.2016.303090		#374	Bach 2016
					#1170	Johnston 201
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		13-Jan			#1149	PublicHealth/
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					#1148	PublicHealth/
8-Jul	182-188		10.14745/ccdr.v44i78a06		#1151	Dickson 2018
	7 1014-1020		10.1093/cid/cit377		#1167	Grebely 2013
	18 397-407		10.14745/ccdr.v40i18a05		#1143	Tarasuk 2014
	6 1049-1052		10.2105/AJPH.2008.141840		#25	Wiessing 200
	1	10	10.1186/1758-2652-15-10		#688	Westergaard
	1	25	10.1186/s12954-016-0114-		#1002	Werb 2016
	4 E93-E99		10.1503/cmaj.180694		#899	Weir 2019
	1	590	10.1186/s12879-016-1926-		#775	Tanner 2016
	2 246-254		10.1080/09540121.2017.11		#602	Szadkowski 20
	6 946-953		10.1111/add.12506		#353	Strike 2014
	48-54		10.1016/j.drugalcdep.2014		#723	Strike 2014
		314	10.1186/1471-2334-11-314		#146	Siemieniuk 20
		16	10.1186/1477-7517-7-16		#62	Shaw 2010
	1 35-44		10.1097/QAI.000000000000		#1010	Schafer 2017
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	4 308-314		10.1097/ADM.000000000000		#622	MohdSalleh 2
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	5 1598-1609		10.1002/hep.26431		#251	Martin 2013
	2 90-96				#108	Martin 2011
	8 1330-1339		10.1111/add.12970		#402	Lappalainen 2
	3 356-362		10.1097/QAI.0b013e31827		#694	Rebeiro 2013
	1 111-119		10.1111/add.12736		#393	Lappalainen 2
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		24-25			#873	Janjua 2018
	4 548-568		10.1080/10826080802544		#661	Cox 2009
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	10 792-799		10.1111/jvh.12393		#939	Artenie 2015
	4 e0195185		10.1371/journal.pone.0195		#864	Choi 2018
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10.1007/s10900-010-9269-#80

Milloy 2010

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10.1007/s10461-016-1470-#800

McNeil 2017

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Notes	Tags
Exclusion reason: Not addressing a program, service or intervention;	
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Exclusion reason: Not addressing prevention or management of infectious diseases;	
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Exclusion reason: Drug efficacy trials;	
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## Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	6
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence§		the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	7
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	7-8 (See Fig.1)
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-9
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8 (See Supplementary Table 1)
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8-18
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8-18
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	23
Limitations	20	Discuss the limitations of the scoping review process.	23-24
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	26
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	27

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467–473. doi: 10.7326/M18-0850.

# BMJ Open

## Health programs and services addressing the prevention and management of infectious diseases in people who inject drugs in Canada: a systematic integrative review

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-047511.R1
Article Type:	Original research
Date Submitted by the Author:	29-Jul-2021
Complete List of Authors:	Bouzanis, Katrina; McMaster University, Department of Global Health Joshi, Siddharth; McMaster University, Health Research Methods, Evidence and Impact Lokker, Cynthia; McMaster University, Health Research Methods, Evidence, and Impact Pavalagantharajah, Sureka; McMaster University, Department of Undergraduate Medical Education Qiu, Yun; Jiangsu Institute of Commerce, School of Health Sciences Sidhu, Hargun; McMaster University, Department of Undergraduate Medical Education Mbuagbaw, Lawrence; McMaster University, Department of Health Research Methods, Evidence and Impact Qutob, Majdi; McMaster University, Department of Surgery Henedi, Alia; Eastern Mediterranean University Mitchell, Levine; McMaster University, Department of Health Research Methods, Evidence and Impact Lennox, Robin; McMaster University, Department of Family Medicine Tarride, Jean-Eric; McMaster University, Department of Health Research Methods, Evidence, and Impact ; McMaster University, Center for Health Economics and Policy Analysis Kalina, Dale; Hamilton Health Sciences, Infectious Diseases Alvarez, Elizabeth; McMaster University, Health Research Methods, Evidence and Impact; McMaster University, Centre for Health Economics and Policy Analysis (CHEPA)
<b>Primary Subject Heading</b>:	Infectious diseases
Secondary Subject Heading:	Public health, Addiction, Health policy, Health services research
Keywords:	PUBLIC HEALTH, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Substance misuse < PSYCHIATRY

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4 **2 diseases in people who inject drugs in Canada: a systematic integrative review**  
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44 87 **WORD COUNT** - Abstract: 286, Body of text: 5902

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46 89 **Health programs and services addressing the prevention and management of infectious**  
47 90 **diseases in people who inject drugs in Canada: a systematic integrative review**

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3 92  
4 93 **ABSTRACT**

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7 94 **Objectives:** People who inject drugs (PWID) experience a high burden of injection drug use-  
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9 95 related infectious disease and challenges in accessing adequate care. This study sought to  
10  
11 96 identify programs and services in Canada addressing the prevention and management of  
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13 97 infectious disease in PWID.

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16 98 **Design:** This study employed a systematic integrative review methodology. Electronic databases  
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18 99 (PubMed, CINAHL, Web of Science Core Collection) and relevant websites were searched for  
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20 100 literature published between 2008 and 2019 (last search date was June 6, 2019). Eligible articles  
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22 101 and documents were required to address injection or intravenous drug use and health programs or  
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24 102 services relating to the prevention or management of infectious diseases in Canada.

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27 103 **Results:** This study identified 835 unique articles and 97 were included in this study. The health  
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29 104 programs and services identified included testing and management of HIV and HCV (n=27),  
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31 105 supervised injection facilities (n=19), medication treatment for opioid use disorder (n=12),  
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33 106 integrated infectious disease and addiction programs (n=10), needle exchange programs (n=9),  
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35 107 harm reduction strategies broadly (n=6), mobile care initiatives (n=5), peer-delivered services  
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37 108 (n=3), management of IDU-related bacterial infections (n=2) and others (n=4). Key implications  
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39 109 for policy, practice and future research were identified based on the results of the included  
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41 110 studies, which include addressing individual and systemic factors which impede care, furthering  
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43 111 evaluation of programs and the need to provide comprehensive care to PWID, involving medical  
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45 112 care, social support and harm reduction.

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48 113 **Conclusions:** These results demonstrate the need for expanded services across a variety of  
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50 114 settings and populations. Our study emphasizes the importance of addressing social and  
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52 115 structural factors which impede infectious disease care for PWID. Further research is needed to  
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3 116 improve evaluation of health programs and services and contextual factors surrounding accessing  
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5 117 services or returning to care.  
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8 118 **PROSPERO registration number** – CRD42020142947  
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## 10 119 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

- 11  
12 120 • A systematic integrative review allowed for the inclusion of empirical, non-empirical and  
13  
14 121 grey literature and enabled a broad overview of health programs and services available  
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16 122 for PWID in Canada.  
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18 123 • Article screening, data extraction and quality assessment was performed independently  
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20 124 by two reviewers, improving reproducibility and limiting bias.  
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22 125 • This review is limited to published literature, which may exclude programs or services  
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24 126 not published.  
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26 127 • This review was limited to Canada, reducing the generalizability of these results,  
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28 128 however improving the specificity of policy and practice recommendations derived from  
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30 129 these results.  
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## 35 130 **KEYWORDS**

36 131 Infectious diseases, people who inject drugs, substance misuse, public health, organization of  
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38 132 health services  
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## 41 133 **BACKGROUND**

42 134 Injection drug use (IDU) and intravenous drug use (IVDU) are major public health  
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44 135 problems in Canada, with the number of people who inject drugs (PWID) increasing over the last  
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46 136 decade (1). IDU is associated with adverse health and social outcomes including overdoses, poor  
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48 137 access to medical care and social support, and spread of infectious disease (2). PWID are at  
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50 138 increased risk for viral blood-borne infections, such as human immunodeficiency virus (HIV)  
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3 139 and hepatitis C virus (HCV), bacterial infections, including endocarditis and skin and soft tissue  
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5 140 infections, and fungal infections. According to the Public Health Agency of Canada (PHAC),  
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8 141 68% of PWID in Canada have been infected or are currently infected with HCV (3).  
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10 142 Additionally, PWID are 59 times more likely to contract HIV than people who do not use  
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12 143 injection drugs (4).

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15 144 The high incidence of infectious disease amongst PWID, and other adverse health  
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17 145 outcomes, have resulted in increased emphasis on harm reduction efforts. These include  
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19 146 supervised injection facilities (SIFs) and needle exchange programs (NEPs). The use of  
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21 147 medication treatment as management for opioid use disorder has been associated with a  
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23 148 reduction in IDU (5–7). These harm reduction efforts are well-established methods of preventing  
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25 149 infectious disease in PWID (8–10). Additionally, guidelines are well established for the  
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27 150 treatment of infectious diseases commonly associated with IDU, such as anti-retroviral therapy  
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29 151 (ART) for HIV or direct-acting antivirals (DAA) for HCV (11–14).

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33 152 PWID may experience a range of healthcare trajectories, barriers to care and  
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35 153 fragmentation between social and health systems, which impede infectious disease prevention or  
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37 154 management (2). PWID are frequently hospitalized, have higher rates of patient-initiated or self-  
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39 155 discharge and face system barriers that make it difficult to assess clinical outcomes (15,16). The  
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41 156 scope of health care services and programs across Canada that aim to prevent and treat infectious  
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43 157 diseases in PWID remains unclear. The purpose of this study is to describe literature available on  
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45 158 health programs and services in Canada relating to the prevention and management of infectious  
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47 159 diseases in PWID, with the hope of informing policy, practice and future research. This research  
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49 160 employed an integrative systematic review methodology, allowing for the inclusion of a variety  
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51 161 of study designs, including experimental and non-experimental research. The diversity and  
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3 162 broadness of studies included in this type of review is well-suited to informing evidence-based  
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5 163 policy and practices (17).  
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## 7 164 **METHODS**

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10 165 This research followed an integrative systematic review as outlined by Whittmore and  
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12 166 Knafl (17) and has been previously described elsewhere (18). An integrative systematic review  
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14 167 may be used to gather diverse and broad evidence, allowing the inclusion of varying  
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16 168 methodologies to understand the breadth of a health issue (18). This manuscript follows the  
17  
18 169 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines  
19  
20 170 adapted for scoping reviews (19).  
21  
22

### 23 171 *Literature search*

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25  
26 172 PubMed, CINAHL and Web of Science Core Collection electronic databases were  
27  
28 173 searched for empirical literature between 2008 and June 6, 2019 (one additional year from that  
29  
30 174 indicated in the published protocol paper (18) to include studies from at least 10 years).  
31  
32 175 Additionally, PHAC, the Canadian Institute for Substance Use Research, and Canadian Centre  
33  
34 176 on Substance Use and Addiction websites were searched. The search strategy included terms for  
35  
36 177 infectious diseases, drug use and geography. References of included articles were hand-searched  
37  
38 178 for additional relevant articles.  
39

### 40 179 *Inclusion/exclusion*

41  
42  
43 180 For eligibility, articles and documents were required to address injection or intravenous  
44  
45 181 drug use and health programs or services relating to the prevention or management of infectious  
46  
47 182 diseases in Canada. Articles or documents reporting drug efficacy trials, published prior to 2008,  
48  
49 183 or not in English or French were excluded.  
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3 184 More than 55 articles (over 5%) were reviewed for inclusion/exclusion by the entire data  
4  
5 185 collection team to ensure consistency. Titles and abstracts were screened independently by two  
6  
7 186 reviewers. Conflicts were resolved by consensus or a third reviewer when necessary. Full-text  
8  
9 187 screening for remaining articles was conducted by two independent reviewers with consensus or  
10  
11 188 review by a third individual when necessary. A list of articles excluded at the full-text stage is  
12  
13 189 available upon request.  
14

#### 15 190 *Data extraction*

16  
17 191 A data extraction form was used to collect the following: bibliographic data, type of  
18  
19 192 research study and design, location, site of health program or service (community, clinic,  
20  
21 193 hospital, etc.), infection(s) discussed, description of health program or service, population of  
22  
23 194 study within PWID, description of cohort (if part of a cohort study), purpose of study, outcomes  
24  
25 195 measured, summary of findings, implications for policy, practice or research and gaps according  
26  
27 196 to authors. Data extraction was performed by a primary data collector, followed by independent  
28  
29 197 review by a secondary data collector.  
30  
31

#### 32 198 *Data analysis and quality appraisal*

33  
34 199 Data were organized in tables to categorize certain characteristics, such as, the study  
35  
36 200 design, types of health programs or services, infectious diseases, locations, and PWID sub-  
37  
38 201 populations. Implications for policy and practice, and areas for future research were identified.  
39  
40 202 There was too much diversity in study types and outcomes to conduct a meta-analysis, therefore  
41  
42 203 narrative descriptions are provided and an overall conclusion on efficacy of interventions could  
43  
44 204 not be determined.  
45  
46

47 205 Quality appraisal was performed according to the Quality Assessment Tool for Studies  
48  
49 206 with Diverse Designs (QATSDD) (20). This tool was chosen due to its applicability to diverse  
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207 study types, including quantitative and qualitative methodologies. The tool was validated by  
 208 health service researchers, increasing the reliability of its use in this study (20). Each included  
 209 empirical study was appraised by two reviewers and a final score was determined by consensus.

## 210 RESULTS

### 211 *Characteristics of included studies*

212 We identified 1142 citations from the database searches and 112 citations from manually  
 213 searching the references of included documents and other sources (Figure 1). Of the 1254  
 214 citations identified, 419 duplicates were removed, leaving 835 studies for potential inclusion.  
 215 Articles were excluded through title and abstract screening (694 documents) or full text  
 216 screening (44 documents). A total of 97 studies were included in the study for data extraction.

217 Empirical studies, non-empirical studies and grey literature were included, resulting in a  
 218 variety of methodologies and study designs (Table 1). Additionally, Table 1 provides a  
 219 breakdown of the infections discussed, jurisdiction of health program or service, and population  
 220 within PWID discussed in included studies, QATSDD scores of empirical studies ranged from  
 221 31% - 83.3%. Study sizes ranged from 11 to 36,077 participants.

222 **Table 1.** Description of included studies (study design, infectious disease, health program or  
 223 service, jurisdiction and population).

	Description	Total studies: 97 n (%)
Study Design	Cohort	45 (46%) 28 prospective, 17 retrospective
	Commentary, report, non-systematic literature review, roundtable discussion	14 (14%)
	Qualitative (ethno-epidemiological, ethnographic, interviews, participatory research)	12 (12%)



	Cost-benefit and cost-effectiveness analysis	7 (7%)
	Mathematical modelling of disease transmission	5 (5%)
	Randomized controlled trial (RCT) / protocol for RCT	3 (3%)
	Survey	3 (3%)
	Chart review - retrospective	2 (2%)
	Mixed methods	2 (2%)
	Systematic review	2 (2%)
	Case series	1 (1%)
	Interventional	1 (1%)
Infections Discussed	HIV	43 (44%)
	HCV	21 (21%)
	HIV and HCV	22 (22%)
	Combinations of infectious diseases (HIV, HCV, HBV, cellulitis, bloodborne pathogens, STIs)	9 (9%)
	Infective endocarditis	2 (2%)
Health Program / Service	Services providing testing for and prevention or treatment with antivirals for HIV or HCV (ART / DAA / HAART / PEP / Seek and Treat Initiatives / TasP / POCT / PrEP)	27 (28%)
	Supervised injection facilities / safe injection facility / safe injection site	19 (19%)
	Medication treatment for opioid use disorder (MMT / OST / OAT / HAT / MAT)	12 (12%)
	Integrated infectious disease and addiction programs	10 (10%)
	Needle exchange programs / Syringe exchange programs / Kit distribution programs	9 (9%)
	Broad harm reduction strategies	6 (6%)
	Mobile care initiatives / Telehealth	5 (5%)

	Other (motivational interviewing for high risk IDU behaviours, pharmacies as providers of expanded health services, PWID emergency department use, hospital providing acute care for addiction related infectious conditions)	4 (4%)
	Peer delivered services	3 (3%)
	Infective endocarditis surgical vs. medical management	2 (2%)
Jurisdiction	Multi-country	5 (5%)
	Canada	5 (5%)
	British Columbia	63 (64%)
	Ontario	11 (11%)
	Quebec	9 (9%)
	Alberta	2 (2%)
	Saskatchewan	2 (2%)
Population within PWID	All PWID	48 (49%)
	Persons with HIV	18 (18%)
	Persons with HCV	6 (6%)
	Persons in prison	4 (4%)
	PWID using specific health services (including NEP, SIF, OAT, pharmacies)	4 (4%)
	Not applicable	3 (3%)
	HIV and HCV-positive	2 (2%)
	HIV-negative	2 (2%)
	Indigenous	2 (2%)
	PWID with infective endocarditis	2 (2%)
	Hard to reach street youth and adults	2 (2%)
	Female sex workers	2 (2%)
	PWID leaving hospital due to self-discharge	1 (1%)

	Vancouver Area Network of Drug Users volunteers	1 (1%)
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224 Abbreviations: ART, antiretroviral treatment; DAA, direct-acting antivirals; HAART, highly  
 225 active antiretroviral treatment; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human  
 226 immunodeficiency virus; IDU, injection drug use, NEP, needle exchange program; OAT, opioid  
 227 agonist therapy; PEP, post-exposure prophylaxis; PrEP, pre-exposure prophylaxis; PWID,  
 228 people who inject drugs; RCT, randomized controlled trial; SIF, supervised injection facility;  
 229 STI, sexually transmitted infection; TasP, treatment as prevention

### 231 *Health programs and services*

232 Included studies were categorized by health programs and services discussed to analyze  
 233 their relevant features. Supplementary Table 1 provides data extracted from articles and  
 234 can be found here:  
 235 [https://docs.google.com/spreadsheets/d/1DUqwdFp06dRItagkxiiKaBqppnPshN1GbSNSbTJgAq](https://docs.google.com/spreadsheets/d/1DUqwdFp06dRItagkxiiKaBqppnPshN1GbSNSbTJgAqI/edit?usp=sharing)  
 236 [I/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1DUqwdFp06dRItagkxiiKaBqppnPshN1GbSNSbTJgAqI/edit?usp=sharing). Findings for each program or service type are presented with a description of  
 237 included studies and main outcome measures. Implications for policy, practice and further  
 238 research are described for each health program or service. Table 2 presents a summary of these  
 239 results.

### 240 Services providing testing, prevention or treatment with antivirals for HIV or HCV

241 Many studies addressed the provision of antiviral treatment and testing (n=27, 28%) (21–  
 242 47). The programs and services all addressed treatment and prevention of HIV (n=17) (21,22,24–  
 243 26,28–30,32,35–38,40,43,46,47), HCV (n=7) (23,27,31,33,34,39,41) or both (n=3) (42,44,45).  
 244 Treatments provided through these programs and services included ART, (also referred to as  
 245 highly active antiretroviral treatment [HAART]) (n=13) (22,24–26,28–30,32,35,37,38,40), HCV  
 246 treatment (including cascade of care) (31,33,34,39,41) or DAA (n=9) (23,27,44,45), post-  
 247 exposure prophylaxis (n=1) (43), pre-exposure prophylaxis (n=1) (21), and antiretroviral  
 248 treatment as prevention (TasP) (n=1) (46). Services included HIV and HCV testing, including

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3 249 seek and treat initiatives (n=2) (36,42) and peer-administered point-of-care testing (POCT) (n=1)  
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5 250 (47). When indicated, the majority of health services were situated in the community (n=17).  
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8 251 Some of the main outcome measures for these studies included experiences of PWID  
9  
10 252 receiving ART (24); factors related to testing, ART initiation, treatment adherence or  
11  
12 253 discontinuation (21,25,26,29,30,32,35,37,38); self-reported difficulties with taking ART (22);  
13  
14 254 and plasma viral load (21,24). As with ART, adherence and willingness to use DAA was  
15  
16 255 examined (44,45). Other studies examined patterns of mortality for PWID with HIV (28,40,42),  
17  
18 256 initiation of post-exposure prophylaxis when delivered by registered nurses (43), uptake of point-  
19  
20 257 of-care testing in the community (47), ART initiation during a community wide TasP initiative  
21  
22 258 (46), and the use of a seek-and-treat program to improve testing and treatment for marginalized  
23  
24 259 PWID (36).  
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28 260 Included articles also discussed HCV care. Studies aimed to characterize the HCV  
29  
30 261 cascade of care (33,41), and examined outcomes of HCV treatment when received via physician  
31  
32 262 or self-referral (39). Mathematical modelling studies were conducted to determine the burden of  
33  
34 263 HCV in a variety of care scenarios, including increased testing and antiviral regimens (n=3)  
35  
36 264 (23,27,41). Two survey studies examined HCV care behaviors of physicians, where the main  
37  
38 265 outcome was physician provision of HCV care to PWID (31,34).  
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42 266 Authors identified implications for practice and policy, particularly emphasizing the need  
43  
44 267 to address social and structural factors which impede HIV and HCV testing, treatment initiation  
45  
46 268 and adherence. To improve antiviral treatment adherence, authors suggested the need for  
47  
48 269 improved housing stability for PWID and supportive housing models with harm reduction  
49  
50 270 services. Other strategies to improve adherence included more welcoming clinical environments  
51  
52 271 for PWID and integrated, multidisciplinary care to manage comorbid conditions and reduce  
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3 272 barriers, which contribute to treatment discontinuation. Authors mentioned the need for targeted  
4  
5 273 approaches to reach particularly marginalized PWID, such as females and sex workers.  
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8 274 Additionally, authors mentioned scaling up ART, TasP, testing and care linkages. Strategies  
9  
10 275 mentioned included expansion of community-based testing and seek-and treat campaigns for  
11  
12 276 PWID unaware of HIV or HCV status, and follow-up for patients who engage in post-exposure  
13  
14 277 prophylaxis services. The need for policies to support MOUD services for inclusive HIV  
15  
16 278 treatment strategies and to improve HCV treatment adherence were also highlighted.  
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18

19 279 Further research surrounding reasons for treatment discontinuation, factors associated  
20  
21 280 with adherence, and the effect of incarceration on HIV treatment adherence and access was  
22  
23 281 suggested. There is a need to understand how stigma and marginalization create barriers in  
24  
25 282 accessing treatment. Authors also suggested the evaluation of interventions like integrated,  
26  
27 283 multidisciplinary HIV and HCV care, supportive housing models and addiction treatments.  
28  
29 284 Further research is needed to determine the optimal timing of treatment for PWID receiving  
30  
31 285 MOUD, and how these programs affect antiviral treatment and access. There is a need to develop  
32  
33 286 community-based testing initiatives which use peers to reach PWID who may not seek testing  
34  
35 287 and treatment in conventional health care settings.  
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#### 40 288 Supervised injection facilities

41  
42 289 Supervised injection facilities (SIFs), also known as safe injection facilities, or safe  
43  
44 290 injection sites (SIS), were also represented in our sample as an important health program  
45  
46 291 addressing the prevention of infectious disease in PWID (n=19, 19%) (48–66). Studies addressed  
47  
48 292 the prevention of HIV (n=10) (50–55,58,60,62,64), HCV (n=1) (49) or both (n=6)  
49  
50 293 (56,59,61,63,65), with only two studies mentioning skin infections or abscesses in combination  
51  
52 294 with HIV and HCV (48,57). Most SIF programs identified were community-based (n=17),  
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3 295 however some discussed SIF use in hospitals (n=1) (49), clinics (n=1) (49), care facilities (n=1)  
4  
5 296 (55) and prisons (n=1) (48). The majority of studies examined SIFs in Vancouver, BC (n=12)  
6  
7 297 (50–58,62,64,65) with a portion specifically looking at InSite (n=7), Canada’s first sanctioned  
8  
9 298 SIF, which provided precedence for SIF expansion (51–54,57,62,65). Other studies addressed  
10  
11 299 SIFs in Ottawa (n=2) (61,63) or both Ottawa and Toronto (n=1) (59) in ON; Montreal, QB (n=1)  
12  
13 300 (66); Saskatoon, SK (n=1) (60); Drumheller, AB (n=1) (48); and Canada broadly (n=1) (49).  
14  
15 301 Main outcome measures for cost-effectiveness and cost-benefit studies included prevented  
16  
17 302 number of HIV and/or HCV infections and overdose deaths, and others, such as quality adjusted  
18  
19 303 life years (QALYs) and life years gained (51,53,54,56,59,60,63,66). Considerations used in these  
20  
21 304 models ranged from IDU population factors (e.g., number of IDU in populations, prevalence of  
22  
23 305 HIV infection), injection-related factors (e.g., injections per IDU per year, injections with shared  
24  
25 306 equipment), and facility factors (e.g., annual operating cost, number of injections per year at  
26  
27 307 site). Other outcome measures involved self-reported use or potential use of SIFs by IDU,  
28  
29 308 perspectives on use of and access to SIFs, and benefits and acceptability of SIFs. Authors  
30  
31 309 described the benefits of SIFs as improving access to care, reducing public health care costs and  
32  
33 310 reducing IDU/IVDU-related harms.

34  
35 311 Overall, authors discussed policy and practice implications of SIFs. SIFs were discussed  
36  
37 312 as saving lives from overdose deaths, decreasing infections, improving health outcomes,  
38  
39 313 providing points of contact for the highest risk PWID, and facilitating access to care. However, it  
40  
41 314 was pointed out that SIFs could also be used to deliver a wider range of services, including HIV  
42  
43 315 testing and treatment. Even though every study showed that SIFs were cost-saving in the  
44  
45 316 Canadian contexts in which they were conducted, there was variability in the service models.  
46  
47 317 Other benefits of SIFs included enhanced public order, fewer public injections and reduced  
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3 318 injection-related litter. For implementation of SIFs, the authors recommended consideration of  
4  
5 319 risk perceptions and priorities of IDUs when designing harm reduction interventions, the need to  
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7  
8 320 create a more enabling environment for SIFs through amendment of federal legislation, and  
9  
10 321 highlighted that community support is fundamental for sustaining a SIF.

12 322 Research implications and gaps in research were also described. These included the need  
13  
14 323 to routinely collect accurate, geographically specific and up-to-date data in order to inform  
15  
16 324 policy; understand harm reduction needs of people who inject alone in private residences, social  
17  
18 325 determinants of injection drug users, and individual or context-specific barriers and reasons for  
19  
20 326 not accessing SIF services; and social and behavioral effects of SIFs (e.g., sharing practices).  
21  
22 327 Several points were noted regarding the evaluation of SIF services. There is a need to develop  
23  
24 328 and implement monitoring and evaluation programs for SIFs once they open, and to consider  
25  
26 329 more than one potential benefit in cost-benefit analysis for public health. These considerations  
27  
28 330 could include diagnostics, immunization, referral to detoxification facilities, decreased use of  
29  
30 331 other medical services, and assessing expansion of services to determine cost-benefits of  
31  
32 332 increased operating hours. Authors noted the challenge in evaluating an intervention without a  
33  
34 333 traditional control group and the need to consider intermediate outcomes, such as changes in  
35  
36 334 injecting practices, along with epidemiological data. There is also a gap in understanding needs  
37  
38 335 and use of SIFs by street-involved youth.

#### 336 Medication treatment for opioid use disorder

337 A number of studies (n=12, 12%) addressed the provision of medication treatment for  
338 opioid use disorder (MOUD), sometimes referred to as opioid agonist therapy (OAT) (67),  
339 opioid substitution therapy (OST) (68,69) or medication assisted treatment (MAT) (70), with  
340 seven studies focused specifically on methadone maintenance therapy (MMT) (15,71–76) and

1  
2  
3 341 one on heroin-assisted treatment (HAT) (77). Five studies addressed HCV (67,69,71,75,76), four  
4  
5 342 addressed HIV (72–74,77), and three addressed both HCV and HIV (15,68,70). The programs  
6  
7 343 were situated in communities (n=5) (70,72,73,75,76), hospitals (n=1) (15), clinics (n=2) (67,74)  
8  
9 344 or unspecified locations (n=4) (68,69,71,77). All programs were in BC (n=10), except two,  
10  
11 345 which included multiple countries (67,70). Community provision of MMT in BC was  
12  
13 346 specifically discussed as methadone is readily available through primary care physicians and  
14  
15 347 dispensed through community pharmacies in this jurisdiction (74). These programs were  
16  
17 348 examined as a protective factor for limiting HIV and HCV transmission. Authors examined the  
18  
19 349 effect of these programs on HIV and HCV care, including access to a regular physician. Studies  
20  
21 350 also examined eligibility of PWID for HAT in the local community, perceptions of HCV care  
22  
23 351 among physicians working in MOUD clinics, and use of prescription opioids in hospitals to  
24  
25 352 prevent patient-initiated discharge. Studies found that these types of programs improved  
26  
27 353 regularity of access to care and antiviral treatment outcomes, and reduced risk of infection and  
28  
29 354 other IDU-related harms.

30  
31 355 Authors identified the need for expansion of MOUD and harm reduction services by  
32  
33 356 addressing system-level factors, such as decriminalization policies, accessibility and funding of  
34  
35 357 services, decreasing barriers which limit physicians' ability to prescribe these medications,  
36  
37 358 enhancing physician education in providing these services, improving referral systems, and  
38  
39 359 developing new pharmacotherapies for opioid use disorder. Authors also suggested the  
40  
41 360 integration of MOUD services with infectious disease care and addiction treatment. PWID  
42  
43 361 should be included in policy-making surrounding the availability and delivery of MOUD  
44  
45 362 services, including the expansion of these services as harm reduction in hospitals. Future  
46  
47 363 research is needed to assess the impact of MOUD in combination with other harm reduction  
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3 364 services and counseling, and their effects on infectious disease care, re-infection and treatment  
4  
5 365 retention and adherence. Specifically, experimental designs are needed, and studies need to  
6  
7 366 examine certain population groups, such as women. Other avenues of investigation include  
8  
9  
10 367 exploring perspectives of hospital staff regarding care of PWID and the potential integration of  
11  
12 368 harm reduction services into hospitals.

### 14 369 Integrated infectious disease and addictions services

16  
17 370 Programs (n=10) incorporated infectious disease treatment with addictions treatment or  
18  
19 371 other services, such as counseling (78–87). Studies were conducted in Vancouver, BC (n=7)  
20  
21 372 (78,79,81–83,87), Montreal, QB (n=2) (80,84), and Kingston, ON (n=1) (86). Programs were  
22  
23 373 community based (n= 2) (83,84), in established community health centers (n=4) (81,85–87),  
24  
25 374 offered through multiple sites (n= 3) (78–80) or not specified (n=1) (82). Studies addressed HIV  
26  
27 375 (n=3) (81,82,85), HCV (n=5) (79,80,84,86,87), or HIV and HCV (n=2) (78,83). Main outcome  
28  
29 376 measures can be classified as use of services (n=5), such as documented or self-reported use of  
30  
31 377 existing integrated services, and how use of services shaped access to and engagement with other  
32  
33 378 supportive care services, behavior change (n=2), and treatment response (n=3). Treatment  
34  
35 379 completion, post-treatment follow-up and re-infection were other outcomes used. Study findings  
36  
37 380 supported a multi-disciplinary model of treatment which included medical, psychiatric, social  
38  
39 381 support and access to more individualized care.

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41 382 Authors stated that concurrent mental health and nonprescribed drug use may act as  
42  
43 383 barriers to adequate HIV care, and changes to the structural-environmental context of services  
44  
45 384 (such as incorporating nonprescribed drug use within a harm reduction approach) can improve  
46  
47 385 engagement with care among people living with human immunodeficiency virus (PLHIV) who  
48  
49 386 use drugs. The policy and practice implication that most resonated across these studies was the  
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3 387 benefits of collaborative, multidisciplinary models, which include counseling and/or peer-based  
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5 388 support groups. These models of HCV or HIV treatment in IDUs may extend beyond virological  
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8 389 outcomes to improve social determinants of health. Specifically, receiving HCV treatment was  
9  
10 390 associated with lower likelihood of reporting IDU (80), and integrating HCV treatment within  
11  
12 391 primary care and addictions clinics, which treat individuals already engaged with MOUD, may  
13  
14 392 help improve follow-up after treatment (79).

15  
16  
17 393 Future research could examine the impact of policy change on uptake of HCV and/or  
18  
19 394 HIV treatment and care among PWID. Authors also called for research on the impact of diverse,  
20  
21 395 innovative, integrated delivery strategies to improve uptake of HCV and/or HIV care in PWID,  
22  
23 396 but also to investigate which aspects of care are likely to support changes in drug use patterns.  
24  
25 397 Further exploratory studies recommended including individual's ideas, beliefs and feelings after  
26  
27 398 HCV treatment and reasons for not returning for care, or PWID experiences of effects of  
28  
29 399 integrated care models on health and social inequities.

### 30 31 400 Needle Exchange Programs

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34  
35 401 Needle exchange programs (NEPs) (also known as clean needle programs, syringe  
36  
37 402 exchange programs) and harm reduction kit distribution programs were also identified (n=9, 9%)  
38  
39 403 (88–96). Studies addressed HIV (n=3) (91,92,95), or both HIV and HCV (n=4) (88,90,94,96),  
40  
41 404 with the remaining studies broadly addressing blood-borne infections and cellulitis (89,93).  
42  
43 405 These studies described NEPs, implementation of a kit distribution program (n=1) (89) and  
44  
45 406 introduction of NEPs in prisons (n=3) (88,90,96). We included two prospective cohort studies,  
46  
47 407 which examined the relationship between NEP use, HIV seroconversion, and rates of syringe  
48  
49 408 borrowing and lending, and both reported a reduction in HIV incidence among PWID (92,95).  
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51 409 One RCT was included, which evaluated a theory-based intervention to increase NEP use.  
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3 410 Participants in the experimental group used fewer borrowed syringes compared to the control  
4  
5 411 group (RR: 0.47 CI95% 0.28–0.79; P = .004) (94). This effect was no longer present three  
6  
7 412 months later.

8  
9  
10 413 Authors identified implications for practice, policy and research. The included studies  
11  
12 414 called for expansion of NEPs and kit distribution programs, particularly in prisons and hospitals.  
13  
14 415 Decentralizing NEPs, promoting peer-run initiatives, and diversifying distribution methods are  
15  
16 416 needed to reach more marginalized PWID. Authors also indicated the importance of including  
17  
18 417 PWID and community members in programmatic decision-making and consideration of local  
19  
20 418 context when initiating NEPs. Researchers found gaps in evaluation of NEPs, therefore future  
21  
22 419 research should focus on ongoing evaluation and monitoring of programs. Authors also indicated  
23  
24 420 the need to examine different models of distribution across settings and cultural contexts.

#### 25 26 27 28 421 Broad harm reduction strategies

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31 422 We identified six studies which provided reviews, recommendations or assessments of a  
32  
33 423 range of harm reduction services (97–102). Studies focused on HIV (n=2) (99,100), HCV (n=2)  
34  
35 424 (97,98), or both +/- HBV (n=2) (101,102). One mathematical modelling study created a  
36  
37 425 community model to simulate the effect of strategies on HIV prevalence, including providing  
38  
39 426 clean syringes, introduction of SIFs, introduction of TasP to improve treatment initiation and  
40  
41 427 retention and increased HIV testing (100). One qualitative study examined factors influencing  
42  
43 428 injection and perceived barriers to injection cessation among marginalized youth, focusing on  
44  
45 429 HIV. The study mentioned health programs and harm reduction services, including MOUD, drug  
46  
47 430 treatment programs, and social support programs (99). These studies discussed HIV, HCV and  
48  
49 431 HBV and highlighted efforts, recommendations and challenges to improving harm reduction  
50  
51  
52 432 efforts. One of these studies specifically discussed community-driven programs to improve HCV  
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3 433 testing and care in Indigenous communities who are at greater risk for adverse IDU-related  
4  
5 434 health outcomes (98).  
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7  
8 435 These studies identified a broad range of implications for policy and practice. The authors  
9  
10 436 support the expansion of harm reduction services, increased financial support for these services  
11  
12 437 and their combination with HIV and HCV testing and treatment strategies. Additionally, authors  
13  
14 438 indicated the advancement of peer-based models of care, the re-assessment of punitive drug  
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16 439 policies, and the need for improved evaluation and monitoring for harm reduction programs.  
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18 440 Increased support is needed for initiatives which address social harms affecting PWID and the  
19  
20 441 social determinants of health. Equity of access to harm reduction services should be ensured.  
21  
22 442 Authors specifically mentioned the need to involve marginalized groups of PWID, youth and  
23  
24 443 Indigenous communities, in planning harm reduction programs. Youth should be included in  
25  
26 444 policy decisions, with targeted services to improve access to care for this group. Similarly,  
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28 445 Indigenous PWID require more targeted services, which includes links between on- and off-  
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30 446 reserve programs and to Indigenous PWID in prison.  
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34 447 Authors also identified gaps and associated research implications related to youth and  
35  
36 448 Indigenous PWID. Indigenous people in Canada may lack access to primary care and HCV  
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38 449 testing. Since many provinces do not collect ethnicity data, national data on HCV prevalence  
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40 450 does not extend to Indigenous communities. Further research is needed to understand HCV  
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42 451 prevalence and determinants related to HCV transmission amongst Indigenous PWID. Further  
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44 452 study is also needed to understand youth engagement and access to harm reduction services.  
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46 453 Finally, it was noted that few studies examine injection equipment distribution policies and  
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48 454 coverage, and more research is needed to understand the risks from sharing injection equipment  
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50 455 using robust study designs.  
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### 456 Mobile care initiatives and Telehealth

457 Mobile care initiatives and telehealth seek to expand the reach of traditional programs.  
458 Studies included mobile care initiatives (n=3) (103–105) and telehealth (n=2) (106,107) and  
459 focused on HIV (n=1) (104), HCV (n=1) (106), HIV and HCV (n=1) (107), or STIs in addition  
460 to HIV (n=2) (103,105). Two of the three mobile care initiatives were peer-led (103,104). Mobile  
461 care initiatives used peer volunteers to distribute sterile injection equipment and to provide harm  
462 reduction education and outreach. Another mobile care initiative deployed nurses to provide  
463 medical attention in addition to equipment and education (105). Main outcomes measured for  
464 mobile care initiatives included use of the program in the previous six months and description of  
465 roles and contributions of healthcare staff delivering the program.

466 Mobile health and telemedicine initiatives included efforts to support HCV and HIV care  
467 remotely for those with difficulty accessing care (106,107). The telehealth programs measured  
468 HIV propensity scores at six months and sustained viral response as their main outcome  
469 measures. These studies also evaluated secondary drug treatment outcomes and use of related  
470 health services.

471 Implications for policy and practice included that peer-led mobile initiatives can play an  
472 important role in extending the reach of conventional public health programs. Specifically for  
473 hard-to-reach female sex workers who use drugs, unsuccessful attempts to access drug treatment  
474 can be associated with increased odds of violence. Mobile outreach programs can serve a role in  
475 HIV and STI prevention. Overall, it is important to empower clients to make changes, by  
476 providing resources, skills, and opportunities within an atmosphere of mutual trust and respect,  
477 education and support, participation and commitment, and power-sharing. Telehealth saved  
478 patients time, travel, and missed work days with high levels of satisfaction. Multidisciplinary

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3 479 telehealth approaches can engage and retain patients in remote areas in the treatment of HCV.  
4  
5 480 Lastly, innovative and culturally safe interventions that address the barriers to HIV prevention  
6  
7 481 while supporting the strength of populations (for example, young Indigenous people) who use  
8  
9 482 drugs are urgently needed. Future research could concentrate on understanding how specific  
10  
11 483 characteristics of mobile outreach programs may facilitate entry into inpatient addiction  
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13 484 treatment or connect women to other services. Research could also address methods of including  
14  
15 485 and evaluating community partnering, coordinating and collaborating in current and future  
16  
17 486 healthcare delivery models for PWID.  
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### 21 487 Peer-delivered services

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24 488 Studies discussed peer delivered services such as counselling and testing (n=2) (108,109)  
25  
26 489 and peer-delivered injections (n=1) (110). These include one cohort study (109) and two  
27  
28 490 qualitative studies (108,110), all programs were conducted in a community setting in Vancouver,  
29  
30 491 BC, These addressed HIV (n=1) (109) or both HIV and HCV (n=2) (108,110). The studies  
31  
32 492 explored experiences as a peer injection drug user with the Vancouver Area Network of Drug  
33  
34 493 Users (VANDU), how VANDU shaped the social context and injection practices in that  
35  
36 494 community, and willingness to receive peer-delivered services. These studies indicate that peer-  
37  
38 495 based services can improve delivery of care for PWID and address issues such as lack of trust  
39  
40 496 and unfamiliarity with the healthcare system and healthcare professionals (109). Additionally,  
41  
42 497 peer-delivered services enabled delivery of care and infectious disease prevention efforts to  
43  
44 498 harder-to-reach, more marginalized PWID. For example, one study examining PWID's use of an  
45  
46 499 unsanctioned peer-delivered injections service indicated that those who require assistance  
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48 500 injecting, including women and people with disability, are at greater risk of harm and experience  
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50 501 barriers which inhibit their use of sanctioned SIFs. These findings underscore the need for harm  
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3 502 reduction initiatives to assess their accessibility to certain, less autonomous PWID populations  
4  
5 503 (110). Peer-led organizations for IDU, such as VANDU, may also give PWID a political voice.  
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7  
8 504 Lastly, legal and regulatory frameworks need to accommodate assisted injections and  
9  
10 505 consideration for peer-based delivery models.

### 11 506 Treatment of Infective Endocarditis

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14 507 Only two studies (2%) addressed the treatment of infective endocarditis in a hospital  
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16 508 setting, comparing mortality associated with surgical versus medical management (111,112). The  
17  
18 509 main outcomes of these studies were the incidence of death two years following diagnosis or all-  
19  
20 510 cause mortality. Rodger and authors additionally collected data related to site of infection,  
21  
22 511 complications and referral to addiction treatment services (111). This study showed that surgery  
23  
24 512 was related to lower mortality (111), while the other found no difference (112). Neither study  
25  
26 513 looked at the prevention of infectious diseases or quality improvement for the delivery of these  
27  
28 514 services. Both studies identified the need for integration of addiction treatment with infectious  
29  
30 515 disease care, including multidisciplinary care teams and patient commitment to addiction  
31  
32 516 rehabilitation. Authors suggested further research include increased use of addiction treatment  
33  
34 517 and noted gaps in understanding of factors associated with PWID mortality.  
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### 40 518 Other health programs and services

41  
42 519 One study included a randomized controlled trial in QB on motivational interviewing  
43  
44 520 (MI) for high risk IDU behaviors, which showed that both MI and educational interviewing  
45  
46 521 decreased risk behaviors, but individuals in the MI group had lower odds of risk behaviors at six  
47  
48 522 months (113). A cohort study in BC evaluated first time emergency department use by PWID  
49  
50 523 along with most common diagnoses, admissions and discharge data (114). A mixed methods  
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52 524 study provided a qualitative description of laws, policies, attitudes, practices, and behaviors  
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3 525 surrounding the possibility of expanding pharmacy services for PWID in six countries (115).  
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5 526 Lastly, performed a chart review to describe trends in admission in a dedicated HIV/AIDS ward  
6  
7 527 in a tertiary hospital in BC, which was repurposed in 2014 and expanded to include HIV-  
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9  
10 528 negative individuals with infectious conditions arising from addictions comorbidities (116).  
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12 529 These papers highlight that increased access to harm reduction and addictions services,  
13  
14 530 urgent primary care, immunizations, ambulatory and integrated care, and stable housing are  
15  
16 531 needed in the PWID population to optimize health outcomes, reduce substance use-related  
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18 532 deaths, and decrease hospital utilization. Macro-, meso-, and micro- changes in policies, laws,  
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20  
21 533 attitudes and behaviors are needed in order to decrease barriers for PWID to access services.  
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23  
24 534 Also, mental health interventions could be incorporated into harm reduction services to support  
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26 535 behavior changes. Authors called for further studies on reasons for hospital admissions and  
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28 536 emergency room (ER) use in PWID/PLHIV. Lastly, studies are needed to determine  
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31 537 effectiveness of mental health interventions in the community and interventions in ER settings to  
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33 538 prevent further ER visits and admissions.  
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**Table 2.** Policy, practice and research implications indicated in included studies and organized by health program or service.

Health Program/Service	Policy and Practice Implications	Gaps and Research Implications
Services providing testing, prevention or treatment with antivirals for HIV or HCV	<ul style="list-style-type: none"> <li>• Address social and structural factors which impede HIV and HCV testing, treatment initiation and adherence</li> </ul> <p>Suggested strategies to improve treatment adherence include:</p> <ol style="list-style-type: none"> <li>(1) Improved housing stability for PWID, supportive housing models with harm reduction services</li> <li>(2) Integrated, multidisciplinary care to manage comorbid conditions and reduce barriers</li> </ol> <ul style="list-style-type: none"> <li>• Scale up ART, TasP, testing and care linkages</li> <li>• Increase targeted approaches to reach marginalized PWID (e.g. females and sex workers)</li> <li>• Create policies to support MOUD services to promote inclusive HIV treatment and to improve HCV adherence</li> </ul>	<ul style="list-style-type: none"> <li>• Research reasons for treatment discontinuation, factors associated with adherence, and the effect of incarceration on HIV treatment adherence and access</li> <li>• Understand how stigma and marginalization create barriers in accessing treatment</li> <li>• Evaluate interventions like integrated, multidisciplinary HIV and HCV care, supportive housing models and addiction treatments</li> <li>• Determine the optimal timing of treatment for PWID receiving MOUD, and how these programs affect antiviral treatment and access</li> <li>• Develop community-based testing initiatives which use peers to reach PWID who may not seek testing and treatment in conventional health care settings</li> </ul>
Supervised injection facilities	<ul style="list-style-type: none"> <li>• Use of SIFs to deliver a wider range of services (e.g. HIV testing and treatment)</li> <li>• Consider risk perceptions and priorities of PWID when designing harm reduction interventions</li> <li>• Amend legislation to create a more enabling environment for SIFs</li> <li>• Community support is fundamental for sustaining a SIF operation</li> </ul>	<ul style="list-style-type: none"> <li>• Collect geographically specific and up-to-date data to inform policy</li> <li>• Understand harm reduction needs of PWID in private residences and social determinants of IDU</li> <li>• Research individual or context-specific barriers and reasons for not accessing SIF services</li> <li>• Research social and behavioral effects of SIFs (e.g., sharing practices)</li> <li>• Gap in understanding needs and use of SIFs by street-involved youth</li> <li>• Further evaluation of SIFs: <ol style="list-style-type: none"> <li>(1) Develop and implement monitoring and evaluation programs for SIFs</li> <li>(2) Consider more potential benefits in cost-benefit analysis (e.g. diagnostics, immunization, referral to detoxification facilities, decreased use of other medical services, expansion of services, increased operating hours)</li> <li>(3) Consider intermediate outcomes (e.g. changes in injecting practices) with epidemiological data due to challenge in evaluating an intervention without a traditional control group</li> </ol> </li> </ul>

Opioid Agonist Therapy	<ul style="list-style-type: none"> <li>• Expansion of MOUD and harm reduction services by addressing system-level factors:               <ol style="list-style-type: none"> <li>(1) decriminalization policies</li> <li>(2) accessibility and funding</li> <li>(3) decrease barriers which limit physicians' ability to prescribe these medications</li> <li>(4) enhance physician education in providing these services</li> <li>(5) improve referral systems</li> <li>(6) develop new pharmacotherapies for opioid use disorder</li> </ol> </li> <li>• Integrate MOUD services with infectious disease care and addiction treatment</li> <li>• Include PWID in policy-making surrounding the availability and delivery of MOUD services, including the expansion of these services as harm reduction in hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the impact of MOUD in combination with other harm reduction services and counseling, effects on infectious disease care</li> <li>• Need experimental designs</li> <li>• Studies need to assess impact of MOUD for certain population groups (e.g. women)</li> <li>• Explore perspectives of hospital staff regarding care of PWID and integration of harm reduction services into hospitals</li> </ul>
Integrated infectious disease and addictions services	<ul style="list-style-type: none"> <li>• Collaborative, multidisciplinary models, which include counseling and/or peer-based support groups extend beyond virological outcomes to improve social determinants of health</li> </ul>	<ul style="list-style-type: none"> <li>• Examine the impact of policy change on uptake of HCV and/or HIV treatment and care among PWID</li> <li>• Research the impact of diverse, innovative, integrated delivery strategies to improve uptake of HCV and/or HIV care in PWID</li> <li>• Investigate which aspects of care are likely to support changes in drug use patterns</li> <li>• Include individual's ideas, beliefs and feelings after HCV treatment and reasons for not returning for care, or PWID experiences of effects of integrated care models on health and social inequities</li> </ul>
Needle Exchange Programs	<ul style="list-style-type: none"> <li>• Expansion of NEPs and kit distribution programs, particularly in prisons and hospitals</li> <li>• Decentralize NEPs, promoting peer-run initiatives, and diversify distribution methods to reach more marginalized PWID</li> <li>• Include PWID and community members in programmatic decision-making and consider local context when initiating NEPs</li> </ul>	<ul style="list-style-type: none"> <li>• Gaps in evaluation of NEPs</li> <li>• Implement ongoing evaluation and monitoring of programs</li> <li>• Examine different models of distribution across settings and cultural contexts</li> </ul>
Broad harm reduction strategies	<ul style="list-style-type: none"> <li>• Expansion of harm reduction services, increased financial support for these services and their combination with HIV and HCV testing and treatment strategies, equity of access</li> <li>• Advance peer-based models of care</li> <li>• Re-assess punitive drug policies</li> <li>• Improve evaluation and monitoring for harm reduction programs</li> </ul>	<ul style="list-style-type: none"> <li>• Indigenous people in Canada may lack access to primary care and HCV testing</li> <li>• Since many provinces do not collect ethnicity data, national data on HCV prevalence does not extend to Indigenous communities</li> <li>• Understand HCV prevalence and determinants related to HCV transmission amongst Indigenous PWID</li> </ul>

	<ul style="list-style-type: none"> <li>• Support initiatives which address social harms affecting PWID and the social determinants of health</li> <li>• Involve marginalized groups of PWID (e.g. youth and Indigenous) in program planning</li> </ul>	<ul style="list-style-type: none"> <li>• Understand youth engagement and access to harm reduction services</li> <li>• Examine injection equipment distribution policies and coverage, understand the risks from sharing injection equipment using robust study designs</li> </ul>
Mobile care initiatives and Telehealth	<ul style="list-style-type: none"> <li>• Peer-led mobile initiatives play an important role in extending the reach of conventional public health programs</li> <li>• Important to empower clients to make changes, by providing resources within an atmosphere of mutual respect, education, support, participation, commitment, power-sharing</li> <li>• Multidisciplinary telehealth approaches can engage and retain patients in remote areas in the treatment of HCV</li> <li>• Culturally safe interventions that address the barriers to HIV prevention while supporting the strength of populations (e.g. young Indigenous people) are urgently needed</li> </ul>	<ul style="list-style-type: none"> <li>• How specific characteristics of mobile outreach programs may facilitate entry into inpatient addiction treatment or connect women to other services.</li> <li>• Methods of including and evaluating community partnering, collaborating in healthcare delivery models for PWID</li> </ul>
Peer-delivered services	<ul style="list-style-type: none"> <li>• Improve delivery of care for PWID and address lack of trust and unfamiliarity with the healthcare system and healthcare professionals</li> <li>• Enable delivery of care and infectious disease prevention efforts to harder-to-reach, more marginalized PWID</li> <li>• Legal and regulatory frameworks need to accommodate assisted injections and consideration for peer-based delivery models</li> </ul>	<ul style="list-style-type: none"> <li>• Need for harm reduction initiatives to assess their accessibility to less autonomous PWID</li> </ul>
Treatment of Infective Endocarditis	<ul style="list-style-type: none"> <li>• Integrate addiction treatment with infectious disease care</li> </ul>	<ul style="list-style-type: none"> <li>• Gaps in understanding factors associated with PWID mortality</li> </ul>
Other health programs and services	<ul style="list-style-type: none"> <li>• Increased access to harm reduction and addictions services, urgent primary care, immunizations, ambulatory and integrated care, and stable housing are needed to optimize health outcomes, reduce substance use-related deaths, and decrease hospital utilization</li> <li>• Incorporate mental health interventions with harm reduction services to support behavior changes</li> </ul>	<ul style="list-style-type: none"> <li>• Further studies on reasons for hospital admissions and ER use in PWID/PLHIV</li> <li>• Determine effectiveness of mental health interventions in the community</li> <li>• Determine effectiveness of interventions in ER settings to prevent further ER visits and admissions</li> </ul>

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3 539 Abbreviations: ART, antiretroviral treatment; ER, emergency room; HCV, hepatitis C virus; HIV, human immunodeficiency virus;  
4 540 IDU, injection drug use, NEP, needle exchange program; MOUD, medication treatment for opioid use disorder; PLHIV, People living  
5 541 with human immunodeficiency virus; PWID, people who inject drugs; SIF, supervised injection facility; TasP, treatment as prevention  
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For peer review only

## DISCUSSION

### *Main findings*

We identified a number of health programs and services included testing and management of HIV and HCV, SIFs, MOUD, integrated infectious disease and addiction programs, NEPs, harm reduction strategies broadly, mobile care initiatives, peer-delivered services and management of IDU-related bacterial infections. A broad range of study types and grey literature were included, allowing for elucidation of key recommendations for policy, practice and research regarding health programs and services for the treatment of infectious disease in PWID in Canada. Discussion of HIV and HCV infections far outweighed other IDU-related infectious diseases. The majority of the health programs and services included in our study addressed the provision of antiviral treatment and viral testing. Studies addressed the cost-benefit and cost-effectiveness of SIFs. MOUD programs were shown to reduce risk of infection and improve antiviral treatment outcomes. Studies discussed harm reduction services broadly, calling for the expansion and combination of these services with HIV and HCV treatment strategies. Interdisciplinary or integrated health programs were shown to provide comprehensive care to PWID. Additionally, we found health programs that attempted to reach more marginalized PWID through telehealth and mobile care initiatives. Peer-delivered services, such as testing, counselling and assisted injections, removed barriers to care for PWID who distrust healthcare providers or require assistance injecting. Only two included studies addressed treatment of infective endocarditis.

### *Strengths and limitations of study*

This study employed a systematic integrative review design which allowed for the inclusion of empirical, non-empirical and grey literature. Using this study design enabled a broad

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2  
3 overview of health programs and services available for PWID in Canada. Additionally,  
4 documents were screened independently by two reviewers, improving reproducibility and  
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6 limiting bias. Similarly, data extraction and quality assessment of included studies were  
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8 performed independently by two data collectors.  
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12 Despite these strengths, this study has some limitations. An integrative review limits our  
13 study to published literature, which may exclude programs or services not published.  
14  
15 Additionally, our study sought to provide an overview of health programs and services for PWID  
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17 in Canada, but did not formally evaluate the effectiveness of the included programs and services  
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19 in preventing or treating infectious disease in PWID. Our review was limited to Canada,  
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21 reducing the generalizability of these results, however improving the specificity of policy and  
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23 practice recommendations derived from these results. Limitations were quite diverse due to the  
24  
25 range of study types included in this review. Many of the cohort studies indicated that their  
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27 sample was not random due to the use of previously established cohorts and, therefore, may not  
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29 be generalizable to larger populations. Similarly, qualitative studies indicated a lack of  
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31 generalizability, since experiences are specific to the PWID included in the study. Studies which  
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33 relied on PWID self-report indicated limitations in the validity of the data due to social  
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35 desirability bias. Cost-benefit analysis and mathematical modelling studies were limited by the  
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37 assumptions, which cannot be verified, necessary for mathematical calculations, which may  
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39 result in over or under-estimations of disease transmission or cost-savings.  
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#### 46 *Fit within literature*

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49 This study provides an overview of health programs and services relating to infectious  
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51 disease care for PWID in Canada. While there are a number of systematic reviews examining  
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53 interventions to treat HIV and HCV in PWID (5,6,8,117,118), our study is unique by focusing on  
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3 the Canadian context, including all IDU-related infectious diseases, and including a variety of  
4 study designs. Other reviews examining the prevention and treatment of infectious disease in  
5 PWID found an emphasis on harm reduction efforts and HIV or HCV care. The included studies  
6 indicate the benefits of harm reduction efforts and support their increased use in communities  
7 and across other sites, including hospitals and prisons. Most studies in Canada are also from  
8 Vancouver, BC, which has a long history of empowering and working with PWID. While other  
9 jurisdictions in Canada can learn from Vancouver's work, it is important to conduct research in  
10 other cities and provinces to account for contextual differences.  
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### 21 *Recommendations for practice and research*

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24 The included studies indicate the advantages of multi-faceted care programs for PWID,  
25 which include harm reduction, medical and pharmaceutical treatments, social support and  
26 education. These programs target the social determinants of health, improving the underlying  
27 social and structural barriers which prevent PWID from accessing and adhering to treatments or  
28 health programs (81,82,85,86). Notably, the included studies call for exploratory work in  
29 facilitators and barriers to treatment and care, more robust study designs, and attention to  
30 contextual factors and more complex interventions.  
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40 There is a need to address social and structural factors which impede continued care for  
41 PWID. These factors relate to the social determinants of health, and include criminalization of  
42 IDU, stigma and discrimination of PWID when accessing health programs or services, and lack  
43 of funding for harm reduction services. Recommendations include the introduction of supportive  
44 housing models for PWID to enable greater adherence and access to infectious disease treatment  
45 or MOUD. Multidisciplinary or integrated care models for infectious disease treatment also  
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3 provide PWID with more comprehensive care, addressing medical, social and mental health  
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5 challenges.  
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8 Targeted programs and services for marginalized groups of PWID, such as street-  
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10 involved adults and youth, sex workers, and Indigenous peoples are needed. NEPs, mobile care  
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12 initiatives, telehealth and peer-delivered services sought to improve access to care for these more  
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14 marginalized groups. Advancing peer models of care may decrease the stigmatization and  
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16 marginalization experienced by PWID and reduce barriers to accessing care. This is a prominent  
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18 and promising area for further research and implementation.  
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21 A pressing consideration for further research is improved evaluation and monitoring of  
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23 health programs and services using more robust research designs. Further research is needed to  
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25 understand specific needs of PWID across settings and cultural contexts. These may elucidate  
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27 reasons for not accessing services or returning to care and ideas and beliefs of PWID regarding  
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29 health programs and services.  
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33 The majority of studies addressed HIV and HCV, which are mainly managed in  
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35 outpatient settings, given the advancements in treatment for these two infectious diseases. A  
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37 related project by this group is a chart review of PWID admitted to hospital to assess the types of  
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39 infectious diseases and concerns around patient-initiated discharges. Preliminary findings show  
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41 there is little overlap in these two studies, highlighting the disconnect between community and  
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43 hospital-based initiatives which ensure continuity of care in this population. There are few  
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45 included studies addressing IDU-related bacterial infections, despite their prevalence amongst  
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47 PWID and leading cause of long-term hospitalizations and emergency department use  
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49 (114,119,120). This gap indicates the need for further research on PWID care in hospital and  
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51 health programs which link the community and hospital settings.  
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## CONCLUSIONS

Programs and services should be expanded across geographic settings, healthcare settings and populations of PWID, specifically more marginalized PWID. Improving infectious disease care for PWID requires attention to social and structural barriers and inclusion of PWID in programmatic decision-making.

## SUPPLEMENTARY DATA

### Supplementary Table 1

- File format: .xls
- Title of data: Data Extraction Form
- Description: Data extraction form including bibliographic data (author, year, journal), type of research study and design, location, site of health program or service (community, clinic, hospital, etc.), infection(s) discussed, description of health program or service, population of study within PWID, description of cohort (if part of a cohort study), purpose of study, outcomes or indicators measured, summary of findings, implications for policy, practice or research according to authors and gaps identified by authors and quality appraisal scores. Data is organized by health program or service.

## DECLARATIONS

### Ethics Approval and consent to participate

Not applicable.

### Availability of Data and Materials

All data generated or analyzed during this study are included in this published article.

### Conflicts of Interest

The authors have no conflicts of interest.

### Patient and Public Involvement Statement

Patients and the public were not involved in the design or conduct of this study.

### Funding

No funding was received for this research project from any funding agency in the public,

1  
2  
3 commercial or not-for-profit sectors. All data collectors either receive course credit at McMaster  
4 University or volunteer their time for this project.  
5  
6

### 7 **Author's contributions**

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9  
10 EA conceived of the topic. CL, LM, ML, RL, J-ET and DK helped develop the research question  
11 and methods. KB, SJ, SP, YQ, HS, MQ and AH helped develop the search strategy and  
12 conducted data collection. KB and EA conducted data analysis and wrote the initial manuscript.  
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15 All authors provided substantive comments and approved the final manuscript.  
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18

### 19 **Acknowledgements**

20  
21 Annie Wang was involved in the initial discussions of the methods for this study.  
22  
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### 24 **REFERENCES**

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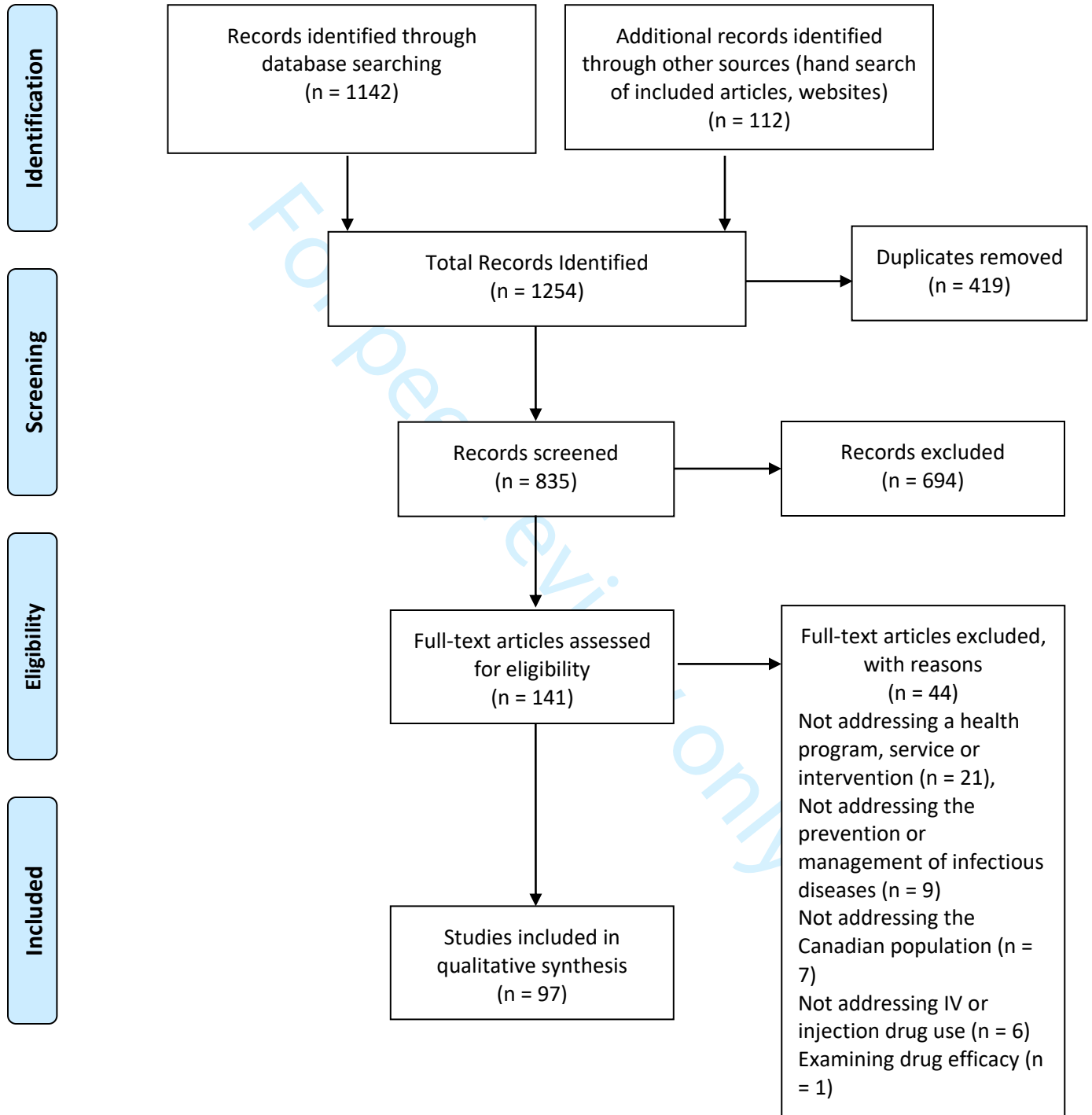
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## FIGURES

**Figure 1.** Flowchart demonstrating identification, screening and inclusion of studies.



# PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit [www.prisma-statement.org](http://www.prisma-statement.org).

Year of publication	Authors	Name of publication	Title of article	Study type - empirical OR non-empirical	Type of empirical or non-empirical study	Location of program / service	Site of program or service - hospital; clinic; community; home; other - (specify); Multiple - (specify)	Infection(s) discussed
<b>Services providing testing for and prevention or treatment with antivirals for HIV or HCV (ART / DAA / HAART / PEP / Seek and Treat Initiatives / Treatment as Prevention / Point of care testing) n=27</b>								
2019	Bazzi, A.R.; Drainoni, M.-L.; Biancarelli, D.L.; Hartman, J.J.; Mimiaga, M.J.; Mayer, K.H.; Biello, K.B.	BMC Public Health	Systematic review of HIV treatment adherence research among people who inject drugs in the United States and Canada: evidence to inform pre-exposure prophylaxis (PrEP) adherence interventions	Empirical	Systematic Review	Multi-country: United States (CT- New Haven, MD- Baltimore, MA- Boston, NY- New York, CA- San Francisco, FL- South Florida) and Canada (BC - Vancouver)	None stated	HIV
2019	Yeung, B.; Mohd Salleh, N. A.; Socias, E.; Dong, H.; Shoveller, J.; Montaner, J.S.G.; Milloy, M.-J. S.	AIDS Behav.	Prevalence and correlates of reporting difficulty taking antiretroviral treatment among HIV-positive illicit drug users in Vancouver, Canada: a longitudinal analysis	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV

Health program or service	Description of health program or service	Population of this study	Study size (number enrolled in study)	Population of study within PWID - All; Indigenous; sex workers; immigrants; men who have sex with men (MSM); transgender; minors; others	If part of cohort study, description of cohort - name of cohort, year of inception, number of participants, location, inclusion and exclusion criteria, outcomes measured or purpose of cohort	Purpose of present study
ART, PrEP	ART, Pre-Exposure Prophylaxis	PWID (HIV positive and negative)	average sample size = 465 ; 20 studies (mean n=465)	All	N/A	to synthesize evidence about ART adherence among PWID to inform PrEP adherence interventions for this population
ART	The experience of taking ART among PWID HIV positive individuals	HIV positive PWID who were ART-exposed at baseline or who initiated ART treatment during follow-up. Analytic sample was restricted to participants with $\geq 1$ CD4+ count and $\geq 1$ plasma HIV-1 RNA viral load (VL) within 6 months of their baseline interview.	746	All	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an ongoing longitudinal prospective cohort study of HIV-positive illicit drug users in Vancouver, Canada. Beginning in December 2005, study participants were recruited through extensive street outreach in Vancouver's Downtown Eastside (DTES) neighborhood, an urban area marked by high levels of poverty, illicit drug use, and incidence of HIVinfection among injection drug users. Eligibility for ACCESS is restricted to HIV-positive individuals aged $\geq 18$ years with a history of illicit drug use (other than or in addition to cannabis) in the previous month, who have provided written informed consent. Study participants respond to an interviewer-administered questionnaire and, during an examination by a nurse, provide serum samples for serological analysis at baseline and at every 6-month follow-up. The structured interview collects comprehensive demographic data, along with descriptions of drug use and various related exposures.	To investigate the prevalence and correlates of reporting ART was difficult to take among a cohort of illicit drug users in Vancouver, Canada

Main outcome and indicator, if any	Other outcomes or variables measured and indicators used, if any	Summary of findings	Implications for policy and/or practice, as reported by authors	Implications for research, as reported by authors
ART adherence outcomes were assessed using pharmacy records (prescription refill data), self-report, biological markers (viral load) and electronic monitoring	predisposing factors, enabling factors and need-related factors analyzed based on the Behavioral Model of Healthcare Utilization for Vulnerable Populations: younger age, sex, education level, race/ethnicity, low health literacy, unemployment, substance use barriers, alcohol use, binge drug use and overdose, high addiction severity, SU to cope with stress, homelessness, sexual abuse history	After screening 1049 unique records, we retained 20 studies of PWID (average sample size = 465) with ART adherence-related outcomes (via pharmacy records: n = 9; self-report: n = 8; biological markers: n = 5; electronic monitoring: n = 2). Predisposing factors (patient-level barriers to adherence) included younger age, female sex, and structural vulnerability (e.g., incarceration, homelessness). Enabling resources (i.e., facilitators) that could be leveraged or promoted by interventions included self-efficacy, substance use treatment, and high-quality patient-provider relationships. Competing needs that require specific intervention strategies or adaptations included markers of poor physical health, mental health comorbidities (e.g., depression), and engagement in transactional sex	None stated	Further studies needed to identify more nuanced differences and necessary adaptations of related intervention strategies. In-depth, formative research, including qualitative studies, should explore PrEP adherence challenges in this population.
The primary outcome of interest was self-reported difficulty taking ART, as assessed during the examination by the study nurse.	age (at baseline); time since HIV diagnosis (in years); gender (male vs. non-male); ancestry (Caucasian vs. non-Caucasian); homelessness (yes vs. no); relationship status (legally married/common law/partner vs. other); formal employment (yes vs. no); education (≥ high school completion vs. < high school); injection drug use (yes vs. no); heavy alcohol use (≥ 4 drinks/day vs. < 4 drinks/day); comorbidity with severe depression, as measured by the Center for Epidemiologic Studies-Depression score [27], dichotomized at 16 (yes vs. no); participation in a methadone program (yes vs. no); satisfaction with healthcare provider (yes vs. no); and understanding how to take prescribed HIV medication (yes vs. no).	ART was reported hard to take by 28.0% of participants at baseline and 61.7% throughout the study period. Patients ingesting a great daily pill count and experiencing barriers to healthcare were more likely to report difficulty taking ART. Patients less likely to report satisfaction with HIV physician and achieve a non-detectable HIV viral load were more likely to report finding ART hard to take. Their findings highlight health system level barriers that may underlie poor ART adherence and call for targeted solutions within the health sector, especially for HIV-positive PWUDs who typically contend with a variety of individual, social, and structural barriers to achieving optimal adherence. Further, they identified a link between non-male gender and a greater likelihood of finding ART difficult to take. It is possible that their current results might explain, in part, findings from previous analyses linking nonmale gender with poorer antiretroviral medication adherence among PWUD, a finding also demonstrated among other populations living with HIV.	Their findings have relevance to both clinical practice and public policy. Specifically, renewed efforts are underway in many settings to promote HIV testing and scale-up access and adherence to ART in order to reduce individual and community-level HIV VL. Their finding of a link between finding ART difficult to take and VL detectability suggests a potential opportunity to improve rates of VL non-detectability through more tolerable ART formulations, and more welcoming clinical environments for HIV-positive PWUDs, particularly women. Supports previous findings that lower pill burden and once-daily dosing regimens are associated with higher likelihood of achieving optimal ART adherence and better virological suppression among non-drug-using samples of people living with HIV. Stigma and discrimination which can affect relationship with healthcare provider, as well as mistrust, has detrimental impact on satisfaction and treatment outcomes. Health system level barriers may underlie poor adherence in this population (ex. long wait times, aversive experience w/ clinic staff, limited access to care, unstable housing, limited employment opportunities).	This data suggests several opportunities to inform new treatment initiatives to improve HIV- health outcomes for seropositive illicit drug users.

Strengths of study, as reported by authors	Limitations of study, as reported by authors	Gaps identified, as reported by authors	Quality appraisal with QATSDD - Primary reviewer	Quality appraisal - secondary reviewer	QUALITY APPRAISAL CONSENSUS		
None stated	1. limited generalizability due to non-random and non-representative sampling 2. variability in outcome measurement (many studies relied only on self-reported medication-taking behaviors) 3. observational study designs are subject to unmeasured confounding 4. systematic review limitation: potential differences between ART and PrEP adherence: both require taking daily medications, but the motivation for adherence to each medication may differ	Innovative strategies may be needed to support adherence among highly vulnerable and marginalized sub-groups of PWID including younger PWID, women, and people experiencing homelessness and social and structural vulnerabilities	30/42=71.4%	30/42=71.4%	71.4+71.4/2=71.4%		
One of the first to identify key demographic prevalence and correlates of difficulty taking ART among HIV-positive PWUDs, they found several factors implicated in finding ART difficult to take. Taken together, their data suggest several opportunities to inform new treatment initiatives to improve HIV- health outcomes for seropositive illicit drug users.	The self-reported nature of some variables may limit the validity of their conclusions. The recruited cohort is not a random sample, and thus, may not be representative of the whole population of HIV-positive illicit drug users in Vancouver, Canada or elsewhere.	None stated	25/42=59.5%	25/42 = 59.52%	25/42=59.52%		



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2018	Young, S.; Wood, E.; Milloy, M-J.; DeBeck, K.; Dobrer, S.; Nosova, E.; Kerr, T.; Hayashi, K.	Subst. Abus.	Hepatitis C Cascade of Care among People Who Inject Drugs in Vancouver, Canada	Empirical	Cohort - prospective	BC - Vancouver	Community	HCV
2017	Cousien, A.; Leclerc, P.; Morissette, C.; Bruneau, J.; Roy, É.; Tran, V.C.; Yazdanpanah, Y.; Cox, J.	BMC Infectious Diseases	The need for treatment scale-up to impact HCV transmission in people who inject drugs in Montréal, Canada: a modelling study	Empirical	Mathematical modelling	QC - Montreal	Not specified	HCV

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<p>HCV treatment</p>	<p>The cascade of care in Vancouver, Canada to improve HCV treatment access and delivery for PWID 5 steps: 1. chronic HCV 2. linkage to HCV care 3. liver dz assessment 4. initiation of treatment 5. completion of treatment</p>	<p>PWID Participants were eligible for the present study if they completed the baseline interview and at least 1 follow-up visit between December 1, 2005 and May 31, 2015. The sample was further restricted to those who were anti-HCV positive at baseline or became positive during follow-up and completed at least one follow-up visit after anti-HCV seroconversion; reported a history of injection drug use at a visit when their blood sample tested positive for anti-HCV; and did not die during the study period</p>	<p>1571</p>	<p>PWID with chronic HCV</p>	<p>the Vancouver Injection Drug Users Study (VIDUS), the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), and the At-Risk Youth Study (ARYS). VIDUS enrolls HIV-seronegative adults who injected illicit drugs in the month before baseline assessment. ACCESS enrolls HIV-seropositive adults who used an illicit drug other than or in addition to cannabis in the month before the baseline interview. ARYS enrolls street-involved youth aged 14 to 26 who used an illicit drug other than cannabis in the month before the baseline interview. The studies use harmonized data collection and follow-up procedures to allow for combined analyses of the different cohorts.</p>	<p>The purpose of this study is to characterize the HCV cascade of care among PWID in Vancouver, BC, as well as to identify factors associated with undergoing liver disease assessment for HCV treatment in order to improve treatment delivery and decrease transmission of HCV</p>
<p>HCV treatment</p>	<p>Development of a computer based dynamic model to simulate 8 cascade of care scenarios in Montreal for the HCV incidence and prevalence after 10 years and cirrhosis after 10-40 years</p>	<p>Starting populatoin was Montreal's active PWID (injected within last 6 months) approximately 4000 people</p>	<p>4000</p>	<p>All</p>	<p>Eligibility criteria: 14 year of age or older, injecting at least once in last 6 months, speaking French or English</p>	<p>Simulate 8 different scenarios based on time to diagnosis, linkage to care, loss to followup rate, treatment eligibility, treatment rates among eligible PWID and %SVR and evaluate HCV transmission and future cirrhosis</p>

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<p>Factors associated with undergoing liver disease assessment for treatment (i.e., any of bloodwork, ultrasound, Fibroscan® or liver biopsy related to investigation for HCV treatment)</p>	<p>Demographic characteristics (age, gender, and ethnicity), HIV seropositivity, homelessness, employment status, substance use (including alcohol, heroin, cocaine, methamphetamine, crack, benzodiazepines, and methadone maintenance therapy), HCV risk behaviour (syringe lending, unprotected sex, and sex work), hospitalization incarceration, and ever diagnosed mental health disorder(s). Definitions of the variables were consistent with those previously defined in other studies from these cohorts. All variables except for gender, ethnicity and a history of mental health disorder diagnoses referred to the past six months.</p>	<p>Findings show that at least 80% of PWID with chronic HCV were linked to care with a physician and have undergone investigations related to treatment. This likely reflects the improvements in screening and referral for care noted in Canada and other high income settings. Despite improvements in linkages to care and investigations, there remains a large gap in initiation of treatment, with only 10% having started on treatment and less than half of those finishing treatment.</p>	<p>The most common reasons for declining to take treatment (concern over side effects and feeling that symptoms were not severe enough to warrant treatment) are consistent with previous studies. This highlights the potential for interventions to improve awareness of DAA regimens and their side effect profile as well as provide education related to the effects of HCV and potential morbidity if not treated.</p>	<p>Further research is needed to better understand prescriber and patient factors that contribute to low rates of initiation of HCV treatment among PWID.</p>
<p>HCV transmission in the population and chronic HCV complications</p>	<p>None</p>	<p>Modeling demonstrated that Treatment as Prevention (TasP) increase (5%/y, 10%/y to 20%/y) resulted in a drop in HCV prevalence (55.8% to 47.5% and 36.6%) in 10 years and the number of cirrhosis complications decreased by 21% and 37% over 40 yrs using 10%/y and 20%/y.</p>	<p>A larger decrease in the disease burden using TasP first requires greater access to treatment for PWID once they are diagnosed and linked to care. Without this scale up increased testing or linkage to care would be limited benefit. Delaying treatment for fibrosis &gt;F2 would allow for several years of transmission. Improvements in prevention interventions complemented a TasP strategy.</p>	<p>Estimating the impact of preventive public health strategies, in addition to variations in the HCV cascade of care, would require a more complex model including information on injecting drug use initiation, injection equipment distribution, use of opioid substitution therapies/programs, and supervised injection facilities, expected soon in Montréal. Further investigation is needed to incorporate them in the model.</p>

<p>None stated</p>	<p>Firstly, the cohort studies from which the data was derived are comprised of a non-random sample and therefore may not be generalizable to local PWID or in other settings. Secondly, while the initial study sample was derived from an anti-HCV test, the remainder of the data was obtained through self-report. While self-report has been shown to be a valid measure among PWID, data is limited by the participant's knowledge and memory of the investigations and treatment they have undergone or been offered. Without obtaining the confirmatory HCV RNA test, their sample of chronic HCV may be over-estimated as participants may be unaware that they had cleared their HCV or the test may not have ever been done. In Vancouver, it is estimated that nearly 75% of people who are anti-HCV positive go on to have RNA testing. Researchers attempted to at least partly control for this by excluding those participants with mismatched self-reported HCV status and anti-HCV serodetection, thereby excluding those who self-report negative because they are aware that they have cleared the infection yet remain anti-HCV positive. Thirdly, data was not obtained on the degree of fibrosis among those who underwent investigations. Therefore, they are unable to determine what percentage of participants were eligible to receive publicly-funded treatment, which may explain some of the loss of participants moving to the treatment step of the cascade. Finally, there may be unmeasured confounders influencing whether or not participants underwent investigations for HCV treatment although their multivariable model</p>	<p>Despite the improvements in linkage to care and investigations, there remains a large gap in initiation of treatment, with only 10% having started on treatment and less than half of those finishing treatment.</p>	<p>23/42=54.8%</p>	<p>20/42 = 47.62%</p>	<p>22/42=52.38%</p>		
<p>Local data through regional surveillance work was used to ensure current situation of HCV infection and care for PWID in Montreal. The model includes the entire cascade of care for chronic infections.</p>	<p>The network model is static and simple. Other comorbidities such as HIV was not considered. No assumptions of risk-taking behaviour changes with diagnosis of HCV. Cost of DAA (\$5000 canadian over 12 weeks) would increase costs to health care system. Improving testing and linkage to care would be associated with costs.</p>	<p>None stated</p>	<p>37/42=88%</p>	<p>33/42=78.5%</p>	<p>78.5+76.1/2=77.3%</p>		

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2017	Hayashi, K.; Dong, H.; Kerr, T.; Dobrer, S.; Guillemi, S.; Barrios, R.; Montaner, J.S.G.; Wood, E.; Milloy, M.-J.	The Journal of Infectious Diseases	Declining mortality rates in HIV-infected people who inject drugs during a seek - and-treat initiative in Vancouver, Canada, 1996-2014: A prospective cohort study	Empirical	Cohort - prospective	BC - Vancouver	Not specified	HIV, HCV
2017	O'Byrne, P.; MacPherson, P.; Roy, M.; Orser, L.	International Journal of STD & AIDS	Community-based, nurse-led post-exposure prophylaxis: results and implications	Empirical	Cohort - retrospective	ON - Ottawa	Community	HIV

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Seek-and-treat	Seek-and-treat initiatives, but not described what was done	Participants in the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS) cohort of HIV infected people who reported having ever injected drugs	961 participants	PLHIV	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), a prospective cohort of HIV infected people who use illicit drugs in Vancouver, Canada, starting in 1996. Participants recruited through self-referral. Inclusion criteria age 18 or older, residence in greater Vancouver area, HIV seropositive, use of illicit drugs (other than cannabis) in the previous month, and written informed consent.	To identify rates, causes and predictors of mortality among HIV-infected PWID in Vancouver between 1996 and 2014
PEP	STI clinics run by Ottawa Public Health - the Sexual Health Centre and GayZone. Community-based program for delivering post-exposure prophylaxis (PEP) to individuals with significant potential exposures to HIV (based on chance of transmission per contact and probability partner is HIV-positive); trained nurses who were experts in STI care and were authorized to provide PEP - included HIV/STI testing, counselling services, PEP based on US and UK recommendations to give three-drug combinations to all patients	Individuals had to be HIV-negative (at least demonstrated by history and a negative HIV point-of-care test at presentation) and had to have engaged in unprotected vaginal or anal sex (receptor or penetrative), needle-sharing, or other blood-blood contact with a person either (1) known to be HIV-positive, or (2) potentially HIV-positive based on local prevalence data. In Ottawa, this included men who have sex with men and persons who inject drugs.	112	All	Sept 5 2013-Sept 4 2015; 112 participants; Two STI clinics run by Ottawa Public Health (Sexual Health Centre and GayZone); inclusion criteria: individuals had to be HIV-negative (at least as demonstrated by history and a negative HIV point-of-care test at presentation) and had to have engaged in unprotected vaginal or anal sex (receptive or penetrative), needle-sharing, or other blood-blood contact with a person either (1) known to be HIV-positive, or (2) potentially HIV-positive based on local prevalence data. In Ottawa, this included men who have sex with men (MSM) and persons who use injection drugs	Study sought to increase use of HIV PEP by having registered nurses provide these medications, when indicated, in community clinics in Ottawa, Canada. Chart review of patients who accessed services for HIV PEP during Sept 5 2013 and Sept 4 2015. Also, sought to determine the feasibility of initiating PEP in community sexual health clinics.

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<p>Mortality rates through BC Vital Statistics Agency</p>	<p>Underlying causes of death; fixed variables - calendar year of study enrollment, self-reported ethnicity/ancestry, time since first initiation of injection drug use at baseline; time-varying variables - demographic and drug-using variables - age, daily heroin injection, daily cocaine injection, daily methamphetamine injection, daily prescription opioid use, daily crack smoking, any cannabis use, daily alcohol use; social, structural and environmental exposures - unstable housing, engagement in sex work, number of incarceration events, enrollment in opioid agonist therapy (OAT), enrollment in addiction treatment other than OAT; clinical variables - HCV seropositivity, ART access and plasma HIV-1 RNA viral load (VL), years since first record in registry, initiating highly active antiretroviral therapy.</p>	<p>961 participants were followed for a median of 63.8 months. 297 deaths occurred and crude mortality rate was 4.6 deaths/100 person-years. The 3 most common causes of death were identical in both sexes: HIV-related (43.3%), other nonaccidental causes (20.5%), and overdose (19.2%). Liver-related mortality rates were lower in women. All-cause mortality rates per 100 person-years dropped from 6.0 in 1996-2003, 5.3 in 2004-2009, and 3.0 in 2010-2014. Those receiving ART and having undetectable VL (&lt;50 copies/ml) had a 42% lower hazard of all-cause mortality among men and 45% lower hazard among women. Those receiving ART but having detectable VL did not have a significantly lower hazard of death. For women, longer duration of injection drug use predicted mortality. For men, daily prescription opioid use, and white ethnicity/ancestry predicted mortality.</p>	<p>Findings suggest scale-up of "seek-and-treat" HIV treatment interventions served to significantly reduce HIV-related mortality among community-recruited cohort of PWID living with HIV in Vancouver. Helping HIV infected PWID maintain their VL at undetectable levels is important to further reduce mortality. HIV-related mortality declined among both men and women, which is encouraging. Sex-based differences remain in that there were no reductions in overdose or other nonaccidental mortality among women, and men had higher liver-related mortality rates. White ethnicity was an independent predictor of death for men, which is counterintuitive where and when Indigenous population had lower access to ART</p>	<p>Examine potential benefits of expanded access to comprehensive HIV care beyond HIV-related morbidity and mortality and identify the gap in care among PWID living with HIV. Investigate how different patterns of prescription opioid use increase the mortality risk.</p>
<p>The primary outcome measured was initiation of PEP.</p>	<p>Other variables measured included reasons for not initiating PEP, gender, point-of-care testing, and sexual encounters/risk factors for exposure to HIV. Age, STI history, needle sharing, HIV status of partner.</p>	<p>Over the two years of data collection, 112 persons requested HIV post-exposure prophylaxis and 64% (n = 72) initiated these medications. Most (93%, or n = 67, of the 72 initiations) were among men, with 88% (n = 59) of these men reporting same sex sexual partners. Among these 58 men, 31% (n = 18) had sexual contact with other men known to be HIV-positive. Among women (n = 8), five initiated post-exposure prophylaxis: three after needle-sharing contact or sexual contact with a male partner who reportedly shared needles, and two after unprotected vaginal sex with a male partner known to be HIV-positive. Overall, no one was diagnosed with HIV at the four-month HIV testing follow-up, although six persons were diagnosed with HIV from the baseline HIV testing, and an additional four were diagnosed with HIV during routine HIV testing one year after completing post-exposure prophylaxis. In total, nine persons in our sample were thus diagnosed with HIV during the study period, which accounted for 9.4% (n = 10 of 106) of all reported HIV diagnoses in Ottawa during this time.</p> <p>The main reasons for not initiating PEP were as follows: presentation greater than 72h post-exposure (n=7); low-risk contact (n=11); a reactive HIV point-of-care test at presentation (n=4); patients declining PEP after being counselled about testing, follow-up, medication use, duration, and side-effects (n=11); and sexual assault (n=2).</p>	<p>Our project demonstrated the feasibility of a program where PEP can be implemented as part of a program in frontline STI clinics, and highlighted some of its benefits (e.g. the diagnosis of 6 men unaware they were HIV-positive, the possible prevention of an unknown number of infections, and the associated potential health system cost savings). This project also showed the lack of outcomes for STI testing, although we would still advocate for such testing based on findings from previous studies. These findings overall demonstrate the utility of outpatient nurse-led PEP programs across Canada. The four confirmed HIV diagnoses that occurred one year after PEP completion emphasizes the need to do long-term follow-up with patients who use PEP, and highlights the need to consider pre-exposure prophylaxis (PrEP) for patients who qualify for PEP.</p>	<p>Further research on why PEP appealed to persons unaware of being HIV-positive is needed to inform future HIV prevention and testing initiatives.</p>

<p>None stated</p>	<p>ACCESS participants were not randomly recruited, therefore generalizability may be limited. Self-reported data may be affected by reporting biases, however, this data has been used in other cohort studies and found to be valid. The setting is in a no-cost universal medical care system, which may limit generalizability. As an observational study, confounding can be present, even after using multivariable adjustment for key predictors of survival.</p>	<p>High-intensity prescription opioid use predicted mortality in men, indicating a need to address factors shaping harms from prescription opioid use in this population.</p>	<p>25/42 = 59.5%</p>	<p>24/42=57.1%</p>	<p>58.30%</p>		
<p>1) Demonstrated feasibility of operating an outpatient, community-based, nurse-led PEP program and offered full STI testing rather than solely focusing on HIV; 2) positivity rate for HIV testing in project was highest ever noted in a prevention or testing initiative in Ottawa, Canada (pickup rate exceeds that of most targeted testing programs and suggests easy access to PEP in community may facilitate HIV testing/diagnosis/linkage to care); 3) Four confirmed HIV diagnoses that occurred one year after PEP completion emphasized need to do long-term follow-up with patients who use PEP and highlights need to consider PrEP for patients who qualify for PEP; 4) Demonstrated overall health systems savings with this program</p>	<p>None really stated; Discrepancy mentioned: The project showed lack of outcomes for STI testing, but they would still advocate for this based on findings from previous studies.</p>	<p>Removing barriers to PEP, such as cost and improved availability, should be considered important components of HIV prevention and reductions in overall community infection rates.</p>	<p>18/42 = 42.9%</p>	<p>17/42 = 40.5%</p>	<p>18/42 = 42.9%</p>		



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2017	Panagiotoglou, D.; Emanuel, K.; Jeong, M.E.; Olding, M.; Ahamad, K.; Ti, L.; Montaner, J.S.G.; Nosyk, B.	Int J Drug Policy	Initiating HCV Treatment with Direct Acting Agents in Opioid Agonist Treatment: When to start for people co-infected with HIV?	Empirical	Cohort - retrospective	BC	Not specified	HCV, HIV (co-infection)
2017	Socias, M. E.; Ti, L.; Dong, H.; Shoveller, J.; Kerr, T.; Montaner, J.; Milloy, M-J	HIV Medicine	High prevalence of willingness to use direct-acting antiviral-based regimens for hepatitis C virus (HCV) infection among HIV/HCV coinfecting people who use drugs	Empirical	Cohort - retrospective	BC - Vancouver	Community	HCV, HIV (co-infection)

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DAA	Opioid agonist treatment (studying adherence to inform initiation of DAA)	HIV/HCV co-infected PWID in British Columbia, Canada; individuals who sought OAT at any point following HIV diagnosis, determined by dispensation records of OAT (either methadone or medications containing buprenorphine) in the PharmaNet database, from 1 January, 1996 to 31 March, 2014	1427	All	Restricted analysis to individuals who sought OAT at any point following HIV diagnosis, determined by dispensation records of OAT (either methadone or medications containing buprenorphine) in PharmaNet database from Jan 1 1996-Mar 31 2014. Cohort included HIV/HCV co-infected PWID in BC, Canada. This study was based on a provincial-level linkage of seven health administrative databases and disease registries: (1) antiretroviral dispensation, (2) virology and (3) HIV-testing registries (antiretroviral dispensations, plasma viral load (pVL), CD4 <sup>+</sup> cell count tests, nominal HIV diagnoses); and the province's (4) Medical Services Plan (MSP, physician billing records), (5) discharge abstract (hospitalizations), (6) PharmaNet (all non- antiretroviral drug dispensations including OAT), and (7) vital statistics (deaths) databases.	To identify when OAT adherence sufficiently improved to inform DAA initiation in OAT settings, assuming continuous OAT retention for at least 12 weeks is necessary to complete the DAA treatment course.
DAA	Direct-acting antiviral (DAA) therapies (not used as an intervention in this study)	HIV/HCV co-infected PWUD in Vancouver	418	HIV/HCV co-infected	Participants were recruited from ACCESS cohort. Prospective cohort of HIV-positive PWUD. Inclusion: HIV positive, age 18+, live in greater Vancouver, used illicit drugs other than cannabis in past month. For present study, participants were included if: HCV seropositive, completed at least 1 study visit between June 2014 and May 2015. Most recent observation was used if there were multiple for the same person.	To explore willingness to use DAA-based regimens among HIV/HCV co-infection PWUD in Vancouver

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<p>Time-dependent, monthly-updated binary measure of 100% OAT adherence (i.e. no days of OAT missed) for 12 weeks from the most recent month completed within a given episode of OAT per patient. An episode of OAT was defined as a continuous period of dispensed OAT medication with no more than a month gap between treatments. A new episode of treatment indicated re-initiation of OAT following a month or longer interruption of dispensed OAT medication. Each episode was followed for up to 18 months, loss to follow-up, death, or censoring.</p>	<p>The primary independent predictor was the consecutively-numbered month on continuous OAT. Other covariates included patient socio-demographics, OAT factors, HIV progression, and treatment status, and reent pharmaceutical treatment for mental health and pain management.</p> <p>Socio-demographics: Age, sex, MSM status, chronic disease score (medication dispensation records)  Course of OAT: Per treatment episode and updated monthly; assessed previous OAT experience, hospital initiation of OAT, OAT compliance/ taper or titration/ change of provider.  HIV progression and treatment status: time since HIV diagnosis, ART adherence for at least 3 months prior to OAT initiation, and ART therapy type. Most recent CD4 count and viral load within 6 months.  Mental Health: DINs prescribed within a year prior to OAT episode</p>	<p>Within the first episode of OAT, the proportion of individuals retained an additional twelve weeks increased from 20% to 31% between the first and seventh month; while the proportion retained an additional eight weeks increased from 27% to 40% over the same period.</p> <p>Our analyses found that after controlling for patient demographics and health characteristics, individuals retained in OAT for three or more months had higher odds of completing another twelve weeks of OAT; individuals retained in OAT for two or more months had improved odds of completing another eight weeks of OAT; and for PWID on ART the odds of completing another twelve weeks of OAT did not change by month. In this context, concurrent retention in ART and OAT appeared to demonstrate ongoing adherence to medical care that could generalize to other forms of continuous care.</p>	<p>Together with results of other studies, this study suggests HCV treatment can be integrated with OAT, and OAT adherence long enough to support the standard twelve week DAA regimen has improved significantly by the third month on OAT. Further, they help assuage concerns of suboptimal adherence to HCV treatment, treatment failure, and the development of treatment resistance, which have been used in the past to limit access to DAA for PWID.</p>	<p>Further implementation science research for DAA treatment initiation time among PWID on OAT without incurring the costs of treatment or drop out, as given the cost of DAA, there are concerns regarding treatment adherence and subsequent antiviral resistance. As well, further research into when treatment can begin, and research showing OAT environments (useful points of care for initiating multiple therapies).</p>
<p>Willingness to use DAA-based regimens, responding as "yes" to a question on the survey</p>	<p>Willingness to use treatment under the following efficacy scenarios: &lt; 40%, 40-59%, 60-79%, &gt;80%</p>	<p>71% of participants reported willingness to use DAA-based regimens. Increased willingness as hypothetical efficacy scenarios increased (12% in &lt;40% efficacy scenario vs. 45% for &gt;80% efficacy scenario). Engagement in methadone maintenance therapy, recent assessment by HCV specialist and self-perception that HCV was affecting health were independently and positively associated with willingness to use DAA-based regimen.</p>	<p>Urgent need for interventions to ensure equitable access to HCV care for PWUD. This includes HCV education, reduced treatment cost, simplifying care delivery and integration with HIV and addiction services, as well as removal of punitive criminal laws and policies against PWUD. Results support calls to expand and sustain access to opioid agonist treatment as part of broader efforts to address HIV, HCV and substance use disorders.</p>	<p>Need to identify and develop effective pharmacotherapies for stimulant use disorders to improve addiction treatment outcomes which may support HCV care for PWUD.</p>

<p>OAT retention is a strong predictor of long-term ART adherence among PWID (Roux et al., 2009), is associated with HCV treatment initiation (Midgard, Bramness, Skurtveit, Haukeland, &amp; Dalgard, 2016), and has been found to improve adherence in studies conducted during the pegylated interferon era (Dimova, Zeremski, Jacobson, Hagan, &amp; Des Jarlais, 2013).</p>	<p>1) Worked exclusively with data on PWID co-infected with HIV/HSC with at least one spide of OAT treatment in BC. Limited potential generalizability of results to individuals with HIV in OAT. 2) Used OAT adherence with assumption that it was necessary for DAA adherence. Some studies suggest that ongoing injectig drug use is not associated with reduced response, prolonged delay in DAA initiation within OAT settings should be avoided, and although DAA retention and SVR are achievable outside OAT settings, OAT remains an important setting for engaging PWID in HSV care and treatment.</p>	<p>DAA's are increasingly being added to insurance drug formularies internationally, but remain out of reach for most PWID. Similar observational findings of HCV treatment compliance in OAT settings are currently lacking (Taylor, Swan, &amp; Matthews, 2013) and OAT remains highly restricted in many settings.</p>	<p>31/42 = 73.8%</p>	<p>28/42 = 66.7 %</p>	<p>29/42 = 69.0%</p>		
<p>To our knowledge, this is the first study to assess willingness to use DAA-based regimens among HIV/HCV co-infected PWUD, a key population within the HCV epidemic.</p>	<p>Sample not randomly selected, so results may not be generalizable to other populations of HIV/HCV co-infected PWUD. Sub-populations of PWUD may be underrepresented. Cross-sectional nature of study: could not determine temporal and causal relationships between explanatory variables and outcome. Self-reported data (may be subject to social desirability bias and recall bias). Finally, due to the lack of systematic access to HCV RNA and tests for liver fibrosis staging (e.g., transient elastography), we were not able to evaluate the number of participants with chronic HCV or who would be eligible for publicly-funded HCV treatment under current Canadian guidelines</p>	<p>None stated</p>	<p>26/42 = 61.90%</p>	<p>27/42=64.3%</p>	<p>63%</p>		

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2017	Tran, M.; Wood, E.; Kerr, T.; Patterson, S.; Bangsberg, D.; Dong, H.; Guillemi, S.; Montaner, J.S.G.; Milloy, M.-J.	Antivir. Ther.	Increases in CD4 cell count at antiretroviral therapy initiation among HIV-positive illicit drug users during a Treatment-as-Prevention initiative in Canada	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2016	Lazarus, L.; Patel, S.; Shaw, A.; Leblanc, S.; Lalonde, C.; Hladik, M.; Mandryk, K.; Horvath, C.; Petrich, W.; Kendall, C.; Tyndall, M.W.	PLOS One	Uptake of Community-Based Peer Administered HIV Point-of-Care Testing: Findings from the PROUD Study	Empirical	Cohort - prospective	ON - Ottawa	Community	HIV

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TasP	Increases in CD4 cell count at antiretroviral therapy initiation among HIV-positive illicit drug users during a Treatment-as-Prevention initiative in Canada	HIV positive PWUD who initiated ART between January 1, 2005 and June 1, 2013	355	All	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an ongoing prospective cohort of people living with HIV/AIDS who use illicit drugs in Vancouver, Canada. The study aims to measure and analyse the behavioural, social, structural and environmental factors that facilitate or impede access and adherence to HIV treatment and thus effect disease progression and viral transmission among people who use drugs. It has been described in detail previously. Briefly, individuals were eligible for the study if they were HIV-positive, aged ≥ 18 years and had used illicit drugs other than cannabis at least once in the 30 days prior to the baseline interview. Participants were recruited from community settings by word-of-mouth, postering and snowball sampling focused on the Downtown Eastside (DTES) area of Vancouver, Canada. The site of an explosive outbreak of HIV infection among injection drug users and their sexual partners beginning in the mid-1990s (21), the area has high levels of illicit drug use and poverty as well as an active open drug market. The ACCESS study has been reviewed and approved by the University of British Columbia/Providence Healthcare Research Ethics Board. All participants provided written informed consent and were compensated \$30 for each study visit	To characterize CD4 cell count at ART initiation over time and evaluate patterns of subsequent virologic response during a community-wide TasP-based initiative
POCT	community-based peer-administered point of care testing (POCT) program	age 16 years or older, having injected or smoked drugs other than marijuana in the past 12 months, and having lived in Ottawa for at least three months and who did not previously test positive for HIV	593 recruited	PWID not previously tested positive for HIV	Participatory Research in Ottawa: Understanding Drugs (PROUD) Study is a prospective cohort study examining HIV risk among people who use drugs in Ottawa, Ontario The Participatory Research in Ottawa: Understanding Drugs (PROUD) Study is a prospective cohort study examining HIV risk among people who use drugs in Ottawa, Ontario.	To elicit the factors associated with the uptake of community-based HIV POCT and to inform models of peer-administered testing among this population

<p>Observed increasing CD4 cell counts at ART initiation over time. Each year later of ART initiation was associated with an increase in 30 CD4 cells/mL. Higher CD4 cell count at initiation was associated with improved virologic response to treatment.</p>	<p>Age at ART initiation, gender, Caucasian ancestry, Downtown East side of Vancouver dispensation, years since initiation of illicit drug use, and HIV MD experience.</p>	<p>Among the 355 participants, 130 (37%) were non-male and the median age at ART initiation was 41 years. Two hundred people (56%) self-reported Caucasian ancestry. Approximately one-third of the participants received their first ART dispensation at a location in the DTES (106, 30%). The median cell count at CD4 initiation for the entire study period was 220 cells/mL. Of note, between 2005 and 2013, median CD4 cell count increased from 130 (IQR: 60 – 205) to 330 (IQR: 205 – 430) cells/mL (test for trend: <math>p &lt; 0.001</math>). There was a statistically significant upward trend in CD4 cell count at ART initiation from 130 cells/mL in 2005 to 330 cells/mL in 2013, peaking in 2011 with a cell count of 380 cells/mL. increasing year of ART initiation was significantly and positively associated with higher CD4 cell count at baseline (<math>\beta = 31.2</math>, 95% CI: 23.0 – 39.3, <math>p &lt; 0.001</math>). This association was maintained in a multivariable model also adjusted for gender and HIV physician experience. In the adjusted analysis, each later year of ART initiation was associated with a baseline CD4 cell count increase of 29.5 cells/mL (95% CI: 21.0 – 37.9). Initiating ART at CD4 &gt; 350 cells/mL was associated with the swiftest time to a non-detectable VL compared to initiation at lower CD4 strata (i.e., &lt; 200 cells/mL or <math>\geq 200</math> cells/mL and <math>\leq 350</math> cells/mL). Median time to non-detectable VL among all participants was 341 days; among individuals in the highest CD4 strata, median time was 185 days vs. 265 days among individuals in the middle strata. The difference in survival times was statistically significant in a log-rank test (<math>p &lt; 0.001</math>). In the first 12 months following ART initiation, the probability of reaching a non-detectable VL was &gt; 60% in the group with the highest CD4 levels compared to a probability &lt; 30% in the CD4 &lt; 200 cells/mL group. A new multivariable model was fit adding an interaction term between time and VL at ART initiation. In this final model, increased CD4 cell count at ART initiation was associated with shorter time to VL.</p>	<p>Earlier ART uptake among PWUD can be achieved in the setting of a community-wide TasP initiative and results in improved virologic response to treatment. Results support earlier initiation of ART as a part of efforts to improve HIV/AIDS treatment and care within marginalized, drug-using communities.</p>	<p>Additional study is required to understand the possible contribution of different factors to the observed increase, such as improvements in the convenience, tolerability and potency of antiretroviral regimens over time, or the components of the local community-wide TasP campaign, such as changes to clinical HIV/AIDS treatment guidelines and addiction services.</p>
<p>HIV status and agreement to undergo HIV POCT</p>	<p>individual-level variables, including socio-demographic information and drug use patterns; interpersonal variables, including sexual history and connections to community; and structural variables, including access and use of harm reduction services, information on housing and homelessness, experiences with the law, and health status and access to health care, including hepatitis C virus (HCV) and HIV testing and treatment</p>	<p>550 (92.7%) of the 593 participants were offered a POCT, of which 458 (83.3%) consented to testing. Of those participants, 74 (16.2%) had never been tested for HIV.</p>	<p>Our findings support the expansion of novel community-based methods for providing testing, including peer-administered approaches; Low agreement for testing among female participants and those involved in sex work suggest the need for more targeted approaches to reach populations who may face multiple sources of stigma and experience increased barriers to accessing HIV testing and treatment services. More specialized approaches, including female only services, should be explored to better reach these groups; Future community and peer-based approaches should be implemented towards specific at-risk communities, including women and those involved in sex work, who may face challenges in accessing conventional clinic-based HIV-testing and treatment services.</p>	<p>There is a need to develop novel models of community-based testing that draw on the strengths of peer involvement to reach individuals who may not seek testing and treatment in conventional health care settings</p>

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21</p> <p>It is the first study to characterize trends in CD4 cell counts at ART initiation among HIV-positive PWUD during a community-wide TasP initiative. The study offers compelling evidence to suggest that earlier ART uptake among PWUD can be achieved in the setting of a community-wide TasP initiative.</p>	<p>First, as the local setting offers HIV/AIDS treatment and care free-of-charge, including all antiretroviral medications, the researchers were unable to consider the possible role played by financial ability on treatment outcomes, an important consideration in studies of HIV treatment outcomes among members of marginalized and vulnerable communities (. In addition, while efforts were made to recruit participants from community settings and include individuals at all stages of clinical care, they cannot claim that it is fully representative of HIV-positive PWUD in our setting or others.</p>	<p>Researchers were unable to include some time-updated behavioural data, such as drug-using practices, presence of psychologic co-morbidities and incarceration that have been shown to influence ART initiation and subsequent virologic response</p>	<p>35/42=83.3%</p>	<p>29/42 = 69.05%</p>	<p>33/42 = 78.57 %</p>		
<p>22 23 24 25 26 27 28 29 30 31 32 33 34 35</p> <p>We successfully reached participants who had not previously been tested for HIV, thus providing new opportunities for HIV prevention education and counseling. To the best of our knowledge, and with the exception of the integration of peer educators and testers in a pilot project in Vancouver's Downtown Eastside [19], there are no other examples of engaging PWUD as testers in community-based HIV testing</p>	<p>Findings may not be applicable to all populations of PWUD due to purposive sampling; characteristics are based on self-report to highly sensitive questions, which may have contributed to social desirability bias and an underreporting of high-risk practices; those who declined testing did so not because of the absence or presence of characteristics found to be associated with uptake of testing, but because they were aware of their positive status or had very recent testing, which was not fully elicited by our study. It is also possible that characteristics of testers other than peer or student status influenced uptake. For example, peers tended to be older and male, whereas medical students were younger and female; It is possible that our recruited population was already served by other testing and care services, or that HIV rates may be higher among those who did not agree to testing</p>	<p>None stated</p>	<p>33/42 = 78.6%</p>	<p>32/42=76.19%</p>	<p>77.40%</p>		

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2016	Rozada, I.; Coombs, D.; Lima, V.D.	J Theor Biol	Conditions for eradicating hepatitis C in people who inject drugs: A fibrosis aware model of hepatitis C virus transmission	Empirical	Mathematical modelling	BC - Vancouver	Not specified	HCV
2016	Small, W.; Milloy, M.J.; McNeil, R.; Maher, L.; Kerr, T.	AIDS Research and Therapy	Plasma HIV-1 RNA viral load rebound among people who inject drugs receiving antiretroviral therapy (ART) in a Canadian setting: an ethno-epidemiological study	Empirical	Qualitative - ethno-epidemiological study	BC - Vancouver	Community	HIV
2015	Bach, P.; Wood, E.; Dong, H.; Guillemi, S.; Kerr, T.; Montaner, J.; Milloy, M.J.	BMC Infectious Diseases	Association of patterns of methadone use with antiretroviral therapy discontinuation: a prospective cohort study	Empirical	Cohort - prospective	BC - Vancouver (Downtown Eastside)	Multiple - clinic and community	HIV

DAA	DAA	PWID in BC	N/A	All	Model was calibrated with data from PWID cohorts in British Columbia, Canada, where HCV prevalence is around 65%.	To present a mathematical model where transmission of HCV is studied in a simulated population of PWID where fibrosis progression is explicitly tracked. Analyzed the stability properties of the solutions to the model with the goal of understanding the conditions necessary to eradicate the HCV epidemic.
ART	Responses from participant questionnaires receiving ART	PWID who had recently experienced viral rebound	27 (16 male, 11 female)	PWID who had recently experienced viral rebound.	AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS). Participants identified in April 2011. Ongoing community-recruited cohort. Age 18+, history of illicit drug use (other than marijuana). Inclusion: exposed to ART since enrolling in ACCESS, at least 2 consecutive measurements indicating PVL suppression (<50) since 2007, at least 1 subsequent measurement w/ elevated PVL (>1000).	To investigate circumstances surrounding the emergence of plasma viral load (PVL) rebound among PWID in Vancouver, BC.
ART, MMT	MMT and effect on ART discontinuation	HIV-positive PWID	794 HIV-positive PWID	HIV+ PWID	ACCESS - AIDS Care cohort; 18 yrs or older, HIV seropositive, history of illicit drug use. Participants answered interview-questionnaire at baseline and 6 months and provided blood samples for virologic and serologic analyses. Data was also added from local province-wide drug treatment program (DTP) at the British Columbia Centre for Excellence in HIV/AIDS (BC-CfE), a centralized ART dispensary and HIV laboratory for the province of BC. Data include CD4 counts, plasma HIV-1 RNA viral loads and history of exposure to specific antiretroviral agents. The study period is from May 1996 to May 2013. Inclusion exposed to antiretroviral therapy (ART) during follow up with a baseline CD4 count with a viral load measured within 6 months before or after baseline data	To examine the impact of continuous MMT use, non-use and discontinuation on the time to antiretroviral therapy discontinuation (defined as 90 days of continuous non-use following previous enrolment)

<p>1 2 3 4 5 6 7 8 9 10 11 12</p> <p>1) The stability thresholds that determine whether HCV will remain endemic or become eradicated; 2) Conditions on testing and treatment rates for eradication to occur within the context of the new high efficacy therapies.</p>	<p>None</p>	<p>In this paper we presented a deterministic mathematical model of HCV transmission, with fibrosis progression taken into consideration. The model simulates realistic features of the HCV epidemic among PWID, including reinfection, time to diagnosis, and risk reduction after successfully clearing the disease. We described the existence of both disease-free solution and endemic solutions, independent of initial conditions.</p> <p>The results show that HCV eradication in the PWID population of the Vancouver, BC test scenario is achievable, but testing and especially treatment rates will need to increase significantly from current rates.</p>	<p>From a policy perspective, this shows that efforts to reduce the contact rate, e.g. via harm reduction efforts, will have a big effect in pushing the disease into the eradication window. We assumed that infected individuals are most infective during the acute phase, therefore detecting and treating individuals in the acute phase will have a large effect on the epidemic.</p>	<p>None stated</p>
<p>13 14 15 16 17 18 19 20 21 22 23</p> <p>PVL rebound</p>	<p>None</p>	<p>Rebound episodes were shaped by interplay of several factors (individual, social, structural, environmental) within the HIV treatment risk environment. Associated w/ disruption of stable living arrangements and routines (ex. housing transition, managing comorbid conditions (inadequate care and support for mental health and physical conditions), changes in drug use (binge drug use following monthly distribution of social assistance benefits) and drug scene involvement). Intentional treatment discontinuation related to poor relationships with HCPs and misunderstandings about ART.</p>	<p>Interventions to increase housing stability and quality may reduce potential for non-adherence. Efforts to improve continuity of HIV care should focus on ensuring specialist care and appropriate dispensing arrangements after housing transitions. Supportive housing models and housing use harm reduction supports help facilitate adherence. Improving economic opportunities may help reduce drug scene involvement. Need for integrated health services to help manage comorbid conditions and maintain adherence. Potential benefit for peer counselling/support programs. Education about addiction medicine and training to improve patient-provider interactions.</p>	<p>Further research is needed regarding circumstances surrounding rebound</p>
<p>24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>discontinuation of ART, defined as 90 days of continuous ART non-use following previous enrolment in ART</p>	<p>primary explanatory variable was methadone status, and participants at each study visit were categorized either MMT non-users, continuous MMT users taking methadone for at least 6 months or as prior MMT users who had discontinued therapy over the past 6 months. Potential confounders considered were gender, age, ethnicity, homelessness within past 6 months, sex work involvement, at least daily heroin injection, at least daily cocaine injection, at least daily crack cocaine smoking, at least daily alcohol use, a protease inhibitor in initial ART regimen, baseline CD4 count, baseline viral load (VL), and the number of individuals the participant's ART-prescribing physician had experience treating at the time the participant initiated ART</p>	<p>Multivariate analysis showed that both being continuously off MMT (adjusted hazard ratio (AHR) = 1.44, 95% CI: 1.19-1.73) and discontinuing MMT (adjusted hazard ratio (AHR) = 1.82, 95% CI: 1.27-2.60) were each independently associated with an increased risk of discontinuing ART.</p>	<p>Policy not supporting MMT could have significant negative impacts on HIV/AIDS treatment programs</p>	<p>Future qualitative study needed to explore the reasons for discontinuation of ART</p>

<p>None stated</p>	<p>Continuous deterministic models such as this one present a number of caveats: homogeneous mixing across compartments does not account for high and low risk behavior among PWID; residence times across compartments are distributed exponentially, and the continuous nature of the model makes it unsuitable for modeling small populations; added heterogeneity to model by separating major compartments according to fibrosis level; does not account for patients developing resistance to treatments/becoming immune after spontaneously clearing disease/developing super-infections; does not account for other known vectors of HCV transmission such as unsafe therapeutic injections and contaminated blood transfusions.</p>	<p>None stated</p>	<p>36/42 = 85.7%</p>	<p>34/42 = 81 %</p>	<p>35/42 = 83.3%</p>		
<p>Allowed for direct examination of experiences of PWID who recently experienced rebound. first study to use qualitative and ethno-epidemiological methods to examine VLR among PWID. Looked at individual, environmental and societal factors that play a role.</p>	<p>Findings are specific to the experience of the participants, not necessarily other PWID with rebound. Some participants were unable to describe circumstances surrounding rebound; this analysis focused on cases where complete account was available.</p>	<p>None stated</p>	<p>25/42 = 59.52%</p>	<p>26/42=61.9%</p>	<p>60%</p>		
<p>our data provide support to the positive effects of MMT on optimizing HIV/AIDS treatment outcomes, and provide evidence suggesting that MMT discontinuation is independently associated with ART discontinuation</p>	<p>generalizability to other studies not certain; self-reporting and possibility of response bias; reasons for ART discontinuation not available; exclusion of diagnostic screening for opioid dependence may lead to misclassification bias; observational cohort study; representative to local population; data on reasons for discontinuation not available; does not include diagnostic screening for opioid dependence; relationship between MMT and ART discontinuation is not a causal one</p>	<p>None stated</p>	<p>26/42=61.9%</p>	<p>27/42=64.2%</p>	<p>61.9+64.2/2=63%</p>		

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2015	Joseph, B.; Kerr, T.; Puskas, C.M.; Montaner, J.; Wood, E.; Milloy, M.-J.	HHS Public Access	Factors linked to transitions in adherence to antiretroviral therapy among HIV-infected illicit drug users in a Canadian setting	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2015	Lima, V.D.; Rozada, I.; Grebely, J.; Lounco, L.; Nosyk, B.; Kraiden, M.; Yoshida, E.; Wood, E.; Montaner, J.S.G.	PLOS One	Are Interferon-Free Direct-Acting Antivirals for the Treatment of HCV Enough to Control the Epidemic among People Who Inject Drugs?	Empirical	Mathematical modelling	BC - Vancouver	None stated	HCV

For peer review only

ART	Adherence to prescribed ART among PWUD	HIV infected PWUD	703	HIV+	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an ongoing prospective observational cohort of illicit drug users living with HIV/AIDS in Vancouver, British Columbia (BC), Canada. Described in detail elsewhere (Milloy et al., 2011; Strathdee et al., 1998), recruitment for the cohort began in May, 1996, and focused on the city's Downtown Eastside neighbourhood, a post-industrial area with an open drug market and high levels of illicit drug use, poverty, and HIV infection (Strathdee et al., 1997; Tyndall et al., 2003). Eligibility criteria for participation in ACCESS are HIV-serostatus, aged ≥ 18 years, use of illicit drugs other than cannabis in the previous month, and written informed consent. At the baseline interview, and each biannual interview thereafter, participants respond to an interviewer-administered questionnaire, are examined by a study nurse, and provide blood for serologic analyses. At recruitment, participants provide their personal health number (PHN), a unique and persistent identifier issued for billing and tracking purposes to all residents of BC by the government-run universal and no-cost medical system.	To identify the behavioural, social, and structural factors associated with losing or attaining ≥95% adherence to prescribed ART among PWUD
DAA	IFN free DAA, HCV testing, engagement in harm reduction	N/A	N/A	All	N/A	To evaluate the impact of increasing HCV testing, treatment and engagement in harm reduction activities for PWID on the HCV epidemic in BC, to provide theoretical support for the implementation of these strategies

<p>Transitions in adherence to ART. Transitions were dichotomized as either out of optimal adherence or into optimal adherence.</p>	<p>age (per year older), gender (female vs. male), self-reported Caucasian ethnicity (yes vs. no), level of education attained (<math>\geq</math> high school diploma vs. &lt; high school diploma), homelessness (yes vs. no), employment (formal employment including regular, temporary, or self-employment vs. none or non-formal employment), injection drug use (yes vs. no), non-injection drug use (yes vs. no), self-reported binge drug use (runs or binges in which participant reported using more drugs than usual; yes vs. no), involvement in sex work (yes vs. no), incarceration (yes vs. no), and engagement in methadone maintenance therapy (MMT; yes vs. no). Clinical variables considered were CD4+ cell count (per 100 cells/mL) and physician HIV-related experience (&lt; 6 vs. <math>\geq</math> 6 patients previously enrolled in the province-wide HIV registry).</p>	<p>In this longitudinal study of factors associated with transitioning into or out of optimal adherence to ART among PLWH who use illicit drugs, we observed a high level of non-adherence, with over 70% of individuals exhibiting non-adherence at baseline. sex work was a barrier to becoming optimally adherent while homelessness and incarceration were both risk factors for becoming non-adherent. Engagement in MMT was predictive of optimal adherence at baseline and was the sole protective factor against becoming non-adherent as well as the sole facilitating factor for becoming optimally adherent in multivariate models. [becoming non-adherent was associated with periods of homelessness (Adjusted Odds Ratio [AOR] = 2.52, 95% Confidence Interval [95% CI]: 1.56 - 4.07), active injection drug use (AOR = 1.25, 95% CI: 1.01 - 1.56) and incarceration (AOR = 1.54, 95% CI: 1.10 - 2.17). Periods of sex work (AOR = 0.51, 95% CI: 0.34 - 0.75) and injection drug use (AOR = 0.62, 95% CI: 0.50 - 0.77) were barriers to becoming optimally adherent. Methadone maintenance therapy (MMT) was associated with becoming optimally adherent (AOR = 1.87, 95% CI: 1.50 - 2.33) and was protective against becoming non-adherent (AOR = 0.52, 95% CI: 0.41 - 0.65)]</p>	<p>Our findings emphasize the importance of considering social and structural determinants of ART adherence dynamics and highlight the role of MMT in the protection and maintenance of optimal adherence to ART among opioid-dependent PWUD. Our analyses show that homeless individuals are at risk of becoming non-adherent, emphasizing an already established need for housing interventions.</p>	<p>Given the high levels of non-adherence among PWUD, more research is urgently needed to better understand ART adherence dynamics, to investigate possible protective factors among non-opiate using PWUD, and to develop effective strategies against threats to optimal ART adherence.</p>
<p>(1) HCV incidence rates—obtained by dividing the estimated number of new HCV cases by the estimated size of the susceptible PWID population in a given calendar year; (2) all-cause mortality rates—obtained by dividing the estimated number of deaths by estimates of the size of the infected PWID population in a given calendar year; and (3) HCV prevalence—obtained by dividing the estimated number of individuals living with HCV by the estimated size of the PWID population in a given calendar year. Control Reproduction Number (Rc)</p>	<p>Calculated the effect of the four HCV antiviral regimen scenarios on the Control Reproduction Number for a wide range of treatment and testing rates</p>	<p>Of all HCV antiviral regimens, only IFN-free DAAs offered a high chance of disease elimination (i.e. <math>R_c &lt; 1</math>), but it would be necessary to substantially increase the current low testing and treatment rates. Assuming a treatment rate of 80 per 1000 infected PWID per year, coupled with a high testing rate, the incidence rate, at the end of 2030, could decrease from 92.9 per 1000 susceptible PWID per year (Status Quo) to 65.5 (by treating any fibrosis level, If PWID also had access to increased harm-reduction activities, the incidence rate further decreased to 53.1 per 1000 susceptible PWID per year.</p>	<p>Should increase access to HCV treatment (IFN free DAAs) and harm reduction; need an optimized implementation strategy, which particularly emphasizes the need to reach, support, treat and protect these individuals; identify and test individuals unaware that they are HCV-positive using aggressive "seek" campaigns; testing should use HCV RNA rather than HCV antibody; should use cheaper, safer, less-invasive tech for determination of liver fibrosis; should implement directly observed HCV therapy (consistent with approach to treat opioid dependence)</p>	<p>Extend the present model to specifically investigate the impact of the proposed interventions on the HIV/HCV co-infected PWID population; assess feasibility of interventions using cohort studies on PWID in Vancouver; plan to fine-tune this model, specifically focusing on the effect of treatment on the distribution of fibrosis states in a population</p>

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</p> <p>Within the context of BC's free healthcare and universal access to ART, confounding due to financial barriers to healthcare access has been reduced. The use of repeated measures every six months has allowed them to isolate periods characterized by loss or gain of <math>\geq 95\%</math> adherence.</p>	<p>First, their analytic sample cannot be seen as representative of all PLWH who use illicit drugs due to non-random participant recruitment and the free availability of ART in their setting. Secondly, the possibility of confounding variable influence cannot be excluded. Third, several explanatory variables such as injection drug use, sex work involvement, and incarceration were derived from participant self-report, which might be susceptible to bias. Lastly, the MMT explanatory variable refers to a maintenance therapy undertaken to treat opioid dependence specifically, and may therefore be biased towards opioid users within the study group. Participants were not screened for opioid or stimulant dependence.</p>	<p>None stated</p>	<p>35/42=83.33%</p>	<p>30/42 =73.8%</p>	<p>35+30/2=77.4%</p>		
<p>19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>included movement across different fibrosis states in this population to inform treatment eligibility and success;this model provides an independent validation of the results in Martin et al. supporting the notion that HCV treatment can be used to reduce the HCV incidence, prevalence and mortality among PWID</p>	<p>assumed a homogenous mixing in the PWID population, thus simplifying the complexities that exist in the sharing networks of these individuals; no definite evidence on what the associated transmission probabilities for HCV infections phases are; did not model the impact of the proposed interventions comparing the HCV mono-infected population and the individuals co-infected with HCV and HIV; the mortality rates associated with liver disease, among PWID infected with HCV in BC, were high</p>	<p>None stated</p>	<p>28/42 = 66.7%</p>	<p>31/42 = 73.8%</p>	<p>29/42 = 69.0%</p>		



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2015	Nosyk, B.; Min, J.E.; Evans, E.; Li, L.; Liu, L.; Lima, V.D.; Wood, E.; Montaner, J.S.G.	HIV/AIDS	The effects of opioid substitution treatment and highly active antiretroviral therapy on the cause-specific risk of mortality among HIV-positive people who inject drugs	Empirical	Cohort - retrospective (linked population-level database)	BC - Vancouver	Not specified	HIV
2014	Reddon, H.; Milloy, M.J.; Simo, A.; Montaner, J.; Wood, E.; Kerr, T.	AIDS Behav	Methadone Maintenance Therapy Decreases the Rate of Antiretroviral Therapy Discontinuation Among HIV-Positive Illicit Drug Users	Empirical	Cohort - prospective	BC - Vancouver	Community - Participants can fill their prescription at any pharmacy in the province	HIV

1 2 3 4 5 6 7 8 9 10 11 12	HAART, OST	Opioid substitution treatment (OST) and highly active antiretroviral therapy (HAART)	HIV+ individuals with history of either OST at initial HAART receipt (indicated by methadone or buprenorphine dispensation records) or having indication of IVDU before HIV infection (indicated by HIV testing database)	1727	HIV+ PWID	7 health administrative databases and disease registries in BC linkage; data included ART dispensation, virology and HIV testing registries, physician billing records, hospitalizations, and non-ART drug dispensations in BC PharmaNet database and BC Vital statistics database; BC PharmaNet database from Jan 1 1996 to March 31 2010; 1727 HIV-positive PWID identified; Excludes HIV-positive PWID who accessed OST but did not access HAART throughout follow-up, as well as excludes pre-HAART periods when individuals may have accessed OST	To determine the independent and joint effects of OST and HAART on mortality, by cause, within a population of HIV-positive PWID following HAART initiation.
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	ART, MMT	Antiretroviral therapy, Methadone maintenance therapy	ACCESS Cohort; aged >= 18 years, are HIV seropositive, have a history of illicit drug use and provide written consent	408	PWID who are HIV+ and ART-exposed at baseline or initiated treatment during follow-up, also had to be on MMT at baseline or opioid-using at baseline or during follow-up	ACCESS cohort; open-prospective cohort of HIV-seropositive illicit drug users in Vancouver, Canada; populated through snowball sampling and extensive street outreach methods in city's Downtown Eastside; eligibility criteria: aged >= 18 years, are HIV seropositive, have a history of illicit drug use and provide written consent; between May 1996 and April 2008	To evaluate the impact of MMT use on ART discontinuation among a cohort of HIV-positive drug users in a setting of universal access to HIV care and treatment

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<p>Dependent variable was mortality, stratified by cause as follows: drug-related, HIV-related, and other cause of death; key-time variable exposures included OST receipt and HAART receipt</p>	<p>Other baseline covariates: age, gender, aboriginal ethnicity, health authority of residence, CD4+ cell count, calendar year of HAART initiation, time from HIV diagnosis and AIDS status; other considerations: Charlson comorbidity index score and OST history at time of HAART initiation, time-varying measures of CD4+ cell count, HA, AIDS status and CCI score</p>	<p>Both forms of treatment were strongly negatively associated with all-cause mortality and HIV-related mortality. However, HART had a stronger independent association with drug-related death, while OST better protected against causes of death other than HIV and drugs. An alternate set of analyses found that the risk of death was lowest when individuals were engaged in both forms of treatment, but had slightly lower hazard of death when only receiving OST compared with only HAART. A novel finding to emerge from our analyses is the relatively stronger association of OST on HIV-related death compared with drug-related death and the generally stronger independent effect compared with HAART. There are both biological and methodological factors that require careful consideration in interpreting these findings.</p>	<p>These findings call for renewed efforts to engage HIV-positive PWID into life-saving OST. Health systems should strive toward integrating the delivery of these medications where possible in order to optimize the individual and public health benefits of these treatments.</p>	<p>OST dosing dynamics may have influenced findings. While dosing information was available, it could not be adequately incorporated into the episode or monthly counting processes within the PH and marginal structural modeling frameworks the study implemented to clearly define its effect; this remains a topic for future study.</p>
<p>Discontinuation of ART defined as a &gt;=90 day period without receiving any antiretrovirals, primary independent variable of interest was MMT in the past 6 months (based on self-reporting)</p>	<p>Secondary explanatory variables that may be related to methadone engagement or antiretroviral treatment patterns: age (per year older); gender (female vs. male); Aboriginal ancestry (yes vs. no); engagement in MMT (yes vs. no); homelessness (yes vs. no); binge drug use (yes vs. no); sex work involvement (yes vs. no); at least daily heroin injection (yes vs. less) and at least daily cocaine injection (yes vs. less)</p> <p>We also considered the following clinical variables: baseline CD4 cell count (cells/<math>\mu</math>L, per 100-cell increase), baseline plasma HIV-1 RNA (log<sub>10</sub>/<math>\mu</math>L, per log<sub>10</sub> increase), date of initiating MMT (per years later) and physician experience</p>	<p>1. By 24 months after ART initiation, the cumulative incidence rate of ART discontinuation was 42.62 per 100 person-years (95 % CI 33.10–52.14) among those engaged in MMT and 71.42 per 100 person-years (95 % CI 59.42–83.43) for those not engaged in MMT</p> <p>2. Additionally, the proportion of participants on MMT to never discontinue their ART was 53 % compared to 67 % among those not on MMT</p> <p>3. Homelessness, sex work involvement, daily cocaine injection, and a higher viral load were associated with shorter time to ART discontinuation</p> <p>4. Participation in MMT, date of therapy initiation, and age were negatively associated with ART discontinuation</p> <p>We observed a high rate of ART discontinuation among HIV-positive drug users. However, participants engaged in MMT had significantly lower rates of ART discontinuation compared to those not engaged in MMT. MMT enrollment remained independently and negatively associated with treatment discontinuation in multivariate analyses that adjusted for a range of potential confounders. These findings translated into higher rates of plasma HIV RNA undetectability among those patients prescribed MMT</p> <p>First, being enrolled in MMT allows more regular contact with the health care system and related programs including the co-administration of ARVs with daily dispensed MMT [33]. Second, the stabilizing effect of MMT may facilitate supportive counseling and other interventions to address barriers to adherence, such as co-occurring mental illness and other psychosocial concerns [34]. Third, enrollment in MMT may provide opportunities for</p>	<p>Given that MMT may provide a means of enhancing uptake and adherence to ART while reducing rates of discontinuation, concurrent delivery of MMT and antiretrovirals should be an essential component of prospective treatment interventions to optimize health outcomes among drug users who are eligible for this therapy. Given the relationship between MMT and higher rates of plasma HIV RNA undetectability, these findings have implications for the recently identified role of ART as a HIV prevention strategy</p> <p>Given the success of MMT as a treatment for opioid dependence, and its role in improving adherence to ART, the search for effective addiction treatments for stimulant users is an urgent priority, as is removing other barriers to optimal HIV treatment outcomes</p>	<p>None stated</p>

<p>Results were robust to multiple modeling techniques and model formulations, thus providing strong evidence supporting the key findings.</p>	<p>Selectivity of study population and time frame should be taken into account when interpreting results and determining to what extent they apply to other settings; potential for unmeasured confoundings factors, as in any study; some individuals included in study on basis of injection drug use history may have been exclusive non-opioid injectors, though unlikely based on epidemiological studies on PWID in BC; analyses on cause-specific mortality may have been subject to degree of outcome misclassification. While dosing information was available, it could not be adequately incorporated into the episode or monthly counting processes within the PH and marginal structural modeling frameworks the study implemented to clearly define its effect.</p>	<p>This setting has universally covered HIV-related medical care and widely available office-based OST. Must consider applicability to other settings based on cohort included in this study and availabilities of this setting.</p>	<p>31/42 = 73.8%</p>	<p>26/42 = 61.9%</p>	<p>29/42 = 69.0%</p>		
<p>Prior investigations have indicated the relationship to be causal as well. Although MMT has previously been shown to enhance access and adherence to ART, to our knowledge this is the first study to report a positive effect of MMT in preventing ART discontinuation and subsequent plasma HIV RNA responses.</p>	<ol style="list-style-type: none"> <li>1. ACCESS is not a random sample - may not generalize well to larger population of HIV-positive drug users in Vancouver</li> <li>2. Relied on self-reported measures - response biases (e.g. socially desirable reporting)</li> <li>3. ART was co-administered with MMT in some cases while other patients received each medication from separate facilities; it is possible that the co-administration of these treatments could impact ART discontinuation and confound the results</li> <li>4. Data regarding length of enrolment in MMT was not available but this did not prevent us from assessing the impact of current MMT enrolment on ART discontinuation, which was the primary objective of the analysis</li> <li>5. Observational study - results must be interpreted with caution; e.g. negative association between MMT and ART discontinuation may have resulted from unmeasured differences between those who used MMT and those who did not</li> </ol>	<p>None stated</p>	<p>30/42 = 71.4%</p>	<p>30/42 = 71.4 %</p>	<p>30/42 = 71.4%</p>		

1	2013	Webb, D.; Milloy, M.-J.; Kerr, T.; Zhang, R.; Montaner, J.; Wood, E.	AIDS Behav.	Injection Drug Use and HIV Antiretroviral Therapy Discontinuation in a Canadian Setting	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
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16	2011	Cox, J.; Graves, L.; Marks, E.; Tremblay, C.; Stephenson, R.; Lambert-Lanning, A.; Steben, M.	Journal of Viral Hepatitis	Knowledge, attitudes and behaviours associated with the provision of hepatitis C care by Canadian family physicians	Empirical	Survey	QC - Montreal	Not specified	HCV
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22	2011	Kuyper, L.; Milloy, M.-J.; Marshall, B.D.L.; Zhang, R.; Kerr, T.; Montaner, J.S.G.; Wood, E.	Addict Behav.	Does Initiation of HIV Antiretroviral Therapy Influence Patterns of Syringe Lending Among Injection Drug Users?	Empirical	Cohort - retrospective	BC - Vancouver	Community- ART dispensation program; BC has a province-wide centralized ART dispensation program and laboratory for HIV/AIDS clinical monitoring	HIV
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31	2011	Myles, A.; Mugford, G.J.; Zhao, J.; Krahn, M.; Wang, P.P.	Can. J. Gastroenterol.	Physicians' attitudes and practice toward treating injection drug users infected with hepatitis C virus: Results from a national specialist survey in Canada	Empirical	Survey	Canada	Not specified- Survey sent to ID specialists, gastroenterologists, and hepatologists,	HCV
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16 17 18 19 20 21	HCV treatment	Sept 2004 and Jan 2005 Self administered survey to Canadian Family Physicians (with a bias to french speaking physicians) on behaviour change related to practice guideline adoption to systematically examine the HCV-related care behaviours	Canadian Family physicians	n=2366 with 786 completed questionnaires and 749 indicating the types of HCV care they provide	All	N/A	Sept 2004 and Jan 2005 Self administered survey to Canadian Family Physicians (with a bias to french speaking physicians) on behaviour change related to practice guideline adoption to systematically examine the HCV-related care behaviours
22 23 24 25 26 27 28 29 30	ART	ART	ART-naïve at baseline and had measurements of HIV-1 RNA levels and CD4+ cell counts within 12 months of the baseline interview.	380 participants included in analysis	HIV+; ART-naive	AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS)-18 years of age or older, HIV-positive, had injected drugs during the previous month, and provided written informed consent	Identify whether ART initiation was associated with increased syringe lending among HIV-positive IDU
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	HCV treatment	HCV treatment	Medical specialists who were most likely to provide care to patients with HCV infection (specialists of ID, gastroenterology and hepatology)	222 completed the survey, of the 528 eligible physicians	HCV+	N/A	To examine the characteristics of Canadian specialist physicians and their likelihood to provide treatment to HCV patients who are IDUs. To describe the clinical practice patterns in treating HCV-infected IDUs and to examine the factors that influence a specialist's likelihood to provide treatment to HCV-infected IDUs

<p>Outcome of interest was ART discontinuation. Defined based on pharmacy dispensation records indicating that a participant did not pick up any ART for 90 days or longer after the end of the prescription refill date.</p>	<p>Potential sociodemographic and drug-related predictors of ART discontinuation that we included in this model were: age, gender, Aboriginal ancestry (yes vs. other), area of residence (defined as residing in Vancouver's downtown eastside, the local epicenter of the drug-related HIV outbreak vs. other areas), enrolment in addiction treatment, public drug use, and binge drug use.</p>	<p>Pharmacy records indicate that almost 2/3 of a cohort of HIV-positive illicit drug users had at least 1 ART discontinuation episode. Rates of ART discontinuation were not significantly elevated among those who reported ongoing injection of heroin, cocaine or other illicit drugs in comparison to those who reported not injecting drugs. However, public drug use was significantly predictive of ART discontinuation. Observed an independent association between public drug use and ART discontinuation.</p>	<p>Clinicians should not make decisions on whether to initiate eligible HIV-positive individuals in ART based solely on abstinence from drug injecting. Decisions to enroll eligible individuals on ART should be done on a case by case basis. In all cases, however, care should be taken to ensure high levels of ART regimen adherence among individuals that may be at particularly high risk of non-compliance. Injecting in public was the only significant drug-related predictor of ART discontinuation in this multivariate analysis. Likely reflects risky nature of public drug use and reaffirms need for structural interventions to address the health needs of this vulnerable population. Findings from this study may contribute to a reconsideration of the role of active drug use in clinical decision-making surrounding ART initiation.</p>	<p>Their results need to be confirmed through further research</p>
<p>The provision of HCV care by family physicians</p>	<p>Sociodemographic and descriptive variables (physician training and practice settings); Outcome and explanatory variables (provision of HCV care, barriers and facilitators); Physician Knowledge related to HCV care; Physician attitude related to HCV care</p>	<p>Only 44% family physicians provided basic/advance HCV care with 63% felt HCV care was not part of family practice; majority of physicians providing care were in rural areas that provided follow-up care; felt limited access to HCV evaluation and treatment supports; women physicians are less likely to provide care; one or more IDU in their practice more likely to provide HCV care and was not associated with attitudes regarding IDUs.</p>	<p>Various care related knowledge attitudes and barriers can serve as strategic opportunities for increasing provision of HCV care by family physicians</p>	<p>Training and CME directed on promoting primary care role in HCV can increase management and access to treatments</p>
<p>lending a used syringe to someone else during the previous six months (i.e. association between ART initiation and syringe lending)</p>	<p>Explanatory variables included: age; gender; ethnicity (Aboriginal vs. non-Aboriginal); homelessness (yes vs. no); frequent heroin injection (<math>\geq</math> daily vs. &lt; daily); frequent cocaine injection (<math>\geq</math> daily vs. &lt; daily); methadone maintenance therapy (yes vs. no); CD4+ count (per 100 cells/mL increase); and HIV-1 RNA plasma viral load (per log<sub>10</sub> increase)</p>	<p>No evidence of increased syringe lending behavior following ART initiation among HIV-positive IDU. In comparison to those who did not initiate ART, those who initiated treatment were more likely to have lower baseline CD4+ cell counts and higher baseline HIV-1 RNA viral loads.</p>	<p>Scale up of ART delivery to IDU to meet the needs of this marginalized and underserved population</p>	<p>None stated</p>
<p>Attitudes towards HCV treatment of IDUs</p>	<p>Physicians' practice region (Atlantic, central, prairies or western Canada), physician type (hepatologist, GI or ID), age, sex, years in practice, size of community where they practice and practice type (eg, solo practice, multiple specialty group, academic and other)</p>	<p>Only 19 (19.79%) comprehensive service providers were likely to provide treatment to a current IDU who uses a needle exchange on a regular basis. The majority of comprehensive service providers (n=86 [89.58%]) were likely to provide treatment to a former IDU who was stable on substitution therapy. On bivariate analysis, factors associated with the likelihood to provide treatment to current IDUs included physicians' type, ie, infectious disease specialists compared with noninfectious specialists and the size of the community where they practice. However, specialists preferred that patients were stable on substitution therapy for at least 6 months prior to provided treatment. IDs reported greater likelihood to provide treatment to current IDUs.</p>	<p>Need to focus on complicated environment-, patient-, disease- and physician-related factors if we intend to improve access of health care to IDUs infected with HCV; Assess each HCV-infected substance abuser individually because they differ considerably from one another; necessary to track change of physicians' attitudes and practice over time; adjust provision of care to take into account the sub-culture of IDUs to more effectively deliver treatment to HCV-infected IDUs</p>	<p>Need for future research and delivery of services that address the complexity of care and treatment for people in marginalized social circumstances.; future studies need to evaluate the entire comprehensive care system that provides treatment to people living with HCV; examine the effectiveness of an integrated multidisciplinary HCV clinic and how it affects treatment uptake in the HCV-infected IDU population.</p>

<p>Findings are consistent with a previous meta-analysis that found no significant differences in the development of ART-resistant HIV among individuals with and without a history of injection drug use</p>	<p>First, cohort participants were not randomly recruited and therefore the results presented may not be representative of the broader population of HIV-positive IDU in Vancouver. Second, while participant reports of discontinuation of ART and clinical status were confirmed through a data linkage with a local HIV treatment registry, researchers relied on self-report for the behavioral and drug-related variables included in their analyses. Given that drug use and related behaviors are highly stigmatized, these activities may have been underreported by participants. Despite this potential for bias, they know of no reason why cohort participants who did and did not discontinue ART would differentially report on their drug use. Finally, there may be unmeasured variables that are important for determining ART discontinuation, including measures of mental illness, which were not routinely evaluated as part of this study.</p>	<p>None stated</p>	<p>20/42=47.6%</p>	<p>23/42 = 54.76%</p>	<p>22/42=52.4%</p>		
<p>None stated</p>	<p>Cross-sectional nature prevents the ability to ascribe directionality to identify associations; no significant difference from nonrespondents except for language, likely due to intentional french oversampling, cannot rule out selection bias; missing data was substituted with low/minimal level responses decreasing estimates of physician knowledge. Bias towards french speaking physicians potentially skewed results.</p>	<p>None stated</p>	<p>29/42=69%</p>	<p>33/42=78.5%</p>	<p>69.0+71.4/2=70.2%</p>		
<p>evaluated ART receipt in multivariate analyses; examined behaviors related specifically to the period following ART initiation using prospective analyses; used a centralized database to confirm the exact date of ART initiation, a relatively long follow-up duration, and an analytic technique allowing for within-individual changes in behavior prior to and following ART initiation</p>	<p>Syringe lending was self-reported, possibility of under reporting (social desirability); cannot be certain that the cohort represents IDU in the community in general; did not account for the possibility of cessation of injection drug use as a potential contributor to decreased syringe lending; findings may have been confounded by the possibility that IDU initiating ART are less likely to engage in risk behavior because of sterile syringes provided by primary care physicians</p>	<p>Few studies have reported on HIV-related risk behaviors among IDU receiving ART</p>	<p>26/42 = 61.9%</p>	<p>26/42 = 61.9%</p>	<p>26/42 = 61.9%</p>		
<p>None stated</p>	<p>Participation was voluntary and there may be bias associated with this approach; lower response rate than desired (difficulties with recruitment); there was no reason to suspect that physicians treating HCV patients were less likely than those who were not to respond to this survey, not sufficient info to estimate biases assoc with nonparticipation; only selected practitioners who were representative of the English-speaking specialists rather than all HCV-related health care providers; only 96 specialists stated that they had a role in providing treatment; therefore, the sample size was relatively small; the data obtained from the surveys were self-reported and comprises the respondents' estimates of the HCV-management conditions in their practice and their own behaviours, which were possibly inaccurate; study results cannot be interpreted as a measure of physicians' adherence to the current guideline.</p>	<p>Lack of comprehensive strategies to treat HCV in IDUs</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>		



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2011	Palepu, A.; Milloy, M.-J.; Kerr, T.; Zhang, R.; Wood, E.	Journal of Urban Health	Homelessness and adherence to antiretroviral therapy among a cohort of HIV-infected injection drug users	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2010	Kazatchkine, C.	HIV/AIDS Policy and Law Review	British Columbia project seeks to improve access to HIV treatment and care among hard-to-reach populations	Non-empirical	Report	BC - Prince George and Vancouver (Downtown Eastside)	Community	HIV

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ART	ART	Aged 18 years or older, HIV-infected, having used illicit drugs other than cannabinoids in the previous month. HIV-infected injection drug users in Vancouver	545 HIV-infected illicit drug users	HIV+ IDUs	<p>AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS), an ongoing prospective observational cohort of HIV-infected illicit drug users in Vancouver, Canada.</p> <p>In brief, beginning in May 1996, participants were recruited through snowball sampling and extensive street outreach in the city's Downtown Eastside neighborhood, the local epicenter of drug-related HIV transmission.</p> <p>ACCESS eligibility criteria include: aged 18 years or older, HIV-infected, having used illicit drugs other than cannabinoids in the previous month, and having provided written informed consent.</p> <p>At baseline and every 6-month follow-up interview, participants answer a standardized interviewer-administered questionnaire, are examined by a study nurse and provide blood samples for serologic analysis. The information on sociodemographic, drug uses and other behavioral characteristics gathered at each interview is augmented with data on HIV care and treatment outcomes from the British Columbia Centre for Excellence in HIV/AIDS Drug Treatment Programme. This province-wide, centralized antiretroviral therapy dispensary and HIV/AIDS monitoring lab provides a complete prospective profile of CD4 cell counts, plasma HIV-1 RNA viral load, and dispensation of specific antiretroviral agents for each</p>	to determine the longitudinal impact of homelessness on adherence to ART using data derived from longstanding community-based cohort of HIV-infected IDU with detailed data on housing status and drug use behaviours
Seek and Treat	"Seek and Treat," the first program of its kind in Canada and thought to be the first internationally, will provide Highly Active Antiretroviral Therapy (HAART). Under the pilot program, health workers will be deployed on the streets of marginalized communities in order to diagnose, support and provide treatment to those who are medically eligible.	HIV-positive residents, especially those who are hard to reach, including PWID	N/A	HIV+	N/A	To provide update on recent legislation and policy

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<p>adherence to antiretroviral therapy (defined as adherence &gt;= 95% adherence to ART during 6-month period)</p>	<p>variables measured: age, gender, Aboriginal ancestry, education, employment, injection use of cocaine, heroin, methamphetamine, use of methadone maintenance therapy, CD4+ cell count, HIV-1 RNA plasma viral load</p> <p>Legal employment referred to having salaried or temporary work at any time in the previous 6 months.</p>	<p>The multivariate model showed that homelessness (adjusted odds ratio [AOR] 0.66; 95% CI: 0.53–0.84) and frequent heroin use (AOR 0.40; 95% CI: 0.30–0.53) were significantly and negatively associated with ART adherence adjusting for baseline CD4 count and baseline plasma viral load. Methadone maintenance therapy was positively associated with ART adherence (AOR 2.33; 95% CI: 1.86–2.92). There were no significant interactions.</p> <p>The multivariate model revealed that homelessness (adjusted odds ratio [AOR] 0.66; 95% CI: 0.53–0.84) and frequent heroin use (AOR 0.40; 95% CI: 0.30–0.53) were significantly and negatively associated with ART adherence, whereas methadone maintenance was positively associated (AOR 2.33; 95% CI: 1.86–2.92). Sub-optimal ART adherence was associated with homelessness and daily injection heroin use among HIV-infected IDU.</p>	<p>Given the survival benefit of ART, it is critical to develop and evaluate innovative strategies such as supportive housing and methadone maintenance to address these risk factors to improve adherence. A focus on individual-level behaviors alone may not be effective in improving ART adherence, especially in the context of homelessness or unstable housing. Strategies that address broader determinants of health, such as housing, for this vulnerable group are more likely to be effective in creating the social and physical environments that reduce the ongoing risks for non-adherence and other HIV-risk behavior.</p>	<p>Future studies should evaluate innovative interventions that strengthen the links between supportive housing and addiction treatment for HIV-infected IDU</p>
<p>N/A</p>	<p>N/A</p>	<p>The Seek and Treat program will provide Highly Active Antiretroviral Therapy (HAART) to HIV-positive people in Vancouver and Prince George, BC</p>	<p>The pilot program was launched after a recently published study found evidence suggesting that HAART is becoming increasingly effective at the population level in British Columbia.</p>	<p>None stated</p>

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None stated	<p>1. The cohort was not a random sample of HIV-infected participants and this is not feasible as no registry of all HIV-infected individuals, particularly illicit drug users, exists. This may limit generalizability</p> <p>2. Limitation of generalizability of results to other settings</p> <p>3. Our pharmacy refill measure may be an overestimation of adherence in our sample as we do not know if the study participants ingested their medication</p>	None stated	28/42=66.6%	27/42 = 64.29%	27.5/42 = 65.48%		
None stated	None stated	None stated	N/A	N/A	N/A		

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2010	Krüsi, A.; Wood, E.; Montaner, J.; Kerr, T.	International Journal of Drug Policy	Social and structural determinants of HAART access and adherence among injection drug users	Non-empirical	Literature review	Multi-country	Not specified	HIV
2010	Uhlmann, S.; Milloy, M.-J.; Kerr, T.; Zhang, R.; Guillemi, S.; Marsh, D.; Hogg, R.S.; Montaner, J.S.G.; Wood, E.	Addiction	Methadone maintenance therapy promotes initiation of antiretroviral therapy among injection drug users	Empirical	Cohort - prospective	BC - Vancouver (Downtown Eastside)	Community	HIV
2009	Doucette, K. E.; Robson, V.; Shafran, S.; Kunimoto, D.	Canadian Journal of Gastroenterology	Improving access to care by allowing self- referral to a hepatitis C clinic	Empirical	Cohort - retrospective	AB - Edmonton	Clinic	HCV

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HAART	HAART	IV drug users	N/A	N/A	N/A	To encourage a conceptual shift away from understanding suboptimal HAART adherence as determined predominantly by individual factors modifiable through individually focused interventions, towards a greater acknowledgement of the influence of social and structural factors such as stigmatization and social exclusion, unstable housing environments, the organization of health care systems and the continued prohibitionist approach to illicit drug policy
ART, MMT	A cohort of antiretroviral-naive HIV infected IDU to investigate whether exposure to methadone maintenance therapy increased initiation and subsequent adherence to ART	All IDU with HIV who participated in the AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS) study.	709 HIV-infected participants were recruited for this study, among whom 457 (64.5%) had never been on ART at baseline. Of these 457, 231 (50.5%) participants reported heroin injection and had had at least one CD4+ count within 12 months of recruitment, and were therefore eligible for the present study.	All	AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS) was created to study issues related to access to HIV/AIDS care among HIV-infected IDU. Beginning in May 1996, participants were recruited through self-referral and street outreach from Vancouver's Downtown Eastside. At baseline and semi-annually, all participants complete an interviewer-administered questionnaire. The questionnaire elicits demographic data as well as information about participants' drug use, including information about type of drug, frequency of drug use, involvement in drug treatment and periods of abstinence	The present study using a cohort of antiretroviral-naive HIV-infected IDU to investigate whether exposure to methadone maintenance therapy increased initiation and subsequent adherence to ART.
HCV treatment	Comparing characteristics and outcome of HCV patients who self-referred for HCV treatments with those who were HCP-physician referred	Hepatitis C infected individuals	1563 patients enrolled with 336 self referral and 1227 referred by physician; IDU were 49.7% and 52.6% respectively	All	All patients in the Hepatitis Support Program database from December 17 2002 to Decemeber 31 2007 were included with follow up completed to June 30 2008. All patients were included with no exclusion. Outcomes measured were characteristics between referred and self referred patients; Sex, age, HCV genotype distributions, and liver biopsy fibrosis scores with similar treatment rates and outcomes. Self referral patients had higher rates of IDU (49.7% vs 52.6%) and immigrants (4.8% vs 4.2%)	Self referral vs Physician referral

N/A	N/A	<p>1. Proposal of risk environment framework: Conceptualizes drug-related harms as a product of the social situations and environments in which individuals who use drugs operate; shifts focus of analysis and intervention from individual level to include social and structural contexts which shape IDU's access and adherence to HAART. Also allows room for thinking about how social and structural contexts intersect with the economic, social, gender and ethnic position of individuals and how these factors may lead to higher levels of vulnerability among individuals belonging to these groups</p> <p>2. Emphasis on individual adds to stigma and social exclusion; drug addiction received among highest ratings of social disapproval cross-culturally, and this is exacerbated amongst women and ethnic minority groups. This likely contributes to women and members of ethnic minority groups facing elevated risk for HIV and hepatitis C.</p> <p>3. Impact of homelessness and unstable housing conditions on HIV treatment among IDU has received limited attention in developing/transitional settings and developed settings. Several factors related to substandard living conditions likely related to HIV-positive IDU's ability to follow through with HIV treatment: crowded living environments, lack of security and privacy, food insecurity, absence of cooking and food storage facilities, inadequate sanitary facilities</p> <p>4. Highly compartmentalized health care systems do not easily allow for comprehensive care for HIV-positive IDU whose service needs are complex and span multiple areas including HIV specialty and primary care, addiction treatment, psychiatric care and hepatology</p> <p>5. Lack of exploration of how drug policy approaches which prioritize law enforcement over social and health focused interventions, interfere with access and</p>	<p>Given the shortcomings of the predominant individually focused approach to access and adherence to HAART among IDU, it is clear that a broader approach to HAART provision needs to be prioritized urgently. A conceptual shift is required to move away from understanding suboptimal HAART adherence as determined primarily by individual factors modifiable through individually focused interventions towards a better understanding of the social situations and structures that facilitate and interfere with the delivery of HAART to this population. This will require a range of novel research, programmatic, and policy initiatives internationally.</p> <p>1. Development of multidisciplinary HIV treatment approaches that address HIV-positive IDU's health care more comprehensively</p> <p>2. Promote continued investigation of stimulant substitution therapies that can be effectively coupled with HAART</p> <p>3. Policy changes which facilitate program delivery that supports HIV treatment such as MMT and opioid prescription</p>	<p>Research that fosters an improved understanding of the mechanisms through which stigma and social exclusion create barriers to accessing HIV treatment and care among IDU. Furthermore, ongoing monitoring of the effect of policing and incarceration on HIV treatment access and adherence should be prioritized. Interventional studies documenting novel approaches to supportive housing for HIV-positive IDU will contribute to a better understanding of the housing needs of HIV-positive</p>
<p>The primary end-point of interest in the present analysis was time to first antiretroviral therapy (ART) use among participants who were HIV-positive opioid users.</p>	<p>Explanatory variables considered included: age (24 years versus &gt;24 years); gender (female versus male); ethnicity (Aboriginal versus non-Aboriginal); involvement in the sex trade in the past 6 months (yes versus no); daily cocaine use (yes versus no); daily heroin use (yes versus no); any injection drug use in the past 6 months (yes versus no); plasma HIV-1 viral load (&lt;100 000 copies/ml versus 100 000 copies/ml); and CD4+ cell count (&lt;200 cells/mm3 versus 200 cells/mm3). Methadone treatment was associated with antiretroviral adherence levels after ART initiation</p>	<p>The present study demonstrates that, among a community-recruited sample of antiretroviral-naïve opioid-using HIV-infected IDU, those who used MMT initiated ART at an elevated rate compared to those not receiving MMT. Additionally, those individuals on MMT had increased subsequent adherence to antiretroviral therapy.</p>	<p>Importance of providing MMT to opioid-dependent HIV-infected IDU as a strategy to address the ongoing HIV epidemic among this population. MMT should be an essential component of any campaign to curb HIV infection in this population, and policies and regulations restricting access to MMT should be repealed in favour of more evidence-based strategies.</p>	<p>Future research should be to examine how the quality of MMT programmes affects access and adherence to ART</p>
<p>Outcomes of patients treated for hepatitis C virus with pegylated interferon and ribavirin</p>	<p>Source of referral (self or physician/other HCP), demographics (age, sex), risk factors for HCV infection ( injection drug use, transfusion, tattoo, immigrant/therapeutic injection), qualitative serum HCV RNA, HCV genotype, whether HCV treatment was started, Liver fibrosis stages</p>	<p>Primary reason self referral was lack of PCP</p>	<p>Change physician specialist remuneration to allow for self referral and the need for additional HCV treatment education for PCP; allows access to risk reduction education, screening for HIV coinfection and vaccination against Hepatitis A and B</p>	<p>None stated</p>

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	None stated	None stated	None stated	N/A	N/A	N/A		
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	The first study of antiretroviral-naive HIV-infected IDU to examine the possible role of MMT on time to initiation of ART and subsequent antiretroviral adherence	Because this is an observational study, the association of MMT and more rapid initiation of ART must be interpreted with caution; The effect of methadone on uptake of ART may be as a result of inherent differences between those who used methadone and those who did not rather than the effect of methadone. However, there are several reasons why we believe this relationship to be causal. First, in Vancouver, Canada, where the study was conducted, methadone is often dispensed daily with antiretroviral drugs as a strategy to achieve high rates of adherence. Secondly, dispensing methadone affords more regular contact with the health care system. Thirdly, ready access to methadone decreases the time consuming routine of obtaining opioids, and the money to pay for them, which allows more time for individuals to focus upon personal health.	None stated	29/42=69%	27/42=64.2%	66.60%		
37 38 39 40 41 42 43 44 45 46 47	None stated	Self referral may include more "inappropriate" referrals such as those HCV RNA negative or have absolute contraindications for therapy	None stated	32/42=76%	20/42=47.6%	61.9+54.7/2=58.3%		



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2008	Wood, E.; Hogg, R.S.; Lima, V.D.; Kerr, T.; Yip, B.; Marshall, B.D.L.; Montaner, J.S.G.	JAMA	Highly Active Antiretroviral Therapy and Survival in HIV- Infected Injection Drug Users	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
<b>Supervised Injection Site / Safe Consumption Site / Safe Injection Facility / Supervised Injection Facility n=19</b>								
2019	Correctional Service Canada	n/a - Correctional Service Canada website?	Overdose Prevention Service	Non-empirical	Report	AB - Drumheller	Other- Prison (Drumheller Institution)	HIV, HCV, skin infections

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HAART	This study was conducted to compare patterns of mortality between patients with and without a history of injection drug use among a cohort of antiretroviral-naive patients initiating HAART in a setting with free HIV/ AIDS care.	all antiretroviral-naive patients aged 18 years or older initiating HAART in British Columbia, Canada, and has been described in detail elsewhere.	3116 individuals, 915 were IDUs (29.4%), 579 were female (18.6%), and the median age was 39.4 years (interquartile range, 33.3-46.4 years).	All	HAART Observational Medical Evaluation and Research (HOMER), study period (between August 1, 1996, and June 30, 2006), 3372 patients initiated HAART, among whom 256 individuals (7.6%) were excluded from the HOMER cohort for 3116; Vancouver; Inclusion criteria: analyses were restricted to antiretroviral-naive HIVinfected men and women who were first prescribed triple drug antiretroviral therapy between August 1996 and June 2006, and who were followed up to June 30, 2007. Primary outcome was time to death	This study was conducted to compare patterns of mortality between patients with and without a history of injection drug use among a cohort of antiretroviral-naive patients initiating HAART in a setting with free HIV/ AIDS care.
Overdose Prevention Service	The OPS includes consumption rooms within the institutional health care centre, where health care staff are available to provide health teaching, counselling, and emergency response in the event of a medical crisis. Participants will use self-supplied substances and safely dispose of any used equipment and left over substances. Participants will remain in the OPS for 30 minutes or longer as needed after using illicit substances for the purpose of monitoring for signs of an overdose. The OPS will be available between 7:00 a.m. to 7:00 p.m., seven days a week.	OPS intended to serve prisoners at the institute who choose to participate in the program (harm reduction)	N/A	Prisoners	N/A	Purpose of the document is likely just to provide information regarding the purpose of the program: On June 24, the Correctional Service of Canada (CSC) began an overdose prevention service (OPS) at Drumheller Institution to continue ongoing efforts to help prevent fatal and non fatal overdoses, reduce the sharing of needles, reduce the transmission of infectious diseases, including HIV and HCV, reduce the occurrence of skin infections, and facilitate referrals to other health care services and programs.

All-cause mortality	included age, sex, a prior diagnosis of AIDS (yes vs no), protease inhibitor use in the initial regimen (yes vs no), date of therapy initiation (before or after July 1, 1997), physician experience (per 100 patients enrolled), baseline CD4 cell count (50, 50-199, or 200 cells/ $\mu$ L), baseline HIV RNA levels (log <sub>10</sub> transformed), and 95% antiretroviral adherence (yes vs no).	The present study demonstrated mortality rates that were not significantly different between HIV-infected IDUs and non-IDUs initiating HAART in a population-based setting.	HAART regimens may have effectiveness at a population level that is not significantly different regarding the survival of individuals with and without a history of injection drug use.	None stated
N/A	N/A	<p>Since it isn't a study, there are no "findings". The purpose of the program is to provide another option for harm reduction. The CSC's harm reduction measures currently include: 1) screening and testing at reception and ongoing throughout incarceration; 2) education on admission and throughout incarceration regarding IDUs and how to prevent their acquisition and/or transmission; 3) access to trained peer support workers for advice, information and support; 4) access to harm reduction material and information (e.g. condoms); 5) access to substance abuse programs in CSC and community-based Narcotics Anonymous; 6) opiate agonist treatment (methadone/suboxone); 7) health promotion/prevention initiatives on risks of tattooing; 8) mental health referral/counselling; 9) post-exposure and pre-exposure prophylaxis; 10) HIV and HCV treatment; 11) prevention, diagnosis and treatment of TB (parallel screening for HIV &amp; TB); 12) access to bleach; 13) Prison Needle Exchange Program.</p> <p>This will be another program that will be externally evaluated in the future.</p>	N/A	An integral part of the OPS implementation is an external evaluation of the program, where lessons learned from Drumheller Institution will inform future planning in the area of harm reduction.

<p>1 2 3 4 5 6 7 8 9</p> <p>the present study is well suited for comparing real-world outcomes from HAART among IDUs and non-IDUs in a populational setting. Furthermore, the local context provides an excellent opportunity to compare survival patterns in a setting in which the potentially confounding effects of financial barriers to medical care are removed.</p>	<p>Observation study therefore no conclusions about causality can be made.; Only baseline data on injection drug use and we were not able to assess the impact of ongoing drug use.; we only considered patients who were prescribed HAART</p>	<p>None stated</p>	<p>30/42=71.4%</p>	<p>26/42=61.9%</p>	<p>28+27/2= 65.4%</p>		
<p>10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		

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2017	Kerr, T.; Mitra, S.; Kennedy, M.C.; McNeil, R.	Harm Reduction Journal	Supervised injection facilities in Canada: past, present, and future	Non-empirical	Literature review	Canada	Community, clinics and hospital	HCV
2015	Enns, E.A.; Zaric, G.S.; Strike, C.J.; Jairam, J.A.; Kolla, G.; Bayoumi, A.M.	Addiction (Society for the Study of Addiction)	Potential cost- effectiveness of supervised injection facilities in Toronto and Ottawa, Canada	Empirical	Cost-benefit and cost-effectiveness analysis	ON - Toronto and Ottawa	Community	HCV, HIV

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SIS	SIS - discussion of the evolution of policies around Canada for the establishment of safe injection sites over time	PWID	N/A	All	N/A	A historical and political look at the establishment of SIF in Canada
SIS	Using a dynamic compartmental simulation model of HIV and HCV transmission, using published literature, self-reported surveys and 2006 I-track survey and the impact of establishing cost effective supervised injection sites in Toronto and Ottawa.	Simulated populations from Toronto and Ottawa	Simulated	Used published estimates for Toronto and Ottawa focusing on PWID, PWID with MMT, HIV, HCV, Coinfected prevalence;etc	Modeling outcome measures: Primary quantified health effects in terms of number of HIV and HCV infections averted and the number of quality-adjusted life years (QALY) for the optimal cost effective number of supervised injection sites	Determine optimal, cost effective number of safe injection sites for Toronto and Ottawa

N/A	N/A	<p>Our review demonstrates that although considerable progress has been made towards integrating this form of intervention into the continuum of programs offered to PWID, continued activism, research advocacy, and litigation has been necessary in order to advance this evidence-based approach in Canada. There remains a pressing need to amend federal legislation to better enable the scale-up of these services. The ongoing overdose crisis indicates clearly that more must be done. Further, models that are more responsive to the needs of PWUD (e.g., assisted injection services, peer-run models) should be implemented and evaluated, and SIF programming should be extended into new settings (e.g., hospital). The federal government will maintain responsibility for the approval of new facilities and there remains a need to demonstrate a lack of impact on crime, thus continuing to subject the expansion of these critical health services to political processes. Reforms are urgently needed to facilitate the integration of assisted injection and safer smoking interventions into SIFs and reduce challenges in access to these facilities stemming from gender, disability, and polysubstance use. To facilitate the creation and continued functioning of peer-run SIFs, amendments to federal laws should be made to allow PWID to work in SIFs. Further, local health authorities should seek to promote the operation of peer-run SIFs and provide necessary financial support given existing evidence indicating that peer-run SIFs extend the reach and coverage of these programs.</p>	<p>While much progress has been made in that regard, there is a pressing need to create a more enabling environment for SIFs through amendment of federal legislation. Further innovation in SIF programming should also be encouraged through the creation of SIFs that accommodate assisted injecting, the inhalation of drugs. As well, peer-run, mobile, and hospital-based SIFs also constitute next steps needed to optimize the impact of this form of harm reduction intervention.</p>	None stated
<p>Quantified health effects in terms of the number of HIV and HCV infections averted and the number of quality-adjusted life-years (QALYs) gained, an outcome that integrates quality of life with survival</p>	<p>(See table 1) Drug use populations size; MSM; Migration rates per 100 person years; Aging rates per 100 person-years; Drug use heterosexuals, men having sex with men; MMT; HIV prevalence; HCV prevalence; Annual Probability of HIV transmission per sexual partner; annual number of sexual partners; proportion of sexual partners with whom a condom is used; HIV and HCV transmission probability per shared injection; Annual number of injections, proportion of shared needles; HIV and HCV Transmission probability per episode of sharing crack cocaine paraphernalia; Crack cocaine smoking; HIV and HCV progression, diagnosis and treatment parameters; Annual mortality rates (see list); Annual health-care costs (2012 CAD\$) (See list); Annual supervised injection facility costs (fixed facility costs; variable per-user costs); Quality of life weights (persons who smoke cocaine; inject drugs; MMT; HIV infected persons; HIV infected persons with antiretroviral therapy; persons with advanced stage chronic HCV infection)</p>	<p>a cost-effectiveness threshold of \$50 000, the optimal number of facilities from an economic evaluation perspective was three in Toronto and two in Ottawa; projected that a single supervised injection facility in Toronto would be visited by 10.8% of people who inject drugs; visit a facility is projected as 29.6% for three facilities and 39.8% for five facilities; In Ottawa a single facility would be visited by 36.2% of people who use drugs; Over 20 years projected that one supervised injection facility in Toronto would avert 164 HIV infections and 459 HCV infections; in Ottawa, one facility would avert 358 HIV infections and 323 HCV infections; Toronto, a single facility resulted in a gain of 385 discounted QALYs and incurred \$4.1 million in net discounted costs for an ICER of \$10 763 per QALY gained; In Ottawa, a single facility resulted in a gain of 743 discounted QALYs and incurred \$4.6 million in net discounted costs for an ICER of \$6127 per QALY</p>	<p>While our analysis contributes to the demonstration of local conditions indicating a need for a facility in Toronto and Ottawa, a factor identified by Canada's Supreme Court for granting exemptions for facilities, recent legislative changes restrict exemptions to exceptional circumstances' and impose additional requirements [97,98]. Although economic analyses are necessary inputs to such debates, the final decision will also reflect the decision-makers' social and political agendas.</p>	<p>Analyses should be repeated once better data on new HCV treatment patterns are available</p>

None stated	None stated	Current gaps in coverage of supervised injection facilities point to the need to extend this evidence-based intervention into new settings and consider new approaches.	N/A	N/A	N/A		
Toronto and Ottawa specific data was used. The model was calibrated closely to observed epidemiological trends, although not validated to external data. Results were generally robust across treatment uptake and cost assumptions	Did not include health impacts of hepatitis B infections, overdoses, referrals to addiction treatment services and infectious complications of injection drug use, thus underestimating overall health benefits. Also did not model social consequences, such as changes in injection-related litter and crime. Did not evaluate supervised smoking facilities, for which strong evidence of effectiveness is unavailable. Did not have data on the variability of HIV and HCV prevalence and risk behaviors across neighborhoods, which would further enhance our analysis. I-Track respondents were recruited through harm reduction programs and may over-represent people who use drugs more frequently and people who use multiple substances. Did not model the use of buprenorphine as a treatment for opioid dependence, it has comparable net costs and overall effectiveness to MMT and our results were insensitive to variation in the cost and effectiveness of the opioid substitution program used by people who inject drugs. Did not include male-to-male sexual transmission of HCV, but this occurs at low rates and probably would not alter our conclusions. Did not include indirect health costs. As a simulated model a wide variety of assumptions were made	None identified	38/42=90%	33/42=78.5%	83.3+80.9/2=82.1%		

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2015	Jozaghi, E.; Jackson, A.	Int J Health Policy Manag	Examining the potential role of a supervised injection facility in Saskatoon, Saskatchewan, to avert HIV among people who inject drugs	Empirical	Cost-benefit and cost-effectiveness analysis	SK - Saskatoon	Community	HIV
2015	Shaw, A.; Lazarus, L.; Pantalone, T.; LeBlanc, S.; Lin, D.; Stanley, D.; Chepesiuk, C.; Patel, S.; Tyndall, M.; PROUD Community Advisory Committee	Harm Reduction Journal	Risk environments facing potential users of a supervised injection site in Ottawa, Canada	Empirical	Cohort - prospective	ON - Ottawa	Community	HCV, HIV

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SIF	SIF - Proposed	PWID	N/A - modeling study	All	N/A	To determine cost-benefit and cost-effectiveness employing HIV data and sharing needle cases in Saskatoon to determine prospect of a safe injection site in Saskatoon.
SIS	Self-reported risk environments (social, economic, political, etc.) faced by PWID in Ottawa and willingness to use supervised injection sites	Subset of PROUD cohort: 270 participants recruited in Byward Market who reported injecting drugs in last 12 months previous to interview	858	All	PROUD cohort: 858 people aged 16 or older who reported using injection drugs or smoking crack cocaine in past 12 months, had been living in Ottawa for at least 3 months at time of interview (March to December 2013). 593 were recruited in Byward Market area. This study focuses on 270 participants (see population column)	To understand risk behaviours and risk environments faced by PWID in Ottawa, establish need for a supervised injection site (SIS), and help contribute to SIS design that addresses current risks and reduces harm

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<p>Marginal benefit and cost are the measurement of benefits or cost of producing one more unit, in this case cost of running an SIF and cost of averting HIV care</p>	<p>None</p>	<p>Establishing at least two SIF in Saskatoon is cost-effective. In Saskatoon, HIV reports were more than three times that of the national average. The annual incidence report for Saskatoon was 31.3 per 100,000 persons in comparison to the national average of 9.3 per 100,000 persons. Additionally, the majority of Saskatoon's HIV reports were attributed to PWID (76.9%), while the nation's average of PWID contribution to HIV was 18.9%. At least two SIF in Saskatoon will on average prevent at least 14 new HIV cases. This translates into cost savings of \$764,970 for the first two facilities. Moreover, the establishment of SIF in Saskatchewan's largest city appears to be cost-effective.</p>	<p>We suggest that harm reduction services in Saskatoon should include SIF as part of healthcare delivery to this vulnerable population. Education to health professionals and policymakers is needed about the benefits of harm reduction programs and the roles they play in reducing crime, drug dealing, public injection, and other social maladies. Community support is fundamental for sustaining a SIF.</p>	<p>The models may be considered simple in comparison to other more complex models that consider the dynamics of the social system and a score of parameters, such as secondary sexual transmission, effects of attending methadone therapy and increase in the population of drug users.</p>
<p>Hypothetical uptake of future SIS in Ottawa based on the question "Would you likely use a supervised injection site if one was opened in Ottawa?"</p>	<p>None</p>	<p>84.8% of participants thought there should be an SIS in Ottawa and 75% reported they would use an SIS if one opened. 74.9% of potential SIS users reported ever having been diagnosed w/ mental health illness. 63.5% tested positive for HCV at their last test, 12.8% self-reported that they were HIV positive. 39.5% reported public injection, 39.4% accessed addictions treatment and 43.8% sought care in hospital/ER in past year. Significant association with insecure housing/homelessness. Among potential SIS users, 19.2% had trouble accessing new needles. In univariate analysis, those willing to use an SIS were more often younger, identified as LGBTQ, injected in public, injected with other people, required assistance to inject, had overdosed in the past 12 months.</p>	<p>There is a demand for SIS in Ottawa. PWID who are likely to use SIS face complex risk environments for drug-related harm, which could be addressed by developing SIS that respond to the local context. Based on savings from HIV and HCV prevention alone, an SIS in Ottawa would be an efficient and effective use of resources. However, the model must be suited to its users.</p>	<p>Future research should investigate harm reduction needs of people who inject alone in private residences. Also investigate other context-specific barriers and reasons for not accessing SIS services. Future research should also develop and implement monitoring and evaluation program for SIS once opened.</p>

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None stated	The first limitation pertains to the exclusive focus on HIV cases. Other costing studies, that have considered Insite and its potential role for expansion in other cities, have included HCV in the cost-benefit analysis. However, the current study due to unavailability of key parameters had to rely on HIV cases alone which made the costing study more conservative in reporting the benefits of SIF in Saskatoon. However, the most noteworthy limitation of this study concerns the static mathematical models used in the analysis. Such models omit Quality-Adjusted Life Years (QALYs). Our models may be considered simple in comparison to other more complex models that consider the dynamics of the social system and a score of parameters, such as secondary sexual transmission, effects of attending methadone therapy and increase in the population of drug users.	None stated	22/42=52.4%	24/42 = 57.1%	54.80%		
CBPR combines academic inquiry with meaningful community participation and control. Street-based, peer-driven recruitment can identify highest-risk populations. These methods ensure that priorities of communities with PWID are affected by future SIS.	The CAC elected to recruit during daylight hours due to group safety concerns, which could reduce the representation of sex workers and other community members who are primarily available at night. Recruiters targeted street-involved PWID, which mirrors the target population of an SIS which leads to overrepresentation of homeless and socially marginalized PWID. Outcome measure addresses hypothetical use of a future site. Self-reported data may be influenced by social desirability bias, underestimation of high risk practices, nonresponse (missing data). This analysis cannot predict willingness to use SIS based on specific health risks/user characteristics. Does not capture all contextual factors that interact with or shape risk for harm/access to harm reduction among PWID.	N/A	35/42 = 83.33%	32/42=76.2%	34/42=80.95%		

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2014	Hadland, S.E.; DeBeck, K.; Kerr, T., Nguyen, P.; Simo, A.; Montaner, J.S.; Wood, E.	J Adolesc Health.	Use of a medically supervised injection facility among street youth	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2014	Jozaghi, E.; Reid, A.A.; Andresen, M.A.; Juneau, A.	Substance Abuse Treatment, Prevention, and Policy	A cost-benefit/cost-effectiveness analysis of proposed supervised injection facilities in Ottawa, Canada	Empirical	Cost-benefit and cost-effectiveness analysis	ON - Ottawa	Community	HCV, HIV
2014	Ti, L.; Kerr, T.	Harm Reduction Journal	The impact of harm reduction on HIV and illicit drug use	Non-empirical	Commentary	BC - Vancouver	Community	HIV

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SIF	Insite - supervised injection facility (SIF) as government-sanctioned space for users to inject pre-obtained drugs under nurse supervision. Open 18 hours, 7 days per week. Nurses can intervene in the event of an overdose.	Actively-injecting street youth in Vancouver. Street-involved was defined as being absolutely or temporarily without stable housing, or having accessed street-based youth services in the past six months. Had to report injection in the preceding 6 months during Sept 2005-May 2012, either at baseline or at any semiannual follow-up visit.	1,019 in ARYS 414 included in this study	Street youth	At-Risk Youth Study (ARYS) - prospective cohort of street youth in Vancouver, Canada. Started 2005. Inclusion criteria 1) age 14-26 years, 2) use of an illicit drug other than or in addition to marijuana in the 30 days prior to enrollment. Have baseline and bi-annual interviews and bloodwork for HIV and Hep C.	To identify factors associated with use of the Vancouver SIF among street youth
SIF	SIF - Proposed	PWID	N/A - modeling study	All	N/A	To conduct cost-benefit and cost-effective analyses for the opening of SIFs in Ottawa, Ontario
SIF	SIF	HIV+ PWID	N/A	HIV+ PWID	N/A	Commentary in support for harm reduction programs as an essential component for responding to the HIV and illicit drug use epidemics

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<p>Primary outcome is self-reported use of the Vancouver SIF at least once in the preceding 6 months. "In the last six months, have you fixed at the Insite safe injection site?"</p>	<p>For those that did use the SIF, descriptive data included how often participants used the SIF, proportion of all injections conducted at the SIF, where participants injected most of the time if not injecting at the SIF, if they received new information about safe injection practices they did not already know at the SIF, and whether they felt the SIF was youth-friendly. Blood samples to determine HIV and HCV serostatus. Covariates included age, biologic gender at birth, Aboriginal ancestry, high school education, recently having lived or spent time in the Downtown Eastside, recent homelessness, recent incarceration, recent sex work, recent daily heroin / cocaine, / crystal methamphetamine injections, recent drug overdose, recently having dealt drugs, any recent drug injection in a public place, recently having help injecting from someone else, recently having visited a crack house or shooting gallery, having borrowed a syringe, 'jacked up' by police (i.e., stopped, searched or tained for presumed drug possession without arrest) and recently having received drug treatment.</p>	<p>These findings show that street youth that use the SIF appear to be those who inject frequently and may be at greatest risk of overdose death and of HIV or HCV infection. 414 individuals were actively injecting drugs, 33.8% female, 22.9% Aboriginal, 3.4% 14-17 yrs, 20.8% 18-20 yrs, 75.8% at or over 21 yrs; Mean age of first injection drug use was 22.8 yrs; At baseline, 2.4% were HIV seropositive and 35% were HCV-seropositive; 305 returned for follow-up after reporting injection drug use; 42.3% used the SIF at least once and SIF use was reported 37.5% of all study visits; Of 175 using SIF, 51.4% used the facility at least weekly and 44.6% used it for at least one-quarter of all injections, 22.3% reported receiving new information about safe injection practices; 2.9% of SIF users felt the facility was not youth-friendly. In final multivariate model, variables significantly and independently associated with SIF use included having lived or spent time in the Downtown Eastside neighborhood surround the SIF, daily heroin injection, daily cocaine injection, daily crystal methamphetamine injection, and having injected in public.</p>	<p>The SIF provides a critical point of contact with the city's highest risk homeless adolescents and young adults who might otherwise be 'hidden' from other public health efforts. Other arguments for establishing SIF may be associated with public health benefits, including enhanced public order, from injection not done in public, and decreased injection-related litter. As governments consider novel approaches to prevent and mitigate the harms of injection drug use, these data support the implementation of SIFs as a way of promoting public health and community safety.</p>	<p>In adjusted analysis, recent overdose was not independently associated with SIF use and SIF use was not associated with reduced syringe sharing or recent entry into drug treatment, but these may be due to the higher frequency of drug use. Further research may find benefits of SIF use that are not captured statistically in this study, such as syringe sharing, overdose, and drug treatment are not less common, even though this is a higher-risk population. Future studies could attempt to delineate how far street youth may be willing to travel for safe injection to help determine ideal locations for similar facilities in other settings.</p>
<p>The costs of operating numerous SIFs in Ottawa was compared to the savings incurred; this was done after accounting for the prevention of new HIV and Hepatitis C (HCV) infections</p>	<p>None</p>	<p>The sensitivity analyses conducted with the models reveals the potential for SIFs in Ottawa to be a fiscally responsible harm reduction strategy for the prevention of HCV cases – when considered independently. With a baseline sharing rate of 19%, the cumulative annual cost model supported the establishment of two SIFs and the marginal annual cost model supported the establishment of a single SIF. More often, the prevention of HIV or HCV alone were not sufficient to justify the establishment cost-effectiveness; rather, only when both HIV and HCV are considered does sufficient economic support became apparent.</p>	<p>Funded supervised injection facilities in Ottawa appear to be an efficient and effective use of financial resources in the public health domain. Though this is not scientific evidence, these models serve as excellent tools to identify what kind of changes we can expect when public health policy is implemented.</p>	<p>These results demonstrate the need to routinely collect accurate, up-to-date, and geographically specific data so that studies such as this may help to inform public policy with greater accuracy and confidence. More-over, these results also show the importance of considering more than one potential benefit in cost-benefit analyses for public health. In moving forward, research should also consider how to facilitate the implementation of new SIFs.</p>
<p>N/A</p>	<p>None</p>	<p>None stated</p>	<p>Harm reduction programs do not exacerbate individual and community drug use patterns. It is clear that programs like Insite save lives and support rather than undermine treatment efforts by connecting individuals to various forms of addiction treatment.</p>	<p>None stated</p>

<p>Characteristics of ARYS sample are similar to those from other studies of high-risk youth.</p>	<p>Study recruitment used snowball sampling to recruit street youth, who are frequently homeless and although the ARYS sample is not random, characteristics of the cohort are similar to those from other studies of high-risk youth. Interviews relied on self-report - social desirability bias could underestimate true prevalence of risk behaviours and overestimated true prevalence of SIF use. Sociodemographic and drug use-related covariates were determined within the same six-month window period as a participants' SIF use, so cannot determine temporality.</p>	<p>Relationship of street youth SIF use and outcomes such as decreased overdose and HIV and HCV infections.</p>	<p>31/42 = 73.8%</p>	<p>28/42=66.7%</p>	<p>70.30%</p>		
<p>None stated - however, the use of multiple mathematical formulas and ranges of prevalence rates for outcomes gathered from evidence are strengths</p>	<p>It is important to note that the calculated cost-savings of Insite are an under-estimate of the actual cost savings. In our analyses, we do not consider any growth of the PWID population, new secondary HIV and HCV infections, or any reductions in other harms such as cellulitis, subcutaneous abscesses, endocarditis, and other soft-tissue infections. Perhaps, more significant is the fact that we do not consider the value of a prevented death</p>	<p>None stated</p>	<p>21/42=50%</p>	<p>24/42 = 57.1%</p>	<p>53.60%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		



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2013	Jozaghi, E.; Andresen, M.A.	Harm Reduction Journal	Should North America's first and only supervised injection facility (InSite) be expanded in British Columbia, Canada?	Empirical	Qualitative - semi-structured interviews	BC - Vancouver, Surrey and Victoria	Community	HCV, HIV
2013	Jozaghi, E.; Reid, A.A.; Andresen, M.A.	Substance Abuse Treatment, Prevention, and Policy	A cost-benefit/cost-effectiveness analysis of proposed supervised injection facilities in Montreal, Canada	Empirical	Cost-benefit and cost-effectiveness analysis	QC - Montreal	Community	HCV, HIV
2012	Small, W.; Moore, D.; Shoveller, J.; Wood, E.; Kerr, T.	Health, Risk and Society	Perceptions of risk and safety within injection settings: Injection drug users' reasons for attending a supervised injecting facility in Vancouver, Canada	Empirical	Qualitative - ethnographic methods and in-depth interviews	BC - Vancouver	Community	HIV

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SIF	InSite in Vancouver, needle exchange programs in Surrey and one which closed down in Victoria	People who had injected illicit drugs in the previous month, 19 years or older and provided informed oral consent	31	All	N/A	To explore the potential of expanding InSite to more locations throughout British Columbia including from injection drug users who reside in cities that have no access to supervised injection facilities
SIF	SIF - Proposed	PWID	N/A - modeling study	All	N/A	To present cost-effectiveness and cost-benefit analyses for various SIF operation scenarios in Montreal in an effort to inform public policy on this complex issue
SIF	Questionnaires used to understand injectors' reasons for using supervised injection facility (Insite)	PWID - Insite clients recruited from Scientific Evaluation of Supervised Injecting Cohort (Vancouver), interviewed between November 2005-February 2006	50 (28 male, 21 female, 13 First Nations, 37 non-First Nations)	Insite clients	Scientific Evaluation of Supervised Injecting Cohort. Cohort composed of >1000 randomly selected Insite users in Vancouver. Representative of population of IDUs who use Insite	To examine injection drug users' motivations for using Insite and explore how the SIF setting is perceived to shape experiences of risk and safety when injecting drugs

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Themes on benefits of InSite and need for expansion	None	Safe injection sites lead to decreases in overdose deaths, sharing of needles and spread of infectious diseases, increased safety by decreasing theft, assault and arrest, connection to addiction and counselling services, personal connections and therapeutic alliances, decreased emergency care use, and increased personal and community empowerment.	There is a need to open similar supervised injection facilities in cities with significant IDU populations and IDUs in Surrey and Victoria would attend a supervised injection facility if one were available.	None stated
Specifically, the analyses estimate the number of new HIV and HCV infections prevented as a result of operating SIFs using mathematical modelling with conservative parameter estimates. The dollar costs of illnesses avoided are compared to the operational cost of a SIF. The analyses are then extended to consider the impact of opening additional SIFs. As long as the marginal benefits outweigh the marginal costs of additional SIFs hours and locations, the expansion of SIF should be recommended	None	It is predicted that the addition of each supervised injection facility (up-to a maximum of three) in Montreal will on average prevent 11 cases of HIV and 65 cases of HCV each year. As a result, there is a net cost saving of CDN\$0.686 million (HIV) and CDN\$0.8 million (HCV) for each additional supervised injection site each year. This translates into a net average benefit-cost ratio of 1.21: 1 for both HIV and HCV. Increasing the scope of SIFs through site expansion would result in a decrease of HIV infection cases.	Establishing SIFs in Montreal will benefit the publically funded health care system.	None stated
None	None	Participants injected at Insite because it is a safer alternative to public/private sites. It is perceived as the "proper" venue for injecting to reduce health risks and relocate injection behaviour from public settings. Regulated environment perceived as beneficial, but some felt that it restricted their behaviour. Provide an alternative to injecting within private residences belonging to other individuals as obligation to share drugs is eliminated, these resources reduced the potential for blood-borne virus transmission and helped to reduce injection-related health risks, some participants reported a preference for social interactions during injecting and viewed the individual booths as a negative aspect of the injection setting at Insite, participants frequently reported that medical supervision was a reason why they injected at Insite, it protects clients from charges of drug possession, while they are on-site, it is a regulated injection environment is that it is perceived to reduce the potential for violence or robbery.	There is a need to fully consider risk perceptions and priorities of IDUs when designing harm reduction interventions. Attention to IDUs' risk perceptions will enable development of more appropriate interventions, which may increase their use and decrease risks.	Explore perspectives of IDUs who have never used SIS and why some do not use this intervention. Future research should investigate how social and spatial arrangements within the Downtown Eastside drug scene impact the operation and management of the supervised injection facility, as this information would be helpful in optimising the design and operation of the facility. Another dimension that remains unclear is how the alterations in social relationships within Insite might 'spill over' into the street, as only a fraction of a drug user's day is spent within the facility.

None stated	None stated	None stated	20/42=47.6%	19/42 = 45.2%	46.40%		
None stated	Potential for cost-savings with respect to cellulitis, subcutaneous abscesses, endocarditis, and incidence of soft-tissue infections averted were not considered in the calculations	None stated	21/42=50%	24/42 = 57.1%	53.60%	Background?? 26. Holtgrave DR, Pinkerton SD: Updates of cost of illness and quality of life estimates for use in economic evaluations of HIV prevention programs J Acquir Immune Defic Syndr Hum Retrovirol 1997, 16:55-61	
N/A	Exclusively conducted study with Insite clients (may have affected responses). Interview participants were recruited through evaluation study. Did not include perspectives from people who have never used the SIS and does not address reasons for not using the SIS.	None stated	23/42 = 54.76%	25/42=59.6%	24/42 = 57.14%		

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2011	Pinkerton, S.D.	Int J Drug Policy	How many HIV infections are prevented by Vancouver Canada's supervised injection facility?	Empirical	Literature review and mathematical modelling	BC - Vancouver	Community	HIV
2011	Reddon, H.; Wood, E.; Tyndall, M.; Lai, C.; Hogg, R.; Montaner, J.; Kerr, T.	AIDS Educ Prev	Use of North America's first medically supervised safer injecting facility among HIV-positive injection drug users	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV

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SIF	InSite SIF	Uninfected IDU	N/A	All	N/A	To review and critique the mathematical models utilised in the Andresen and Boyd article, then describe an alternative and potentially more accurate method for estimating the impact of the Insite SIF.
SIF	InSite SIF	HIV-positive IDU	395	HIV+ PWID	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS): Open prospective cohort of HIV-positive IDUs in Vancouver, Canada; populated through snowball sampling and extensive street outreach methods; inclusion criteria: 18+, HIV-positive, used injection drugs, provided written informed consent, recruited and completed at least one follow-up interview between Dec 2005-May 2008	To examine supervised injecting facility (SIF) use among a cohort of 395 HIV-positive injection drug users in Vancouver, Canada. We sought to investigate the prevalence and correlates of SIF use among HIV-positive IDUs in Vancouver, Canada.

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<p>Estimates the number of HIV infections prevented by Vancouver Canada's Insite supervised injection facility</p>	<p>None</p>	<p>Article critiqued the Anderson and Boyd article that aimed to create a mathematical model to estimate the number of HIV infections prevented by Vancouver's Insite supervised injection facility. Developed an alternative model.</p> <p>Target article suggested Insite SIF prevents between 19-57 incident HIV infections per year. Analysis of this study indicates that it prevents approx. 5-6 infections per year, with a plausible range of 4-8 prevented infections. These estimates suggest that the Insite SIF reduces HIV incidence among DTES IDU by about 6-11%.</p>	<p>The present analysis supports Andresen and Boyd's (2010) conclusion that the Insite SIF is cost saving as a stand-alone operation, independent of Insite's other programmes.</p>	<p>Previous study found that Vancouver IDU who reported that "some, most, or all" of their injections took place that the Insite SIF were 70% less likely than other IDU to have borrowed or lent a syringe in the past 6 months. However a 70% reduction in the prevalence of borrowing or lending does not imply an equivalent reduction in the borrowing rate (i.e. the proportion of injections that involve borrowed syringes). Additional research could help clarify this issue.</p>
<p>Primary outcome of interest was reporting frequent SIF use, which was operationally defined as using the SIF for more than 25% of injections</p>	<p>Selected a range of individual and contextual variables that were deemed to be potentially associated with the outcome. These variables were age, gender, Aboriginal ancestry (yes vs. no), residence in the Downtown Eastside (yes vs. no), homelessness (yes vs. no), frequent crack use (yes vs. no), daily heroin injection (yes vs. no), daily cocaine injection (yes vs. no), daily methamphetamine use (yes vs. no), participation in the sex trade (yes vs. no), public injecting (yes vs. no), borrowing needles/syringes (yes vs. no), lending needles/syringes (yes vs. no), nonfatal overdose (yes vs. no), and methadone maintenance therapy (yes vs. no). All behavioral variables referred to the 6-month period prior to the interview.</p> <p>From the confidential linkage to the centralized antiretroviral dispensary, we added these variables: current ARV use, HIV-1 RNA level (<math>\geq 500</math> copies/mL vs. <math>&lt; 500</math> copies/mL), and CD4 cell count (<math>\geq 200</math> cells/<math>\mu</math>L vs. <math>&gt; 200</math> cells/<math>\mu</math>L).</p>	<p>Of 395 participants, 104 (26.4%) reported using the SIF for more than 25% of their injections. Factors positively associated with frequent SIF use at baseline included gender, homelessness, daily heroin injection, daily cocaine injection and non-fatal overdose, whereas factors negatively associated with SIF use included age and current receipt of antiretroviral therapy. Reasons for not using SIF included (subanalysis of 341 observations): 21% having another safe place to inject, 31% preference for injecting at home, 10% preference for keeping drug use private, 8% living too far from Insite, 6% dislike of design or operations of facility (e.g. entrance too public, don't want to register), 6% report of requiring help injecting (prohibited at Insite), 4% wanting to avoid Downtown Eastside, 13% various other reasons. Of the 1051 observations from baseline to most recent follow-up, 58% reports included an account of using services other than injecting room. In terms of health-related service use, there were 49% reports of needle exchange use, 17% reports of receiving care from a nurse, 8% reports of alcohol and drug counseling use, and 2% reports of receiving a health care referral.</p> <p>There are also correlations between frequent SIF use and age, gender, homelessness, daily heroin injection, daily cocaine injection, and antiretroviral use.</p>	<p>Given that the SIF in Vancouver is attracting high-risk IDUs with a lower likelihood of receiving HIV treatment, the SIF could provide a venue for enhanced HIV care, including viral load and CD4 count testing, vaccinations and other preventive measures, and distribution of antiretroviral therapies. With the subanalyses revealing reasons why some HIV-positive IDUs refrain from using Insite, efforts to remove structural barriers to prevention and treatment services are critical to ensuring the optimal impact of such services. Efforts aimed at increasing coverage of SIFs locally should therefore focus on both increasing the number of SIFs (and their geographic coverage) and modifying rules that prevent assisted injecting. As well, the SIF is therefore an ideal environment in which to offer HIV-specific services to IDUs, as it makes treatment and care more readily accessible to this population.</p> <p>Overall, modifications to and expansion of the SIF program may result in higher coverage of SIF services among HIV-positive IDUs. Further, the services offered at the SIF could be expanded to include HIV-specific services such as disease monitoring and the provision of antiretroviral therapy.</p>	<p>Further research should seek to evaluate the impact of these types of structural changes to SIF program delivery (structural changes: increasing number of SIFs/geographical coverage and modifying rules to allow for assisted injecting).</p>

<p>None stated. Robustness of their result was tested with univariate analysis, demonstrated the results were most sensitive to number of injections per IDU and to presumed incidence of HIV infection with Insite SIF in operation. Also conducted Monte Carlo sensitivity analysis.</p>	<p>These estimates are conservative inasmuch as they take into account only the reduction in the number of injections with borrowed "street" syringes amongst uninfected IDU. They do not account for possible behavioural changes on the part of Insite clients that could lead them to decrease the rate at which they inject with borrowed syringes, over and above the reduction due to utilisation of the SIF.</p>	<p>The actual reduction in HIV transmission due to the Insite SIF is difficult to quantify. Incidence surveillance data cannot separate out the impact of the Insite SIF from the multiple other factors that influence HIV incidence in the Vancouver area.</p>	<p>35/42 = 83.3%</p>	<p>33/42 = 78.6%</p>	<p>34/42 = 81.0%</p>		
<p>To our knowledge, this is the first study to examine SIF use, as well as barriers to SIF use, among HIV-positive IDUs.</p>	<p>1) ACCESS is not a random sample; study findings may not generalize well to larger population                  2) Variations across settings, including differences in high-risk behaviors in other urban environments, findings may not generalize well to HIV-positive IDUs in other locations                  3) We relied on a dichotomous outcome, and several of our independent variables were also dichotomized. Use of continuous variable may have allowed for a more nuanced analysis and less restricted variance across measures, we note that we were able to detect several significant associations between the outcome and independent variables that were considered.                  4) Relied on self-reported measures, which may have introduced response biases into results, such as socially desirable responding. Thus, we may have underestimated the sensitive behaviors and experiences, such as injection drug use and sex work involvement, among the participants.</p>	<p>None stated</p>	<p>31/42 = 73.8%</p>	<p>31/42 = 73.8%</p>	<p>31/42 = 73.8%</p>		



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2010	Andresen M.A.; Boyd, N.	International Journal of Drug Policy	A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility	Empirical	Cost-benefit and cost-effectiveness analysis	BC - Vancouver	Community	HIV
2010	Pinkerton, S.D.	Addiction	Is Vancouver Canada's supervised injection facility cost-saving?	Empirical	Cost-benefit and cost-effectiveness analysis	BC - Vancouver	Community (InSite-supervised injection facility)	HIV

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SIF	InSite (supervised injection facility): exemption from Canada's Controlled Drugs and Substances Act (Vancouver Coastal Health, 2007), allowing users to consume at a specific location without arrest	PWID who use InSite	N/A	All	N/A	To estimate the number of new HIV infections and deaths prevented among PWID each year and use this with estimated lifetime public health care costs of a new HIV infection and the value of a life to calculate the societal benefits of Insite (supervised injection facility) using mathematical modelling. The annual costs of operating the SIF are used to measure the social costs of Insite. In using this information, we calculate cost-effectiveness and benefit-cost ratios for the SIF.
SIF	InSite: provides safe, supervised location to inject drugs using sterile, facility supplied syringes. Health personnel are available to monitor the injection process and intervene if necessary. They treat infections, provide counseling and referral to drug treatment programs.	IDU	13,500 (modeling parameter since approx 13,500 IDU reside in greater Vancouver.	All	N/A	<p>1. to calculate number of HIV infections prevented 2. to determine if the savings in averted HIV-related medical care costs are more than sufficient to offset Insite's operating costs</p> <p>We conducted a mathematical model-based analysis to shed further light on the economic efficiency of Insite. The objectives of this analysis were: (i) to quantify the epidemiological impact of the Insite supervised injection facility (number of HIV infections prevented), including the facility's syringe exchange program; and (ii) to determine whether or not the associated savings in averted HIV-related medical care costs are sufficient to offset Insite's operating costs—that is, to determine whether or not Insite is 'cost-saving'.</p>

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<p>Annual cost-effectiveness and cost-benefit of prevented HIV infections and overdose deaths</p>	<p>Variables used: number of needles used per client-year, number and rate of shared injections per year, HIV prevalence rate, cumulative probability of HIV infection, number of IDUs in population, participation rate at Insite, reduction of risk from participation, number of needles in circulation, percentage of needles not cleaned, probability of HIV infection from a single injection, number of sharing partners, percentage of HIV infected needles</p>	<p>Through the use of conservative estimates, Vancouver's Insite (supervised injection facility), on average, prevents 35 new cases of HIV and about 3 deaths each year. This provides a societal benefit of more than \$6 million per year after considering the program costs indicating an average benefit-cost ratio of 5.1:1. Insite generates benefits from 2 sources: provision of clean injecting equipment and facilitating change in injecting behaviors in PWID.</p>	<p>Expansions of Insite should be considered in order to accommodate a greater proportion of the injections taking place in Vancouver's Downtown Eastside - in order to further reduce the harm from injecting drug use.</p>	<p>First, assessment of both the expansion of Insite to other locations and the costs of 24 hours operation of the facility should be carried out to determine whether the benefits from increased operating hours and increased facilities are greater than the increased operating costs. Second, public health benefits should be expanded to include diagnostics, immunization, referral to detoxification facilities and a correspondingly diminished use of various medical resources.</p>
<p>mathematical modeling to find out if the savings in averted HIV-related medical care costs are more than sufficient to offset Insite's operating costs.</p> <p># of incident HIV infections among Vancouver IDU and associated costs if Insite were closed</p>	<p>Modeling parameters used:  - IDU population parameters (IDU living in Vancouver, prevalence of HIV infection (%), annual incidence of HIV infection (%))  - Injection-related parameters (injections per IDU per year, injections with borrowed syringes (%))  - Syringes distributed in Vancouver per year (syringes distributed by Insite SEP, syringes distributed by non-Insite sources)  - Insite facility parameters (supervised facility injections per year, annual operating cost (CAD))</p>	<p>1. In the absence of Insite, the annual incident HIV cases would be 83.5 additional infections per year.  2. The life-time HIV-related medical care costs prevented are about \$17.6 million compared to \$3.0 million annual operating costs of Insite - highly cost-saving.</p> <p>Most infections prevented by Insite were due to the syringe exchange program.</p>	<p>Insite's safe injection facility and syringe exchange program reduce substantially the incidence of HIV infection within Vancouver's IDU community. The associated savings in averted HIV-related medical care costs are more than sufficient to offset Insite's operating costs.</p>	<p>None stated</p>

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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14</p> <p>Used conservative values as often as possible within each of the models</p>	<p>Only 2 health outcomes (HIV infection and overdose death) studied and used to measure benefit. Other health care outcomes not studied due to lack of data. Immunization, diagnostics, and referrals could all create further health benefits for this population. Mathematical modelling limitations: all benefits assumed to be linear, restricting the ways expansions of Insite can be assessed. Greater detail in fixed versus variable costs would allow for better assessment of how and expansion of Insite would impact public health costs.</p>	<p>None stated</p>	<p>27/42=64.2%</p>	<p>31/42=74%</p>	<p>64.2+69/2=66.6%</p>		
<p>15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>None stated</p>	<p>1. scarcity of detailed information about the injection practices of Vancouver IDU 2. analyses did not account for sexual and other types of transmission 3. did not consider prevention of hepatitis C transmission and associated medical care savings 4. analyses were restricted to one-year time frame (do not reflect secondary (downstream) infections that were prevented as a consequence of infections prevented in this 1 yr time frame) 5. did not account for additional services provided by the supervised injection facility and the economic impact of these services.</p>	<p>This research cannot address socio-political concerns</p>	<p>25/42=59.5%</p>	<p>27/42= 64.29%</p>	<p>26/42=61.90%</p>		

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2009	Krüsi, A.; Small, W.; Wood, E.; Kerr, T.	AIDS Care	An integrated supervised injecting program within a care facility for HIV-positive individuals: a qualitative evaluation	Empirical	Qualitative - in-depth interview	BC - Vancouver	Other-Dr. Peter Centre	HIV
2008	Bayoumi, A.M.; Zaric, G.S.	Canadian Medical Association Journal	The cost-effectiveness of Vancouver's supervised injection facility	Empirical	Cost-benefit and cost-effectiveness analysis	BC - Vancouver	Community - Participants can fill their prescription at any pharmacy in the province; SIF in Vancouver	HCV, HIV

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<p>SIS</p>	<p>Interview of residents, users with HIV and staff of the DPC SIS centre in downtown Vancouver.</p>	<p>The interviewees included 15 male and seven female HIV-positive IDU. Six of the interviewees were residents at the DPC, and the remaining 16 individuals were day-program participants. The mean age among the sample was 43.8 (range 28-54), and the average number of years living with HIV was 12.</p>	<p>22 in-depth interviews</p>	<p>HIV+ PWID that are DPC participants and have used the Harm Reduction Room (HRR) at least once</p>	<p>N/A</p>	<p>Participant interviews were facilitated using a semi-structured topic guide encouraging discussion of experiences and impact of the HRR, care experiences at the DPC, and perceived barriers. Staff interviews were facilitated by a different topic guide consisting of questions concerning the operation and integration of the HRR into existing services. <b>To examine the perspectives of HIV-positive IDU and healthcare staff regarding an integrated SIF within an HIVcare facility, with the aim of evaluating the program's influence on access to prevention and care services for HIV-positive IDU.</b></p>
<p>SIS</p>	<p>Supervised injection site</p>	<p>The population included injection drug users, non-users, persons with HIV and hepatitis C virus infection, and those with combinations of these states.</p> <p>Whenever possible, we used Vancouver-specific data for our model, including published and unpublished data for cohorts from 2 studies — the Vancouver Injection Drug Users Study and the Scientific Evaluation of Supervised Injecting. We compared and supplemented these data with estimates from the medical literature. When several estimates were available, we gave the most emphasis to those from North American studies.</p>	<p>N/A - used model cohort. no info listed about # of people in cohort</p>	<p>HIV/HCV+ PWID</p>	<p>VIDUS and SEOSI cohorts - The cohort for the model included individuals aged 15–64 years. We estimated the rate at which individuals leave the cohort over time because of death, aging beyond 64 years or migration out of the Vancouver area. We also estimated the rate at which individuals enter the cohort over time by attaining an age of 15 years or by migrating into the Vancouver area. Vancouver has an estimated population of 578 040, of whom 74% were within the age distribution of our cohort.<sup>11</sup> The supervised injection facility is located in the Downtown Eastside neighbourhood, where about 5000 injection drug users live.<sup>12–14</sup> We included another 2000 users estimated to live in other areas of the city.<sup>12</sup> We excluded other users in the Greater Vancouver Area to facilitate homogeneity in each model compartment and to allow for effective calibration of our model against epidemiologic data. Because the epidemiology of drug use is imprecise, we varied the estimate of the number of users from 3000 to 20 000 in sensitivity analyses.</p>	<p>We used computer simulation to estimate the projected impact of Vancouver's supervised injection site on survival, rates of HIV and hepatitis C virus infection, referral to methadone maintenance treatment and associated costs. Our goal was to assess the cost-effectiveness of the facility and thus provide important insights into this policy debate.</p>

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<p>Access to care; Acceptability; Safer injection education; Relationships; Delivery of care; Overdose prevention; Legitimate space; Type of substance; Shame</p>	<p>None</p>	<p>highlight the potential benefits of integrating harm reduction interventions within HIV care settings, and suggest that a SIFs can positively influence access to care for HIV-positive IDU.</p>	<p>present study highlight the value of integrating a SIF within a comprehensive care facility for HIV-positive IDU</p>	<p>None stated</p>
<p>Our main outcome of interest was the incremental costeffectiveness ratio of the supervised injection facility. Our comparator was a situation in which there was no such facility but other interventions for injection drug users were in place, including needle-exchange programs and methadone maintenance treatment. Although there is no single threshold at which an intervention is considered "cost-effective," we evaluated under which scenarios the incremental cost effectiveness of the facility would exceed \$50 000 per lifeyear gained, a commonly used benchmark</p>	<p>Outcomes included life-years gained, costs, and incremental cost-effectiveness ratios discounted at 5% per year</p>	<p>Focusing on the base assumption of decreased needle sharing as the only effect of the supervised injection facility, we found that the facility was associated with an incremental net savings of almost \$14 million and 920 life-years gained over 10 years. When we also considered the health effect of increased use of safe injection practices, the incremental net savings increased to more than \$20 million and the number of life-years gained to 1070. Further increases were estimated when we considered all 3 health benefits: the incremental net savings was more than \$18 million and the number of life-years gained 1175. Results were sensitive to assumptions related to injection frequency, the risk of HIV transmission through needle sharing, the frequency of safe injection practices among users of the facility, the costs of HIV-related care and of operating the facility, and the proportion of users who inject in the facility.</p> <p>Our analysis indicates that the supervised injection facility in Vancouver is associated with improved health outcomes. These health benefits and cost savings are due in large part to averted cases of HIV infection, even with conservative estimates of efficacy.</p> <p>The model also estimated that, with the introduction of the supervised injection facility, the size of the population of injection drug users would increase owing to fewer HIV and hepatitis C virus infections and reduced associated mortality.</p>	<p>Our analysis indicates that the supervised injection facility in Vancouver is associated with improved health outcomes. These health benefits and cost savings are due in large part to averted cases of HIV infection, even with conservative estimates of efficacy.</p>	<p>More generally, our observations indicate the challenge of evaluating an intervention without a contemporary control group and underscore the importance of considering intermediate outcomes, such as temporal trends in injecting practices, alongside epidemiologic data.</p>

<p>None stated</p>	<p>The present study has a number of limitations. The views represented in our sample may not be entirely representative of all DPC participants who have made use of the HRR, as some participants with deviating views may have chosen not to participate. This study focused exclusively on the views of IDU who have used the HRR at least once; therefore, the views of IDU who attend the DPC but do not use the service are not represented. Likewise, the perspectives of non-IDU DPC participants regarding the HRR were not explored here. Added insights, concerning the acceptability of the HRR could have been gained by interviewing opiate and stimulant users separately. However, this proved difficult in this setting as most IDU are polysubstance users. In addition, we did not collect data on the impact of the HRR on participants' safer sex practices, and therefore we were unable to make inferences concerning the impact of the HRR on participants' sexual practices. Lastly, although we investigated the impact of the HRR on access to care, we did not obtain data specific to the impact of the HRR on access and adherence to HAART. Future studies should seek to investigate this further. An integrated SIF may provide unique opportunities for enhancing uptake of directly observed HAART.</p>	<p>None stated</p>	<p>26/42=62%</p>	<p>25/42=59.5%</p>	<p>26+25/84=60.7%</p>		
<p>None stated</p>	<p>First, we modelled the efficacy of the facility by focusing on the injecting behaviours of regular users of the facility. We may have overestimated efficacy if injection practices of users injecting outside the facility did not change; however, available analyses to date suggest a general change in injecting practices.<sup>3</sup> We may also have underestimated efficacy by ignoring the decreased risk associated with injections within the facility by casual users.</p> <p>Second, we excluded from our analysis potentially important health benefits such as decreased overdose, reduced transmission of hepatitis B, and reduced incidence of softtissue infections, endocarditis and other harms associated with unhygienic injection. We also did not account for benefits such as increased access to, and delivery of, other health services, social services and crisis management as well as societal benefits such as decreased cost of crime and improved social order, which may be particularly important in economic terms.<sup>59</sup></p> <p>Third, we considered methadone maintenance treatment as the only form of drug addiction treatment and not more expensive treatments such as residential care. Finally, we did not consider quality of life or a full probabilistic analysis. Our estimates are specific to the characteristics of the Vancouver supervised injection facility and may not be generalizable to other settings, since the size and geographic location of the population of</p>	<p>Did not include in analysis other health benefits like decreased overdose, reduced hepatitis B transmission, reduced incidence of soft-tissue infection, endocarditis and other harms associated with unhygienic injection. Did not account for benefits like increased access to and delivery of other health servies, social services and crisis management, as well as societal benefits such as decreased cost of crime and improved social order. Did not consider quality of life or full probabilistic analysis</p>	<p>29/42 = 69.05%</p>	<p>27/42 = 64.3%</p>	<p>28/42 = 66.67%</p>		



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2008	Expert Advisory Committee on Supervised Injection Site Research (Ogborne, A.; Larke, B.; Plecas, D.; Waller, I.; Rehm, J.)	Prepared for the Hon. Tony Clement Minister of Health Government of Canada	Vancouver's INSITE Service and Other Supervised Injection Sites: What Has Been Learned from Research? - Final Report of the Expert Advisory Committee on Supervised Injection Site Research [Health Canada, 2008]	Non-empirical	Report	BC - Vancouver	Community	HIV, HCV, other injection related infections such as skin abscesses
2008	Small, W.; Wood, E.; Lloyd-Smith, E.; Tyndall, M.; Kerr, T.	Drug and Alcohol Dependence	Accessing care for injection-related infections through a medically supervised injecting facility: A qualitative study	Empirical	Qualitative - interviews	BC - Vancouver	Community - Scientific Evaluation of Supervised Injecting (SEOSI)	HIV
Opioid Agonist Therapy (MMT / OST / OAT / HAT / MAT) n=12								

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1	SIF	InSite - supervised injection facility (SIF) as government-sanctioned space for users to inject pre-obtained drugs	N/A	N/A	All	N/A	<p>The purpose was to evaluate the services of Insite- focusing on the following:</p> <ul style="list-style-type: none"> <li>i) access to health and addiction care increased or not</li> <li>ii) overdose fatalities reduced or not</li> <li>iii) transmission of blood-borne viral infections and other injection related infections reduced or not</li> <li>iv) public order improved or not</li> </ul> <p>I'm not sure if this means the same thing but: The research reviewed relates to the formally stated objectives of INSITE, namely to: i) increase access to health and addiction care; ii) reduce overdose fatalities; iii) reduce transmission of blood-borne viral infections and other injection related infections; and iv) improve public order.</p>
2	SIF	supervised injection facilities	All	50	All, including indigenous and transgender participants	<p>Interview participants were recruited from the Scientific Evaluation of Supervised Injecting (SEOSI) cohort, which is composed of over 1000 randomly selected SIF users (Wood et al., 2004). Interviewees were selected from persons attending the research office for cohort interviews and recruiting efforts created a sample consistent with the socio-demographic profile of SEOSI</p> <p>no detailed info on the cohort in this paper</p>	<p>Given the significance of injection-related infections locally and the lack of evidence concerning the impact of SIFs on access to medical care, this study sought to investigate IDU perspectives regarding the impact of SIF utilization upon access to care for injection-related infections.</p>

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N/A	N/A	<p>1) INSITE Utilization and User Characteristics Over 8,000 people have visited INSITE to inject drugs. 18% or 1506 of these 8,000 people account for 86% of the overall visits to INSITE. Less than 10% used INSITE for all injections. The median number of visits is approximately 8. Average of &gt;600 visits/day - operating near capacity. ~80% of visits are for injecting, 20% for other support services like counseling.</p> <p>2) Services Provided: INSITE provides clean, supervised environments for injection drug use, clean syringes, needles and swabs, and ensures safe disposal of used needles. It also provides nursing services, including for skin abscesses, to large numbers of users. Users rate services as highly satisfactory. Letters of support and surveys show that health professionals, local police, local community and general public have positive/neutral views of INSITE services and the majority wish to see the service continue. Some local police are neutral, but not antagonistic. Opposition to the service tends to decrease over time.</p> <p>3) Increasing Access to Health and Addiction Care: INSITE encourages users to seek counseling, detoxification and treatment. Existence of INSITE facilitated immunization of IDUs in DTE during an outbreak of pneumococcal pneumonia in 2006.</p> <p>4) Impact on Overdose Fatalities:Mathematical modelling (see caution about validity below) suggests that INSITE saves about one life a year as a result of intervening in overdose events.</p> <p>5) Reducing the Transmission of Blood-Borne Viral Infections &amp; Other Injection Related Infections: Results indicated needle sharing decreases with increased use of SISs but the Expert Advisory Committee were not convinced that these assumptions were entirely valid. This was based on mathematical modeling, based on assumptions about baseline rates of needle sharing – which require estimates for # of HIV cases that might have</p>	None stated	future research could inform policy decisions, including research on the social determinants of injection drug users.
Looked at themes that emerged in interviews about IDUs' perspectives (ex. related to barriers to care, increased access to care and connecting to other medical care facilities); influence of SIF upon healthcare access and potential impact of SIF use on the management of injection-related infections	None	<p>The perspectives of IDU participating in this study indicate that contact with nurses within the SIF serves to facilitate access to care for injection-related infections. The presence of nurses on-site was viewed as mediating common difficulties experienced in accessing medical attention, which may cause IDU to delay seeking care (described nursing staff were non-judgmental and "experienced" in working with IDU). SIF nurses provided care and treatment for infections on-site, and helped to connect IDU with off-site medical attention as required. The findings of the present study suggest that the SIF addresses important social and structural factors which constrain the ability of IDU to access care for injection-related infections. Also, helped by operating on a schedule that better accommodates the hours kept by many IDU.</p>	<p>In summary, our findings indicate that SIFs may help facilitate access to assessment, care, and treatment of injection-related infections among active IDU. By providing non-judgemental care within a setting where drug use can be accommodated, SIFs appear to have potential to overcome many of the well documented social and structural barriers to care commonly experienced by IDU.</p> <p>Our findings highlight the value of SIF as an adapted primary care service, which has potential to increase uptake of health services among IDU</p> <p>Enhancing access to primary care among IDU has the potential to reduce emergency room use and hospitalization among this population (Laine et al., 2005; Friedmann et al., 2006). This suggests that further benefits may be gained by increasing the volume of nursing care provided through the SIF, as well as expanding the capacity of SIF locally. Additionally, increasing IDU access to nursing care through needle exchange programs and outreach services may be effective in expanding the reach of care in urban settings without SIFs</p>	None stated

None stated	Limitations to validity - mathematical models based on assumptions of baseline rates of needle sharing, risks of HIV transmission and other variables, generated very wide ranging estimates for the # of HIV cases that might have been prevented. The EAC were not convinced that these assumptions were entirely valid.	None stated	N/A	N/A	N/A		
None stated	Although interviewees were told that the study was being conducted independently of the SIF, it is possible that social desirability bias affected the responses of some participants. Our findings are based upon interviews with a sample of local IDU who use the SIF, and should be further evaluated through quantitative investigation.	None stated	18/42 = 42.86 %	19/42 = 45.2%	18/42 = 42.86 %		

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2019	Grebely, J.; Drolet, M.; Nwankwo, C.; Torrens, M.; Kastelic, A.; Walcher, S.; Somaini, L.; Mulvihill, E.; Ertl, J.; Liebert, R.; Litwin, A.H.	International Journal of Drug Policy	Perceptions and self-reported competency related to testing, management and treatment of hepatitis C virus infection among physicians prescribing opioid agonist treatment: The C-SCOPE study	Empirical	Survey	Multi-country: Australia, Canada, Europe, USA	Clinics	HCV
2018	Butt, Z.A.; Shrestha, N.; Gesink, D.; Murti, M.; Buxton, J.A.; Gilbert, M.; Balshaw, R.F.; Wong, S.; Kuo, M.; Wong, J.; Yu, A.; Alvarez, M.; Samji, H.; Roth, D.; Consolacion, T.; Hull, M.W.; Ogilvie, G.; Tyndall, M.W.; Krajdien, M.; Janjua, N.Z.	Clinical Epidemiology	Effect of opioid-substitution therapy and mental health counseling on HIV risk among hepatitis C-infected individuals	Empirical	Cohort - prospective	BC	Not specified	HIV, HCV

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OAT	Mix of OAT settings - 53% in publicly funded clinics, 47% in privately funded clinics (30% in private for-profit and 17% in private not-for profit). 38% substance use clinics/centres, 20% in hospital department providing treatment to people receiving OAT, 15% in OAT clinic/centre, 27% other institutions/offices providing treatment for people receiving OAT.	Physicians providing care for patients in a clinic providing OAT, treating PWID with OAT.	203 physicians	PWID receiving OAT treatment at OAT certified centres	N/A	To test perceptions and competency related to HCV testing, management and treatment among physicians practicing in clinics offering opioid agonist treatment (OAT)
OST, mental health counselling	OST, mental health counselling	people with HCV (subgroup: IDUs, MSM)	36,077 participants with HCV	HCV+	The British Columbia Hepatitis Testers Cohort (BC-HTC) includes all individuals (~1.5 million; approximately a third of all BC residents) tested for HCV or HIV at the BC Centre for Disease Control Public Health Laboratory (BCCDCPHL) or diagnosed with HCV, HBV, HIV/AIDS, or active tuberculosis (TB). People diagnosed with HCV during 1990–2013 but negative for HIV were eligible for inclusion	To estimate the risk of HIV and factors preventing and promoting this risk among people living with HCV in British Columbia

1-5 scale for perceptions and 1-7 scale for perceived competency	Multiple covariates including region, primary specialty of physician, number of years in practice, practice source of funding, type of OAT institution, OAT clinic setting, number of patients managed on OAT who are PWID in past 12 months, number of patients personally managed on OAT who are PWID with HCV in past 12 months, number of patients treated for HCV in past 6 months, awareness of any document/tools for screening, diagnosis, or treatment of HCV, training on these in the past year, looked at information on these in past year, read or consulted any specified guidelines for HCV, and availability of a protocol for testing/diagnosing HCV.	73% of physicians were aware of documents for screening, diagnosis or treatment of HCV, 65% obtained same information in past year, 37% attended training on HCV in past year, 37% read specific guidelines. Over 80% recognized it was extremely or very important to perform HCV antibody testing among PWID, perform HCV RNA testing in those who are HCV antibody positive, and for people with detectable HCV RNA test to be linked to professional treating HCV, receive a liver disease assessment, for PWID diagnosed with HCV to initiate HCV treatment and achieve a virological response. However, 69% felt that it was extremely or very important for them to be able to prescribe and treat HCV in PWID.	Need to develop and implement programs to enhance HCV education and improve clinical practice among physicians prescribing OAT, including improving knowledge of assessment of liver disease and DAA therapies. National guidelines could provide important foundation for clinical practice and standardization of care, and increase number of patients accessing HCV treatment. Ensure appropriate referrals amongst multidisciplinary health care	None stated
Time to HIV infection at least 6 weeks after HCV diagnosis	sexual orientation (MSM), IDU, OST, mental health counseling, age at HCV diagnosis, year of HCV diagnosis, hepatitis B, social deprivation quintile at time of test; major mental illness; depression; psychosis; problematic alcohol use; active TB; sex; HIV tests per year	In Cox regression model, injection-drug use (aHR 1.47, 95% CI 1.33–1.63) and being a man who has sex with men (aHR 2.78, 95% CI 2.14–3.61) were associated with higher risk of HIV infection. Opioid substitution therapy (OST) (aHR 0.59, 95% CI 0.52–0.67) and mental health counseling (aHR 0.48, 95% CI 0.43–0.53) were associated with lower risk of HIV infection	Improving access to OST could prevent transmission of HIV and other bloodborne infections, especially in settings where access is limited.	As causal inferences based on intervention effects in observational studies are prone to biases, future research using experimental designs is needed to validate the results of this study

<p>The panels for selection in other countries matched the AMA demographic characteristics.</p>	<p>Possible selection bias due to voluntary opt-in panels as methods for recruitment. There is heterogeneity in the availability of healthcare services, education and training, and policies for HCV testing and treatment between countries which may have influenced responses. As a cross-sectional survey, cannot establish causality. Recall bias from self-reported survey.</p>	<p>Perception and knowledge gaps exist amongst physicians providing OAT care for the screening and treatment of Hep C for PWID</p>	<p>35/42 = 83.3%</p>	<p>29/42 = 69%</p>	<p>31/42 = 73.8 %</p>		
<p>large population based cohort study</p>	<p>1. misclassification of variables 2. observational study: causal inferences based on intervention effects are prone to biases 3. some interactions could not be evaluated because of smaller samples (MSM, IDU)</p>	<p>None stated</p>	<p>33/42=78.5%</p>	<p>33/42=78.5%</p>	<p>78.5+78.5/2=78.5%</p>		



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2018	Klimas, J.; Dong, H.; Fairbairn, N.; Socias, E.; Barrios, R.; Wood, E.; Kerr, T.; Montaner, J.; Milloy, M.-J.	Addiction Science & Clinical Practice	Eligibility for heroin-assisted treatment (HAT) among people who inject opioids and are living with HIV in a Canadian setting	Empirical	Cohort - retrospective	BC - Vancouver	Not specified	HIV
2018	Ti, L.; Socias, M.E.; Wood, E.; Milloy, M.-J.; Nosova, E.; DeBeck, K.; Kerr, T.; Hayashi, K.	PLOS ONE	The impact of methadone maintenance therapy on access to regular physician care regarding hepatitis C among people who inject drugs	Empirical	Cohort - prospective	BC - Vancouver	Not specified	HCV

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HAT	Heroin-Assisted treatment (HAT); injectable diacetylmorphine (i.e. prescribed heroin) for treatment-refractory opioid use disorder	Had completed at least one study visit between December 1, 2005 and May 31, 2014, over 18 years old, reported ever injecting drugs at least once at the baseline interview; people who use illicit drugs and live with HIV in Vancouver, Canada (ACCESS - cohort of HIV-seropositive adults who have used at least one illicit drug, other than or in addition to cannabis, in the month prior to recruitment	478 participants included in analysis	HIV+	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS)-HIV-seropositive adults who have used at least one illicit drug in the month prior to recruitment; baseline and biannual interviewer administered questionnaires assessing sociodemography, drug use and related behaviours, characteristics and exposures, nursing exam and phlebotomy for HIV monitoring, HIV-1 RNA viral loads, CD4 counts, ART records accessed from linked retrospective and prospective HIV monitoring profile	Estimate the prevalence and characteristics of HIV-positive individuals eligible for HAT in Vancouver, Canada
MMT	Methadone Maintenance Therapy	The study was conducted between September 2005 and May 2015 and the sample was restricted to participants who: 1) were HCV seropositive at baseline or became positive during follow-up via serologic test; 2) completed at least one follow-up visit after the HCV-positive test result; 3) reported a history of injection drug use at a visit when their blood sample tested positive for HCV; 4) did not die during the study period (or up until the most recent date of death confirmed through a confidential linkage to the provincial Vital Statistics database); 5) has chronic HCV, defined via self-report as those who reported not having naturally cleared HCV, which was derived through a series of questions related to HCV	1627	All	1)The Vancouver Injection Drug Users Study (VIDUS)--> May 1996 (inception)--> consists of HIV-negative adult (18 years of age) PWID. All participants must have injected an illicit drug in the previous month to be eligible for inclusion, 2) AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS)--> May 1996 (inception)-->cohort of HIV-positive adults people who use illicit drugs (PWUD) who must have recently used an illicit drug other than or in addition to cannabis in the month prior to enrollment. 3) the At-Risk Youth Study (ARYS)--> October 2005 (inception) --> street-involved youth between the ages of 14 and 26 who have used illicit drugs other than or in addition to cannabis in the month prior to enrollment. All individuals must have resided in the greater Vancouver region and provided written informed consent to be eligible for the study. All 3 studies are open cohort studies. At baseline and semi-annually, participants completed a harmonized interviewer-administered questionnaire that elicited information on socio-demographic characteristics, drug use patterns, involvement in addiction treatment, and other relevant exposures and outcomes (i.e., participants in the VIDUS, ACCESS, and ARYS studies completed an identical questionnaire to allow for pooled analyses and comparisons across cohorts). Additionally, at each study visit, participants provided blood samples for HIV and HCV serologic tests and HIV disease monitoring as appropriate.	To examine the relationship between MMT and having access to regular physician care regarding HCV among HCV-positive PWID

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<p>Eligibility for HAT: Defined HAT eligibility as (a) currently residing in the study area (i.e., the city of Vancouver); (b) current regular injection of illicit opioids (i.e., ≥ one time in the previous 6 months); (c) at least two self-reported prior SUD treatment attempts, including one episode of OAT (i.e., methadone or buprenorphine/naloxone); (d) at least 5 years of illicit opioid use; and (e) poor health, or psychosocial functioning, defined as a self-reported mental health diagnosis</p>	<p>Explanatory variables: age; gender; Caucasian ethnicity/ancestry; hepatitis C virus antibody status; number of years of using injection heroin at baseline; homelessness; relationship status; highest level of education completed; formal employment (yes vs. no, i.e., regular job, temporary job, or self-employed); money spent on drugs per day (≥ \$50 per day vs. &lt; \$50 per day); drug dealing; ≥ daily non-injection cocaine use (yes vs. no); ≥ daily non-injection heroin use (yes vs. no); ≥ daily crack use (yes vs. no); ≥ daily methamphetamine use (yes vs. no); non-fatal overdose (yes vs. no); lent used syringe (yes vs. no); recent incarceration (yes vs. no); engagement in any form of unprotected sex (yes vs. no); exchange of sex for gifts, food, shelter, clothes, etc. (yes vs. no); being a victim of violence, defined as having been attacked or assaulted (yes vs. no) Included HIV clinical monitoring data: HIV-1 RNA plasma viral load (VL), using the median of all observations in the previous 6 months or, if none, the most recent observation; ART engagement, using the number of</p>	<p>94 (19.7%) were deemed to be eligible for HAT at least once through study period: 32 reported eligible for once, 19 twice, 11 thrice, and 32 more than thrice; Periods of HAT eligibility associated with markers of severe SUD, such as high-intensity illicit drug use, homelessness and drug dealing; Males in HIV-positive sample were less likely to be deemed HAT eligible</p>	<p>Identifies benefits of expanding access to HAT in population, particularly for those who do not respond to typical treatment of opioid use disorder; expanding HAT to this population might influence the factors linked with sub-optimal HIV treatment and improve HIV treatment outcomes, thus contributing to TasP goals. Moreover, they provide further support for the potential role of HAT in decreasing opioid-associated morbidity and mortality.</p>	<p>More evidence needed for improving access to HAT and its contribution to TasP; need to establish benefit of concomitant HAT/ART treatment for people with treatment refractory opioid use disorder; research into a potential role of HAT in facilitating HAT adherence among women is needed</p>
<p>Main explanatory variable: having been enrolled in MMT in the last 6 months. Found an independent association between being on MMT and having access to regular physician care regarding HCV, even after adjusting for a range of confounders.</p>	<p>sex (male vs. female); age (per year increase); HIV serostatus (positive vs. negative); homelessness (yes vs. no); daily opioid injection, including heroin or prescription opioid injection (daily vs. &lt; daily); daily stimulant injection, including cocaine, crack cocaine, or crystal methamphetamine injection (daily vs. &lt; daily); stable employment, defined as having a regular job, temporary work, or selfemployed (yes vs. no); hospital use (yes vs. no); and incarceration (yes vs. no). All variables except for sex were time-updated and referred to the six-month period prior to the follow-up interview unless otherwise indicated.</p>	<p>A substantial proportion of a community-recruited sample of HCV-positive PWID reported having access to regular physician care regarding HCV. Furthermore, researchers found an independent association between being on MMT and having access to regular physician care regarding HCV, even after adjusting for a range of confounders. The findings from this study are consistent with previous research focused on HIV care that highlighted the positive role that MMT plays in ART retention, adherence, and viral load suppression among HIV-positive PWID [17,25,26]. Specifically, a randomized controlled trial found that PWID enrolled in a MMT program reported significantly faster entry into HIV care compared to those without a history of MMT. There are a number of possible pathways that underline the relationship between engagement in MMT and accessing HCV care. First, it is likely that access to addiction treatment gives physicians an opportunity to discuss HCV testing, treatment, and care options and can provide an entry point for the delivery of these services to patients. Second, MMT is generally daily dispensed through pharmacies in BC; thus, community pharmacists are uniquely positioned to link PWID to HCV testing and treatment .</p>	<p>Adds to a growing body of evidence that suggests that the integration of infectious disease testing, treatment and care within addiction programs is associated with better health outcomes and increased use of healthcare services among PWID and other marginalized populations. Has been done successfully in several settings with high prevalence of HCV; several international guidelines focusing on HCV recommend integrated, multidisciplinary approaches to scale up testing and treatment services. This study also highlights the need to engage PWID in addiction treatment, when appropriate.</p>	<p>Future research needed to more clearly understand relationship b/w engagement in MMT and accessing HCV care; little is known about other possible pathways</p>

<p>None stated</p>	<p>sample was not recruited at random and cannot be assumed to represent the larger population of PWID in Vancouver; did not confirm the diagnoses of mental health and opioid use disorder; underestimated the rates of risky behaviours and drug use (e.g. syringe sharing) due to the effects of social desirability; did not assess potential risk factors for opioid overdose (e.g. current co-use of benzodiazepines, alcohol or non-injection heroin)</p>	<p>None stated</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>		
<p>The study adds to the literature by suggesting that the benefits of opioid substitution treatment programs, such as MMT, may also be extended to the HCV context given the associated effectiveness in linking PWID to HCV care.</p>	<p>First, the observational nature of the study design limited our ability to determine a direct causal relationship between being enrolled in MMT and having access to regular physician care regarding HCV. Second, the study included some data derived from self-report and thus, may be subject to reporting biases. Specifically, participants may have responded as having access to regular physician care regarding HCV if their addiction medicine doctor who prescribed their methadone asked them casually about their HCV once during a six-month period. This may have biased their results away from the null. Third, there may be unmeasured confounding given that we were only able to control for known confounders. Fourth, they measured chronic HCV status based on HCV-antibody positive test results and self-reports of having never been told by a physician that they no longer have HCV but were not on HCV treatment. Therefore, it is unknown whether these individuals had active HCV infection during the study period. Lastly, their study was not randomly recruited and therefore may not be representative of local PWID or generalizable to other PWID populations outside of Vancouver.</p>	<p>None stated</p>	<p>26/42=61.9%</p>	<p>25/42 = 59.52%</p>	<p>26/42=61.9%</p>		

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2017	Socias, M. E.; Wood, E.; McNeil, R.; Kerr, T.; Dong, H.; Shoveller, J.; Montaner, J.; Milloy, M.-J.	International Journal of Drug Policy	Unintended impacts of regulatory changes to British Columbia Methadone Maintenance Program on addiction and HIV-related outcomes: An interrupted time series analysis	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2017	Vashishtha, D.; Mittal, M.; Werb, D.	Harm Reduction Journal	The North American opioid epidemic: current challenges and a call for treatment as prevention	Non-empirical	Commentary	Multi-country: USA, Canada and Mexico	Community	HCV, HIV

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MMT	Switch to 10x more concentrated methadone formulation and restrictions in pharmacy delivery services	HIV-positive opioid users in Vancouver	331	HIV+ (part of ACCESS cohort)	Data drawn from ACCESS cohort. Prospective cohort of HIV-positive PWUD. Inclusion: HIV positive, age 18+, live in greater Vancouver, used illicit drugs other than cannabis in past month. For present study, participants were included if: reported any history of opioid use, with at least one follow-up visit in both the pre- (November 1, 2012 – January 31, 2014) and postpolicy periods (March 1, 2014 – May 31, 2015). Thus, we included data from 15 months prior to the change in the MMT program and up to 15 months after	To evaluate possible unintended effects of changes to regulatory reforms to MMT program in BC on illicit drug use pattern and HIV treatment outcomes among HIV-positive opioid users
MAT	Medication-assisted treatment, treatment as prevention strategy	PWID in the USA, Canada and Mexico	N/A	All	N/A	Review current challenges in responding to opioid misuse, describe barriers to the treatment of opioid use disorder (OUD) through MAT, and explore public health-oriented policy and interventional options to effectively respond to OUD in North America.

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<p>4 yes/no outcomes: 1. current engagement in MMT (self-reported) 2. self-reported illicit heroin injection (within 6 months prior to interview) 3. optimal ART adherence (&gt;=95%) 4. VL suppression</p>	<p>None</p>	<p>although the policy change was associated with a gradual increase in the proportion of HIV-positive opioid users enrolled in MMT, rates of illicit heroin injection increased sharply immediately after the implementation of the policy and remained elevated throughout the study period. Importantly, changes in the MMT program appeared to also have affected engagement in HIV care as demonstrated by a significant drop in ART adherence immediately after the policy change. However, this change was not accompanied by a corresponding decrease in viral suppression rates. In summary, our study provides empirical evidence detailing possible unintended consequences of the regulatory changes introduced to the BC MMT program in February 2014, changes that were made with the goals of improving the quality of OAT. Importantly, adverse effects were documented not only in drug use behavior (increase in illicit heroin injection), but also in HIV-related treatment outcomes (decrease in ART adherence).</p>	<p>Need for interventions that support MMT clients upon introduction of new medication formulations or other changes that affect medication dispensation. First and foremost, the affected community should be consulted and involved in the planning, development and implementation phases of proposed new approaches. Persons on methadone's input on key aspects of implementation strategies and their capacity to provide insights into potential unexpected outcomes (positive and negative) is of paramount importance. findings from this study may help inform the development and implementation of policies targeted to individuals with opioid use disorders (and related comorbidities). Particularly, results from the present analysis underscore the need to consider potential unintended effects of altering health policies targeting vulnerable populations, the need to develop appropriate mitigation strategies, as well as to involve all relevant stakeholders, including the affected community in the planning and implementation of these new policies</p>	<p>please see previous column</p>
<p>N/A</p>	<p>N/A</p>	<p>Part of the treatment gap in the USA is likely attributable to the lack of a national healthcare system, which has allowed for the scale up of buprenorphine prescribing in France and Canada. Further, the USA is lacking in low-threshold programs which increase treatment accessibility for the greatest number of individuals in need. Such low-threshold models are becoming the standard of care in countries such as Canada and elsewhere. In Vancouver, Canada, for example, methadone is dispensed at pharmacies and integrated mental health treatment, and social support services for pregnant opioid users have been implemented. In the USA, the Substance Abuse and Mental Health Services Administration (SAMHSA) will expand MAT availability by allowing previously trained nurse practitioners and physician assistants to prescribe MAT in the form of buprenorphine in early 2017. Only 2.2% of US physicians are waived to provide buprenorphine. Physicians have also been characterized as having "low confidence in addressing addiction, limited access to addiction experts, lack of institutional or office support, lack of behavioral health services, and reimbursement concerns". This is related to the fact that physicians receive little addiction training and have ongoing stigma against treating PWID. Mexico faces an even more serious challenge, as primary care physicians are unable to directly prescribe MAT to patients. This is because methadone treatment is the only MAT option available in Mexico, and it is only dispensed in a few private clinics, while only three government-sponsored clinics are in operation across the entire country</p>	<p>First, federal and state-level funding for MAT treatment centers must be increased to address the 92% of opioid-dependent individuals eligible for MAT treatment. Second, barriers that hamper the capacity of clinicians to prescribe MAT must be removed. Third, geographic "hot spots" of opioid misuse among marginalized populations should be prioritized for the provision of low-threshold and experimental approaches to MAT delivery. Fourth, policies of drug decriminalization should be considered to reduce the risk that PWID populations will remain "hidden," less likely to engage in care, and at higher risk of HIV transmission. Fifth, there must be an overall shift towards more harm reduction-oriented policing practices. Finally, pharmaceutical companies and academic research institutions should be further engaged in developing novel pharmacotherapies for OUD accessible to a range of populations. Clinicians must support and advocate for the development of an evidence-based addiction treatment system that is accessible to marginalized populations and effective in managing the unacceptably high burden of OUD across the USA, Mexico, and Canada.</p>	<p>None stated</p>

<p>The major strength of this study is the use of a strong longitudinal, quasi-experimental design to evaluate the impacts of regulatory changes in BC MMT program on both addiction and HIV-related treatment outcomes among HIV-positive opioid users in Vancouver, BC. Importantly, this study design allows to control from pre-existing levels and trends of each of the outcomes evaluated. Another strength of the present analysis is the utilization of a closed cohort (i.e., inclusion of participants with observations in both the pre- and post-policy periods), which reduces the possibility of selection-attrition biases.</p>	<p>First, our study sample was not randomly selected, and thus, might not be representative of the larger population of HIV-positive opioid users in Vancouver. Likewise, results from this study may not be completely generalizable to HIV-negative opioid users or to settings with different health policies and clinical practices (e.g., low threshold MMT services, universal and comprehensive coverage for HIV care). Second, we relied on self-reported data for some of the outcomes evaluated, which may be subject to social-desirability bias. Third, the use of aggregated individual-level data does not allow making inferences about individual-level outcomes. Fourth, the relatively small number of observations per data point and related variability within the data, as reflected by the presence of some outliers, may have resulted in reduced power to detect small changes in the outcomes. Finally, given that we only measured heroin injection the impact of the policy change on other forms of opioid misuse could not be assessed.</p>	<p>None stated</p>	<p>27/42 = 64.29%</p>	<p>29/42=69%</p>	<p>28/42 = 66.67%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		



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2016	Socias, M.E.; Wood, E.; Small, W.; Dong, H.; Shoveller, J.; Kerr, T.; Montaner, J.; Milloy, M.-J.	Drug and Alcohol Dependence	Methadone maintenance therapy and viral suppression among HIV-infected opioid users: The impacts of crack and injection cocaine use	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2016	Islam, N.; Kraiden, M.; Shoveller, J.; Gustafson, P.; Gilbert, M.; Buxton, J.; Wong, J.; Tyndall, T.; Janjua, N.Z.; BC-HTC Team	Conference report for The National AIDS Treatment Advocacy Project (NATAP) in the American Association for the Study of Liver Diseases (AASLD), Boston, MA, November 2016	Impact of drug use and opioid substitution therapy on Hepatitis C reinfection: The BC Hepatitis Testers Cohort	Empirical	Cohort - prospective	BC	Not specified	HCV

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MMT	Methadone maintenance therapy (MMT) in HIV-infected opioid users	HIV-infected PWUD in Vancouver enrolled in MMT	397	HIV+ (part of ACCESS cohort)	Data drawn from ACCESS cohort. Prospective cohort of HIV-positive PWUD. Inclusion: HIV positive, age 18+, live in greater Vancouver, used illicit drugs other than cannabis in past month. Analysis included HIV-positive opioid users who completed at least 1 study interview between 2005 and 2014. For this analysis, we included participants who reported any history of opioid use, and who were ART exposed at enrollment. ART-naïve participants who subsequently initiated ART were included from the next follow-up interview forward. We further restricted our analytical sample to participants who had at least one VL measure and one CD4 measure within ± 180 days of the earliest interview.	To evaluate whether the effect of MMT on viral suppression differs among opioid users with distinct patterns of cocaine use. Including impacts of high intensity cocaine use (ie. at least daily) and potential differences between routes of administration (ie. crack smoking, cocaine injection)
OST, mental health counseling	Opioid substitution therapy (OST) and mental health counselling	Individuals testing positive for HCV and then clearing infection	5,945 used in analysis; 46,940 positive HCV RNA test, then 19,346 at least one negative RNA test; 5,960 spontaneous clearance (3,690 had at least 1 PCR after clearance) and 3,652 cleared after SVR treatment (2,255 had at least 1 PCR after clearance)	HCV+	The BC Hepatitis Testers Cohort (BC-HTC) includes at least 1.5 million people who have been tested for HBV, HCV, HIV, or active TB; no further information provided in document	To estimate incidence rate of re-infection of HCV and to identify factors associated with reinfection risk, and examine the role of opioid substitution therapy (OST) on HCV reinfection among PWID

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<p>Time-updated measure of viral load (VL). Viral suppression was defined as having a HIV plasma viral load &lt; 50 copies/mL (yes versus no) in the previous six months.</p>	<p>The primary explanatory variable was a time-varying measure of enrollment in a methadone maintenance program (MMT) for the treatment of opioid use disorders in the six-month period preceding the study interview (yes vs. no). Time-fixed variables of interest at baseline included: age (per 10 years older); gender (male versus female); ethnicity (Caucasian versus non-Caucasian); highest educational attainment (high school or postsecondary education vs. less than high school completion); and depressive symptomatology Time-varying variables included frequent heroin injection (<math>\geq</math> daily versus &lt; daily); heavy alcohol use (<math>\geq 4</math> drinks/day versus &lt;4 drinks/day); unstable housing (yes versus no); incarceration (yes versus no); involvement in sex work (yes versus no); and employment (yes versus no)</p>	<p>Enrollment in MMT program was associated with increased odds of VL suppression among less than daily cocaine injectors. There was no beneficial effect of MMT for more frequent cocaine injectors. There was a positive impact on VL for frequent cocaine injectors who were retained on MMT for longer consecutive periods. Crack cocaine use did not undermine positive impact of MMT on viral suppression. Unexpectedly, there was a greater positive effect of MMT on viral suppression among daily crack cocaine smokers (vs. less frequent crack cocaine smokers).</p>	<p>There is a need for multi-level approaches that include harm reduction opportunities (ex. safe smoking facilities and distribution of safer smoking kits) and other social support interventions in order to improve health and wellbeing of people who smoke crack-cocaine.</p> <p>Our findings underscore the urgent need to identify novel and effective pharmacotherapies for the treatment of cocaine use disorders, as well as social-structural interventions to support engagement in addiction and HIV care for this population</p>	<p>Future research is needed to better understand what enables some cocaine users to be retained in MMT. There is a need for research that identifies effective pharmacotherapies to treat cocaine use disorders, as well as individual and structural interventions that promote ART adherence and the reduction of drug-related harm. Further research is needed to understand combination of interventions that are best suited to address health and social harms associated with crack-cocaine use disorders.</p>
<p>HCV reinfection as positive RNA test after two consecutive negative PCR tests <math>\geq 28</math> days apart</p>	<p>age, gender, HIV coinfection, mental health counseling visit, injection drug use, problematic alcohol use, material deprivation, viral genotype</p>	<p>Incidence of reinfection higher among those who spontaneously cleared [(1.6 or 2.9/100person year vs. treated with sustained virologic response (SVR)], HIV coinfection (2.56 or 4.17/100PY) and PWID (1.77 or 3.34/100PY). OST, mental health counselling and female gender reduced risk of reinfection.</p>	<p>More PWIDs are being treated with DAAs, therefore reinfection rates are important to note as insurance companies may be reticent to cover HCV treatment and reinfection rates are expected to increase; OST and mental health counseling reduce risk of reinfection.</p>	<p>Further investigation needed to assess impact of OST and other harm reduction strategies</p>

None stated	<p>1. Sample not randomly selected, so might not be representative of larger population of HIV-positive opioid-dependent individuals in Vancouver or other settings.</p> <p>2. Many measures relied on self-reported data (possible social desirability bias and underreporting).</p> <p>3. This was an observational study - despite the utilization of multivariable statistical approaches, we cannot exclude the possibility of residual unmeasured confounding.</p> <p>4. The current analytic approach does not allow us to tease out relative contributions of behavioral and biological pathways and lower rates of viral suppression among frequent cocaine injectors.</p> <p>5. the absence of a positive association between MMT and VL suppression during periods of at least daily cocaine injection may have been the result of low statistical power</p> <p>5. the study design does not allow us to determine the exact temporal relationship between enrollment in MMT and VL suppression within any six-month period.</p>	None stated	25/42 = 59.52%	31/42=73.8%	27/42 = 64.29%		
None stated	None stated	Reinfection with HCV presents a barrier to treating HCV and for insurers to cover HCV treatments, which must be addressed in order to eliminate HCV. Need to assess OST and other harm reduction strategies such as mental health counselling in reinfection.	20/42 = 47.6%	21/42=50%	48.80%		

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2015	Ahamad, K.; Hayashi, K.; Nguyen, P.; Dobrer, S.; Kerr, T.; Schütz, C.G.; Montaner, J.S.; Wood, E.	Lancet HIV	Low Threshold Methadone Protects against HIV Incidence in a Canadian Setting: An Observational Cohort Study	Empirical	Cohort - prospective	BC - Vancouver	Multiple - clinic and community	HIV
2014	McNeil, R.; Small, W.; Wood, E.; Kerr, T.	Soc Sci Med.	Hospitals as a 'risk environment: An ethno-epidemiological study of voluntary and involuntary discharge from hospital against medical advice among people who inject drugs	Empirical	Qualitative - ethno-epidemiological	BC - Vancouver	Hospital	HCV, HIV

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MMT	Low threshold availability of methadone maintenance therapy (prescribed in primary care and dispensed in community pharmacy)	PWID who were HIV negative at study recruitment and completed at least one follow-up interview between May 1996-May 2013	1639 PWID participants receiving MMT who were initially HIV negative and returned for at least one follow up visit for assess for HIV infection	All	Vancouver Injection Drug Users Study (VIDUS); started in 1996; individuals were eligible to enroll in VIDUS if they had injected illicit drugs at least once in the previous month and resided in the Greater Vancouver region at enrollment; interviewer administered questionnaire and blood samples at enrollment and semi-annual follow-up visits;	To determine the effect of methadone maintenance therapy on HIV incidence in a Canadian setting with low threshold availability of methadone
MMT	MMT, opioid use in hospital	Cohort participants who reported that they had recently been discharged from hospital against medical advice during follow-up surveys that are part of their participation in cohort studies.	30	All PWID leaving AMA from hospital, ensured inclusion of women and people of Aboriginal ancestry to make more representative of population	Vancouver Injection Drug Users Study (VIDUS), AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS); These cohort studies include more than 2000 current and former drug users, and their methods have been described in detail elsewhere (Strathdee et al., 1997; Wood et al., 2003).	To explore how the social-structural dynamics within hospitals function to produce discharges against medical advice among PWID. Particularly concerned with the role of abstinence-based drug policies in hospital settings in framing the social and structural-environmental contexts of hospital care, pain management practices, and in-hospital drug use. Finally, we aimed to identify ways in which the hospital 'risk environment' could be modified to minimize the potential for adverse outcomes, including discharges AMA

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<p>Time to HIV seroconversion, defined as the time interval between recruitment into the cohort and estimated date of HIV seroconversion/infection. Date of HIV infection was estimated as the midpoint between the last HIV negative test and the first HIV positive test.</p>	<p>Primary explanatory variable was use of methadone maintenance therapy (MMT) in previous six months; gender (male vs. female); age (in years); ethnicity (Caucasian vs. other); incarceration defined as being in detention, prison or jail for overnight or longer (yes vs. no); sex work involvement defined as exchanging sex for money, food, drugs, shelter or other commodities (yes vs. no); at least daily injection heroin use (yes vs. no); at least daily injection cocaine use (yes vs. no); syringe borrowing (yes vs. no); required help injecting (yes vs. no); at least daily crack cocaine smoking (yes vs. no); and unprotected vaginal/anal sex (yes vs. no). Unless specified, all behavioural variables refer to activities taking place within the previous six months.</p>	<p>In this setting, where methadone is available through primary care physicians and dispensed by community pharmacies, the use of methadone was independently associated with a reduced rate of HIV infection after adjusting for potential confounders including demographic and drug using characteristics. Of 1639 HIV-negative individuals, 138 cases of HIV seroconversion occurred during a median of 75.5 months of follow-up. Methadone maintenance therapy was independently associated with a reduced hazard of HIV infection (adjusted relative hazard: 0.64[90% confidence interval: 0.41-0.98]).</p>	<p>This study reinforces that decreasing barriers to methadone by providing access through primary care physicians is safe, equally effective and increases access to an essential medical therapy, especially important in settings where HIV related to drug use remains high</p>	<p>Even though a RCT might be better, it could be unethical given the known benefits of methadone maintenance therapy</p>
<p>None</p>	<p>None</p>	<p>Participant accounts underscored the role of social and structural forces in shaping pain management practices and producing suffering that framed experiences in hospital setting; findings underscore how the perception that participants were 'drug-seeking' was critical in shaping the social-environmental context of hospital care, and likely delegitimized the very real pain and suffering that they endured; Most participants expressed that heroin and prescription opioid injection were the only avenues available to them to address pain and withdrawal; Participants characterized hospitals as "jails" or "prisons", and viewed hospital staff as playing the role of "cop" in enforcing abstinence-only drug policies; Whereas all participants indicated that they had been admitted to hospital for complex health problems, and required extensive treatment, approximately one third of our participants reported that they were involuntarily discharged for in-hospital drug use; Approximately half of our participants reported that they left hospital altogether when using drugs. <b>Diverse forms of social control that function to regulate drug use in hospitals (i.e. surveillance and regulation) increases the potential for drug-related harm and discharges against medical advice. Hospitals are a risk environment where social and structural conditions produce discharges AMA and, in turn, more complicated and protracted medical treatment.</b></p>	<p>Reforms may be needed to rethink pain management strategies and re-orient towards alleviating suffering, including changes to legal and professional regulations regarding the prescribing of prescription opioids; education and training programs aimed at improving cultural competency among hospital staff; increase addiction and pain management training among physicians; implement MMT, opioid substitution therapy, appropriate pain management for hospitalized PWID; implement comprehensive harm reduction into hospitals; involving PWID in the development and implementation of hospital-based harm reduction services may serve to increase the acceptability of such services while promoting agency among PWID. "In this regard, our findings highlight the importance of considering how diverse settings constitute risk environments for injection drug-using populations, and how drug criminalization frames the structural vulnerability of PWID in these settings." - highlights potential for larger law/policy change</p>	<p>Further research into the perspectives of hospital staff regarding the care of injection drug-using populations, and the potential integration of harm reduction services into hospitals, is urgently needed.</p>

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</p> <p>Primary endpoint was based on objective laboratory evidence of HIV seroconversion.</p>	<p>Observational design which may not account for all confounding factors, and self-reporting for several measures, including methadone use</p>	<p>Not all jurisdictions allow for low threshold dispensing of methadone, limiting access and use of MMT</p>	<p>31/42 = 73.8%</p>	<p>26/42=62</p>	<p>27/42 = 64.3%</p>	<p>Background? 5. MacArthur GJ, Minozzi S, Martin N, et al. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis. BMJ: British Medical Journal. 2012;345.</p>	
<p>19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35</p> <p>None stated</p>	<p>Because participants had been discharged against medical advice, their experiences in hospital may be negatively biased, and may not be representative of those who completed treatment; findings are specific to hospitals in the Vancouver area and, although they generate insights that may be relevant to other settings where hospital care is shaped by similar contextual forces, they cannot fully account for PWID's experiences in hospitals; participants were covered by universal, publicly-funded health care insurance, PWID in other settings may face additional financial barriers to care that have an additional impact on hospital care; findings represent only the perspectives of PWID not hospital staff</p>	<p>Limited attention has been paid to how untreated and undertreated pain shapes experiences in hospital settings</p>	<p>33/42 = 78.6 %</p>	<p>32/42 = 76.2%</p>	<p>33/42 = 78.6 %</p>		

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2014	Nolan, S.; Lima, V.D.; Fairbairn, N.; Kerr, T.; Montaner, J.; Grebely, J.; Wood, E.	Addiction	The impact of methadone maintenance therapy on hepatitis c incidence among illicit drug users	Empirical	Cohort - retrospective	BC - Vancouver	Community (MMT prescribed by community physicians and dispensed through a network of community pharmacies)	HCV
2010	Buxton, J.A.; Kuo, M. E.; Ramji, S.; Yu, A.; Kraiden, M.	Canadian Journal Public Health Rev Canadienne de Sante Publique	Methadone Use in Relation to Hepatitis C Virus Testing in British Columbia	Empirical	Cohort - retrospective	BC	Community (Community Pharmacy Dispensory recorded by Provincial Public Reference Laboratory)	HCV
<b>Integrated ID and addictions programs n=10</b>								
2018	Beaulieu, T.; Hayashi, K.; Milloy, M.J.; Nosova, E.; DeBeck, K.; Montaner, J.; Kerr, T.; Ti, L.	Journal of Acquired Immune Deficiency Syndrome	<u>HIV Serostatus and Having Access to a Physician for Regular Hepatitis C Virus Care Among People Who Inject Drugs</u>	Empirical	Cohort - prospective	BC - Vancouver	Multiple - clinic and community	HCV, HIV

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	MMT	Methadone maintenance treatment (MMT); enrolment in based on self-report of methadone prescription	HCV negative PWID (HCV negative at study recruitment and had at least one follow-up visit to assess for HCV incidence between May 1996-Dec 2012)	1004	All	ARYS, VIDUS, and ACCESS cohorts; 1) Cohort of drug using stress-involved youth between 14-26 years of age, recruitment beginning in 2005, 2/3) Individual studies of HIV-negative and HIV-positive drug users respectively, recruitment beginning in 1996; Each cohort populated through snowball sampling and extensive street outreach and participants were eligible for inclusion if they lived in greater Vancouver region at enrolment, reported using illicit drug other than marijuana in past 30 days and provided written informed consent	To determine the relationship between methadone maintenance therapy and hepatitis C seroconversion among illicit drug users
16 17 18 19 20 21 22 23 24	MMT	MMT (Linking data of methadone use and serological testing of HCV infection)	Records of individuals in BC tested for anti-HCV 1992-2004 linked to methadone dispensation records 1995-2006	404,941 in total in the provincial laboratory dataset who had anti-HIV testing and were linked to PharmaNet records: 10,314 individuals underwent anti-HIV testing and received MMT	All	PharmaNet database for methadone dispensation (Sept 1, 1995- Dec 31, 2006) and HCV antibody by Provincial Public Reference Lab (April 1, 1992-July 16, 2004); total of 404,941 both databases; in total 10,314 both tested for HCV and receiving MMT	To determine if methadone use can reduce transmission of HCV/bloodborne pathogens
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	Counselling and care linkage	HIV, HCV posttest counselling and linkage to care	PWID who are enrolled in three different prospective cohort studies Vancouver Injection Drug Users Study (VIDUS), AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS) and At-Risk Youth Study (ARYS) and HCV positive completing at least one follow up after positive HCV test result	1627 HCV-positive PWID	All	3 prospective cohorts - VIDUS (18 yrs or more with injection drug use), ACCESS (18 yrs or more with illicit drug use) and ARYS (14-26 yrs, street involved with illicit drug use). Recruitment through self-referral, street outreach and snowball sampling. Participants answered interview-questionnaire at baseline and 6 months and provided blood samples for HIV and HCV tests at each visit. HIV disease monitored. Inclusion criteria: HCV positive at baseline or seroconversion between September 2005 and May 2015. Minimum of 1 follow-up visit after a positive HCV result. Reporting a history of injection drug use after testing positive for HCV at the same visit. Chronic HCV condition. Did not die during the study period.	to assess the effect of HIV serostatus on accessing HCV physician care among PWID in Vancouver, Canada

<p>Baseline and semi-annual HCV antibody testing and standardized interviewer administered questionnaire soliciting self-reported data relating to drug use patterns, risk behaviors, detailed sociodemographic data and status of active participation in MMT program</p>	<p>Primary variable of interest was enrolment in MMT. Other hypothesized factors associated with HCV incidence determined a priori: age (per year older), gender (male vs female), ethnicity (Caucasian vs other), and education defined as high school completion (yes vs no); other measurements: unstable housing (defined as living in single occupancy room in a hotel, a recovery house or treatment, hostel, shelter, jail, or having no fixed address in last 6 months (yes vs no)), syringe borrowing (injecting with used syringe in last 6 months (yes vs no)), various measure of drug use in last 6 months (daily injecting of cocaine, heroin, or methamphetamine (all yes vs no)).</p>	<p>Demonstrated high incidence of HCV seroconversion among drug users in this setting. Furthermore, enrolment in MMT was found to be independently protective after adjustment for a range of sociodemographic and drug use characteristics. Additionally, despite higher risk drug users being attracted into MMT use, the protective effect was maintained with prolonged duration of MMT exposure in a dose dependent fashion.</p>	<p>This study adds to known benefits of MMT on reducing harms associated with heroin and other drug use. These findings have important implications for healthcare systems and settings which continue to limit the availability of MMT.</p>	<p>Study adds to current knowledge as previous meta-analysis was only able to identify 8 studies examining impact of opioid replacement therapy on HCV incidence with heterogeneity and sample sizes impacting results. RCT might be better, however would raise feasibility issues due to duration of follow-up required to demonstrate effect and ethical issues due to non-provision of MMT give proven benefits in treatment of heroin addiction</p>
<p>Number of Anti-HCV positive in people using MMT</p>	<p>None</p>	<p>64% of individuals on MMT were already positive for HCV; more females than males tested for anti-HCV; males high seropositive; 40% of multiple neg antiHCV who receive MMT are female</p>	<p>Missed prevention opportunities and support prior to MMT and require an intergrative care model</p>	<p>None stated</p>
<p>Access to a physician for regular HCV care, defined by any self-reported access to a doctor or specialist for regular HCV care at least once in the past 6 months</p>	<p>The primary explanatory variable was HIV-seropositivity (defined as a positive HIV antibody test. Confounders included age (per yr increase), sex, homelessness, incarceration, daily or more opioid injection drug use, daily or more stimulant injection drug use, enrollment in methadone maintenance therapy and hospitalization. The potential mediator variable (frequency of engagement in health care) was defined as having had access to a doctor, clinic, specialist, jail doctor, health care outside hospital/clinic/doctor's office, or other in the past 6 months. Once vs once every 2-3 months vs once a month vs every 1-2 weeks vs more than once a week vs no access.</p>	<p>HIV serostatus was significantly and positively associated with access to a physician for regular HCV care in multivariable analysis even after adjusting for potential confounders (Adjusted Odds Ratio = 1.99; 95% CI: 1.77 - 2.24). Mediation analysis resulted in a statistically significant Average Casual Mediation Effect (ACME) (Beta = 0.049; 95% CI: 0.044 - 0.054), Average Direct Effect (ADE) (Beta = 0.141; 95% CI: 0.111 - 0.170), and Total Effect (TE) (Beta = 0.190; 95% CI: 0.161 - 1.216). This indicates that for HIV - seropositive participants, an increased frequency of engagement in health care resulted in a higher likelihood of accessing HCV physician care, as compared to HIV-seronegative participants. About 26% of the effect was attributable to mediation.</p>	<p>Results indicate an essential need for scaling-up equitable access to HCV treatment, with service delivery models tailored to the needs of PWID. A sustained commitment to address these contextual differences will be necessary to mitigate the alarming rates of preventable HCV-related morbidity and mortality among PWID.</p>	<p>Future research should examine the impact of policy change on uptake of HCV treatment and care among PWID. Researchers should also explore the impact of diverse and innovative delivery strategies (OAT clinics and HCV-related services, community-based clinics, peer-based models of treatment and task shifting) to improve uptake of HCV care for HCV-monoinfected PWID.</p>

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</p> <p>Present study was conducted among a large community recruited cohort in a setting where access to MMT is less restricted than in US since it is provided in office practices and dispensed through community pharmacies. While some drug use behaviours and other variables may be collinear, given that both the univariable and multivariable models produced similar odds ratios (with the same direction and strength) for each explanatory variable, we are reassured and feel confident multicollinearity did not influence our final results.</p>	<p>Not a random sample as there are no registries of drug user populations in setting; observational study (cannot infer causation and possibility of unmeasured confounders influencing results); use of needle exchange facility is potential confounder; variables in study often relied on self-report (potential underreporting); in some settings, buprenorphine/naloxone is more widely available than MMT but could not assess impact of this due to infrequent use in this setting.</p>	<p>Although high rates of HCV among drug users have previously been reported, the literature investigating the effect of MMT on HCV incidence in this patient population is scarce.</p>	<p>29/42 = 69.0%</p>	<p>23/42= 54.7%</p>	<p>26/42= 61.9%</p>		
<p>16 17 18 19 20 21 22 23 24</p> <p>subjects from entire province as cohort</p>	<p>not a prospective linkage of data</p>	<p>None stated</p>	<p>32/42=76%</p>	<p>27/42=64.2%</p>	<p>64.2+66.6/2=65.4%</p>		
<p>25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Data collection instruments and procedures were harmonized across the 3 cohorts to allow for pooled analyses.</p>	<p>Self-reported data tends to be biased toward social desirability and recall. Results may be affected by residual and unmeasured confounding. Observational study not able to establish causation. The results of this nonrandom sample may not be generalizable beyond the sample.</p>	<p>None stated</p>	<p>25/42=59.5%</p>	<p>28/42=66%</p>	<p>59.5+66/2=62.7%</p>		

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2018	Nouch, S.; Gallagher, L.; Erickson, M.; Elbaharia, R.; Zhang, W.; Wang, L.; Bacani, N.; Kason, D.; Kleban, H.; Knebel, L.; Hall, D.; Barrios, R.; Hull, M.	Int J Drug Policy	Factors associated with lost to follow-up after hepatitis C treatment delivered by primary care teams in an inner-city multi-site program, Vancouver, Canada	Empirical	Cohort - prospective	BC - Vancouver	Community (Three Vancouver Coastal Health hep C treatment sites: Pender, Downtown, and Ravensong Community Health Centres)	HCV
2017	Artenie, A.A.; Zang, G.; Daniel, M.; Fortier, E.; Jutras-Aswad, D.; Puzhko, S.; Bruneau, J.	International Journal of Drug Policy	Short-term injection drug use changes following hepatitis C virus (HCV) assessment and treatment among persons who inject drugs with acute HCV infection	Empirical	Cohort - prospective	QC - Montreal	Multiple - clinic and community	HCV

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Interdisciplinary care	Support groups, education Interdisciplinary HCV treatment program delivered by family physicians within community based on primary care and addictions clinics. Treatment includes OAT and optional drop-in support groups facilitated by a counsellor. Treatment regimens are primarily determined by access to reimbursement for medications as guided by provincial coverage (included DAA therapy, limited access to sofosbuvir/ribavirin). Also included education on adherence and reinfection.	Inclusion criteria included any clients at the three centers who were initiating DAA HCV therapy. Only individuals who received at least one dose of HCV medications and who were due for SVR 12 before Aug 1, 2017 were included in analysis.	138 individuals analysed	All	Participants were enrolled prospectively in a treatment cohort between Oct 2015 and Oct 2017. Exclusion criteria included clients unable to give informed consent and those who had already initiated HCV treatment at another non-VCH site.	To evaluate the effectiveness of an interdisciplinary HCV treatment program delivered by family physicians within community based primary care and addiction clinics, as determined by SVR, with a secondary focus on factors associated with becoming lost to follow-up after HCV treatment.
Addiction medicine clinic for HCV infection - targeted health care services offered to people with mental health co-morbidity and social instability.	Referred to the CHUM addiction medicine clinic for HCV infection follow-up, assessment for treatment suitability, and HCV related care by a team of clinicians, nurses and social workers. Targeted health care services offered to people with mental health co-morbidity and social instability.	PWID with acute HCV infection in Montreal	87 PWID with acute HCV infection	All	IMPACT was a longitudinal prospective cohort study in Montreal to determine the effect of antiviral treatment on behavior change in a community-based sample of current PWID with acute HCV who were systematically referred for HCV clinical assessment and offered targeted health services. Duration was between November 2007 and March 2015. Participants were recruited from 2 main sources: a) the St. Luc Cohort (community-based cohort study assessing the factors of HCV and HIV transmission among current PWID and b) local community and hospital-based collaborating clinics, including the addiction medicine clinic at the Centre Hospitalier de l'Universite de Montreal (CHUM). Eligibility: 18 years of age, history of injected drugs in the past 6 months, infection of acute HCV (lab evidence). Exclusion: pregnancy and HIV seropositivity. Inclusion: completed three study visits Exclusion: chronic HCV infection	Primary objective of the study was to compare eligible IMPACT participants who received treatment to those who chose not to engage in HCV care post-diagnosis with respect to their drug use changes over the course of a year. Secondary objective was to compare a subset of PWID not eligible for treatment either because there was spontaneous clearance of infection or had contra-indications to therapy with those who did not engage in HCV care regarding one-year injection drug use changes.

<p>The primary endpoint was SVR 12, which was defined as a documented negative HCV RNA at least 12 weeks after treatment completion (with a two-week window for early results), regardless of location of the bloodwork.</p>	<p>Study outcomes were treatment completion, treatment response (SVR), and post-treatment follow-up. Other outcomes included re-infection versus viral relapse and loss to follow-up. Participant gender, age, ethnicity, education, and current housing status. Additional variables collected included nature and frequency of illicit substance use, history of ever-injecting and recent injection use (within the last month), alcohol use patterns, harm reduction program use and attendance to medical care, and HCV specific care.</p>	<p>Of 138 individuals included in the analysis, 52% were on opioid agonist therapy (OAT), 75% reported a history of injection drug use (IDU), with 25% reporting IDU in the month prior to treatment initiation. ITT SVR across all sites and genotypes was 86% and mITT was 95%. There was a significant difference in mITT for those reporting recent IDU compared to those who did not (87% vs 99% <math>p = 0.03</math>).</p> <p>HCV treatment programs integrated into community health centers with family-physicians as prescribers can be effective for inner-city patients, including for PWID. Follow-up after treatment is still a challenge. Participants receiving OAT addiction care in the same location as their HCV care were less likely to be lost to follow-up with the HCV program and appropriate post-treatment lab monitoring.</p>	<p>Our results, along with several other real-world studies, suggest that more efforts are needed to explore how to maintain engagement after HCV treatment. Our findings suggest that integrating HCV treatment within similar primary care and addictions clinics who see patients already engaged on OAT, may help to improve follow-up after treatment.</p>	<p>Qualitative studies exploring patients' ideas, beliefs and feelings after HCV treatment and reasons for not returning for care may help understand this important issue. Further studies exploring the integration of HCV treatment into existing primary care and addiction care clinics who see many HCV+ patients may provide further insights into the feasibility to expand treatment uptake within these populations and improve follow-up.</p>
<p>Past-month injection drug use examined dichotomously at the 3rd study visit corresponding to 12-month follow-up. Since participants started treatment at different time points following enrollment, visit three was chosen as the endpoint for this study.</p>	<p>Primary exposure variable was HCV care, consisting of four categories: received treatment, spontaneously cleared the infection, presented with a contra-indication to treatment, and chose not to engage in HCV care. Covariates adjusted for in statistical analyses included age, gender, education, injection drug use in the month before baseline assessment, duration of injection drug use, recent homelessness, receiving opioid agonist therapy (OAS) at baseline interview.</p>	<p>Participants who received treatment were less likely to report injection drug use at 1 year follow-up (adjusted odds ratio (AOR): 0.18, 95% CI: 0.04-0.76) compared to those who chose not to engage in HCV care after diagnosis. The odds of reporting injection drug use at follow-up were considerably lower in participants who showed contra-indication to treatment (AOR: 0.24, 95% CI: 0.05-1.22) and spontaneous resolution of infection (AOR: 0.34, 95% CI: 0.08-1.40) compared to those not engaged in HCV care although p-values were not significant at the 0.05 level.</p>	<p>Receipt of HCV treatment is associated with a lower likelihood of reporting injection drug use; emphasizing the importance of offering access to HCV assessment and treatment</p>	<p>Further research is needed to investigate which aspects of HCV care are likely to help support changes in drug use patterns</p>

<p>Our results add important real-world outcome data from the community setting with information on substance use and a detailed look at follow-up after treatment.</p>	<p>We enrolled participants from the first group of patients considered for HCV therapy following the funding approval of DAAs – which may represent a more stable population who were engaged in care and waiting for treatment. Enrollment in the study was voluntary so those who enrolled may have also represented a more engaged population than all those receiving treatment within the same programs. The significant rate of no response to recent substance use question on the questionnaires (21%) and the possibility that participants who responded may have underreported substance use at the time of treatment initiation due to social desirability bias, together may have contributed to an underestimation of rates of active substance use in the cohort. In addition, data collected on alcohol use was limited and its effect on follow-up may not have been captured. Furthermore, our information on outcomes beyond provincially available HCV RNA is limited by the lack of information on participants who have not returned for care.</p>	<p>As this is a population with high rates of cirrhosis and medical comorbidities, it is important to explore interventions to improve followup.</p>	<p>29/42 = 64.2%</p>	<p>26/42 = 61.9%</p>	<p>27/42 = 64.3%</p>		
<p>the only study to have been conducted in a sample of active PWID recruited from the community, majority of whom were not involved in HCV care at the start of the study demonstrating real-world responses following access to HCV assessment and treatment among PWID.</p>	<ol style="list-style-type: none"> <li>1. participant self-selection relating to engaging in HCV assessment and treatment.</li> <li>2. loss to follow-up</li> <li>3. Injection drug use (outcome variable) was assessed through self-report which may lead to social desirability bias.</li> <li>4. Modest sample size affected the ability to obtain more precise results.</li> <li>5. It is unclear if the study's results are generalizable to current HCV treatment regimens as treatment regimen has changed from interferon-based to direct-acting antiviral (DAA); individuals included in our study may not be representative of the patient population considered for treatment in the current DAA era; study only focuses on changes in injection drug use measured at two time points using a binary variable</li> </ol>	<p>None stated</p>	<p>27/42=64.2%</p>	<p>28/42=67%</p>	<p>64.2+67/2=65.6%</p>		



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2017	Ti, L.; Dong, H.; Kerr, T.; Turje, R. B.; Parashar, S.; Min, J. E.; Montaner, J.; Wood, E.; Milloy, M.-J.	HHS Public Access	The effect of engagement in an HIV/AIDS integrated health programme on plasma HIV-1 RNA suppression among HIV-positive people who use illicit drugs: a marginal structural modelling analysis	Empirical	Cohort - prospective	BC - Vancouver	Other- Dr. Peter Centre (DPC), HIV/AIDS care facility	HIV
2016	Fernando, S.; McNeil, R.; Closson, K.; Samji, H.; Kirkland, S.; Strike, C.; Baltzer Turje, R.; Zhang, W.; Hogg, R.S.; Parashar, S.	Harm Reduction Journal	An integrated approach to care attracts people living with HIV who use illicit drugs in an urban centre with a concentrated HIV epidemic	Empirical	Mixed methods - Linked data from cohort study with administrative data	BC - Vancouver	Not specified	HIV

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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17</p> <p>Integrated health program</p>	<p>An low threshold HIV/AIDS focused adults integrated health program that supports PLWHA facing barriers like homelessness, poverty, mental health and addiction</p>	<p>HIV-positive PWUD who are exposed to Highly Active Antiretroviral Therapy (HAART)</p>	<p>746</p>	<p>All</p>	<p>AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS) , a community recruited open prospective study of HIV positive people who illicit drugs. Study began in 1996, participants were recruited from Vancouver's Downtown Eastside if they were: 18 years or older, resided in the greater Vancouver region, were HIV-positive upon entry, illicit drugs other than or in addition to cannabis in the mouth prior to enrolment, provided informed written consent. Study included 746 participants who are HIV-positive PWUD and received at least one day of HAART before the end of the study period, and at least one day of observation of CD4 cell count and VL within <math>\pm</math> 180 days of the day they entered the study.</p>	<p>To estimate the effect of being a DPC client on viral load suppression among HIV-positive PWUD in Vancouver using a marginal structural model applied to observational data with comprehensive information on VL determinants</p>
<p>18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Integrated care facility</p>	<p>The Dr. Peter Centre (DPC) is a non-profit integrated care facility with a supervised injection room that serves people living with HIV (PLHIV) experiencing multiple barriers to social and health services in Vancouver. Services include, art, music, and recreation, complementary therapy, support and counseling, nursing and dietetics, amenities, food and nutrition.</p>	<p>PLHIV in Vancouver who inject drugs; Specific inclusion criteria: individuals enrolled in the DPC who were over the age of 19, residents of BC, and able to provide consent.</p>	<p>917 LISA cohort participants who had complete clinical data within the Drug Treatment Program (for access to ART for HIV); 558 were PWID and were included in analysis</p>	<p>PLHIV</p>	<p>The Drug Treatment Program at the BC Centre for Excellence in HIV/AIDS is mandated by the provincial government to distribute ART free of charge to all eligible PLHIV. Individuals are entered into the Drug Treatment Program when they are first prescribed ART, and a prospective profile of ART is maintained. Individuals who are 19 or older, residents of BC, and able to provide informed consent are eligible to participate in the Longitudinal Investigations into Supportive and Acillary health services (LISA) study, which aims to examine experiences of harder-to-reach PLHIV who have accessed ART in BC.</p>	<p>To characterize the engagement of PLHIV who use(d) illicit drugs and access the DPC</p>

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<p>Being a DPC patient was associated with a dramatically increased likelihood of VL suppression among HAART-exposed PWUD</p>	<p>age, gender, indigeneous ancestry, HCV positive-serostatus, homelessness, diagnosed mental illness, ≥daily heroin injection, ≥daily cocaine injection, ≥daily crack non-injection, enrollment in MMT, ≥95% HAART adherence, CD4 cell count</p>	<p>The results suggest a potentially important contribution of a harm reduction model-based HIV/AIDS integrated health program on producing optimal virologic responses in a setting where there are no financial barriers to HIV treatment and care. This is largely due to the comprehensive set of programs offered by the DPC, resulting in the provision of appropriate housing, treatment, and care for this vulnerable population. Specifically, the DPC incorporates a wide range of harm reduction strategies and services to meet the needs of clients, including the distribution of drug use paraphernalia as well as a supervised injection facility. Other services offered through the DPC, such as nursing care, art therapy, nutrition services, and counselling, may also be contributing to the observed association. The researchers hypothesize that the continuum of care provided by the DPC alleviates the health and social inequities experienced by this vulnerable population, thereby improving HIV-treatment outcomes.</p>	<p>Findings highlight the potential for harm reduction-based HIV/AIDS integrated health programs to complement existing TasP efforts by serving vulnerable individuals with complex comorbidities. Findings support calls for harm reduction programs and services to be incorporated into treatment strategies in order to provide HIV-positive PWUD with the necessary care to ensure VL suppression, limit disease progression and premature death and HIV transmission in this population</p>	<p>The authors hypothesize that the continuum of care provided by the DPC alleviates the health and social inequities experienced by this vulnerable population, thereby improving HIV-treatment outcomes, future in-depth qualitative research should seek to explore this area further</p>
<p>Self-reported use of DPC services, asked by 2 questions in the LISA survey - 1) what type of place do you live in right now? (DPC is an option), and 2) what 3 agencies or organization do you use most regularly?</p>	<p>Socio-demographic and psychosocial variables - gender, Indigenous ancestry, housing status, relationship status, employment status, use of supportive services, self-reported physician diagnosed mental health disorder, self perceived health now compared to a year prior, having experienced interpersonal violence, history of incarceration. Clinical variables - ART interruption lasting longer than 1 year between first ART date and time of interview, CD4 cell count at time of interview, and prescription dispensation period.</p>	<p>PLHIV with a history of injection drug use and who report attending the DPC experience more complex health challenges than those who do not attend the DPC. The DPC integrated model of care helps facilitate access to support services for this population. The DPC's referral and selection criteria successfully capture and engage key populations experiencing complex health issues.</p>	<p>Syndemic health issues, such as mental health and illicit drug use, interfere with individuals managing their HIV, and engaging in safer practices, thus acting as barriers to adequate care. Specialized health care services targeting PLHIV with complex health issues are necessary for optimization of health outcomes.</p>	<p>Further research on integrated health care facilities, including harm reduction services, should be conducted to examine whether they improve treatment outcomes and quality of life among key populations living with HIV</p>

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<p>The first study to utilize causal inference techniques for observational data to mimic randomized experiments in an effort to gain a better understanding of the effect of an HIV/AIDS integrated health program on VL suppression</p>	<p>It is difficult to truly assess causality given the observational nature of cohort studies and non-random assignment of participants to the exposure of interest, particularly when standard approaches for adjusting for confounders are usually biased due to time-dependent factors. There may be remaining unmeasured confounding (e.g., undiagnosed mental illness, other chronic comorbidities) given that the researchers were only able to control for known confounders. Another limitation of the study relates to the generalizability of the study findings since they included HIV-positive PWUD who were engaged in some level of care (e.g., on HAART), the study sample may not be representative of all HIV-positive PWUD and therefore the findings may not be widely generalizable. The main explanatory measure, being a DPC client, does not account for the frequency and type of service(s) used; thus, it is unclear whether there is a dose-dependent relationship exists between the main explanatory and outcome variables. The study included some data derived from self-report and thus, may be subject to reporting biases.</p>	<p>Missing time-varying confounder information was imputed using the most recent observation carried forward, as done in previous HIV-related analyses. &lt;2% of observations with missing data, so authors did not think there would be a significant impact on results.</p>	<p>24/42= 57.14%</p>	<p>21/42 = 50%</p>	<p>23/42=54.76%</p>		
<p>None stated</p>	<p>Measurement of lifetime history of injection drug use does not necessarily correspond to current drug use. Potential information bias as socio-demographic and psychosocial indicators were self-reported in the LISA survey.</p>	<p>DPC clients with a history of injection drug use are more than twice as likely to have been diagnosed with a mental health condition compared to non-DPC clients. Untreated mental health disorders can make navigating conventional health care systems arduous, often leaving PLHIV who live with these conditions more likely to experience suboptimal treatment and health outcomes.</p>	<p>26/42 = 61.9%</p>	<p>27/42 = 64.3%</p>	<p>61.9+64.3%/2=63.1%</p>		

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2016	Wang, L.; Panagiotoglou, D.; Eun Min, J.; DeBeck, K.; Milloy, M.J.; Kerr, T.; Hayashi, K.; Nosyk, B.	Drug Alcohol Depend	Inability to access health and social services associated with mental health among people who inject drugs in a canadian setting	Empirical	Cohort - prospective	BC - Vancouver	Community	HCV, HIV
2014	Bruneau, J.; Zang, G.; Abrahamowicz, M.; Jutras-Aswad, D.; Daniel, M.; Roy, E.	Clinical Infectious Diseases	Sustained drug use changes after hepatitis C screening and counseling among recently infected persons who inject drugs: a longitudinal study	Empirical	Cohort - prospective	QC - Montreal	Community	HCV

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<p>Existing health and social services</p>	<p>Access to health and social services by three of the most prevalent comorbid conditions among PWID: HIV, hepatitis C (HCV), and mental health, in an urban setting in Canada</p>	<p>PWID who were representing eight mutually exclusive patient subgroups with the occurrence of: HIV; HCV; mental health conditions; HIV and HCV; HIV and mental health conditions; HCV and mental health conditions; HIV, HCV and mental health conditions; and without any of the three conditions at each follow-up.</p>	<p>2494</p>	<p>All</p>	<p>the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), the Vancouver Injection Drug Users Study (VIDUS), and the At-Risk Youth Study (ARYS). The three cohorts have followed HIV-seropositive illicit drug users (aged greater than 18), HIV-seronegative PWID (aged greater than 18), and street-involved youth (aged 14–26) who use illicit drugs, respectively, through word of mouth, street outreach, and referrals since 2005</p>	<p>The current study evaluates PWID's self-reported inability to access health and social services and investigates the relationship between comorbid health conditions and self-reported inability to access health and social services in an urban setting of Vancouver, Canada.</p>
<p>Multidisciplinary care</p>	<p>HCV testing and HCV positive individuals receiving multidisciplinary individualized care</p>	<p>HCV-negative PWID of open cohort in Montreal who had undergone 3 or more visits between November 2004 and March 2011</p>	<p>208</p>	<p>All</p>	<p>St Luc Cohort: an open cohort of PWID started in Montreal in 1988 to study factors of HIV transmission. In 2004, the study focus was expanded to include factors of HCV, and the Hepatitis Cohort (HEPCO), an embedded cohort of HCV-negative PWID, was constituted. Eligibility: PWID who had injected drugs in the past 6 months, negative for HCV antibodies and 18 or more years of age. Cohort visits were scheduled at 6-month intervals and consisted of behavioral questionnaires administered by trained interviewers as well as venous blood samples obtained for HIV and HCV antibody testing. Participants were asked to return for their serostatus test results 2 weeks after their visits, when posttest counseling and referrals were provided. 208 participants (60%) who had undergone &gt; 3 visits between November 2004 and March 2011; measures include cocaine, heroin and illicit prescription opioid use, syringe sharing and alcohol</p>	<p>1. To assess substance use and injection behaviors after HCV status notification 2. to compare changes over time between PWID who tested positive and those that remained negative after test</p>

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<p>The primary outcome of interest was a binary variable capturing self-reported inability to access health and social services (barriers to access) in the last six months determined from the question "In the last six months, was there a time you were in need of a service but could not obtain it?".</p>	<p>PWID's sociodemographic characteristics, drug use patterns, criminalization, and other social and structural factors included age (in years), male (yes vs no), Caucasian (yes vs other), 2daily heroin use, 2daily stimulants use, 2daily prescription opioid use, non-fatal overdose, binge alcohol use, incarceration, homelessness, employment, sex work, drug dealing and reporting being the victim of violence. Other primary covariates of interest were the 3 most prevalent comorbid health conditions among PWID: HIV, HCV and mental health conditions. Mental health conditions were determined by a binary composite indicator constructed to capture any of the following self-reported markers of mental health conditions in the last 6 months: 1) diagnosis with one of the following mental illnesses: depression, anxiety, obsessive compulsive disorder, schizophrenia, PTSD, personality disorder, bipolar, attention deficit disorder, oppositional defiance disorder, other hyperactive disorder; 2) receipt of mental health treatment; 3) suicide attempt(s); and 4)</p>	<p>Over 65% of participants reported inability to access services at some point during the study period. Mental health conditions were independently associated with increased barriers to access health and social services (despite individual's participation in addiction treatment). HIV not associated with barriers to access services. PWID residing in DTES were less likely to report barriers to access than those residing outside DTES.</p>	<p>Findings reveal the need to improve the connection between HIV treatment settings and other services. It would be ideal to have a comprehensive integrated model with all required services located in the same setting or if not possible, through referral pathways and linkages to local services. Targeted strategies to seek and treatment mental health conditions in settings that serve PWID, and assist PWID with mental health conditions in navigating the healthcare system may improve the efficiency and effectiveness of publicly-funded health and social services.</p>	<p>None stated</p>
<p>Several outcome variables were examined to assess potential changes associated with notification of HCV status. Drug use and injection behavior outcomes were chosen because of their positive association with HCV acquisition. Measures included cocaine, heroin and illicit prescription opioid (mainly hydromorphone, hydrocodone, and fentanyl) injection, as well as syringe sharing. In addition, alcohol use was chosen for its clinical relevance in relation to liver disease. All outcomes were measured by questions pertaining to use within the past 6 months, expressed as dichotomous variables (with yes or no responses).</p>	<p>None</p>	<p>Of the 208 participants (83% male; mean age, 34.7 years, mean follow-up time, 39 months), 69 (33.2%) seroconverted to HCV. A linear decrease in syringe sharing behavior was observed over time after HCV and status notification, whereas a 10% decrease for each additional 3 months of follow-up was observed for injection cocaine and heroin use among HCV seroconverters but not among HCV-seronegative PWID (<math>P &lt; .05</math>). No significant changes were observed in alcohol use</p>	<p>There is a need for regular and individualized HCV screening and counseling for all PWID, with linkage to HCV treatment and opiate substitution therapy when appropriate</p>	<p>Further research is needed to identify what works, that is, whether it is the influence of the result itself (new infection), the intensified counseling, the reference for care, or a combination of all these factors</p>

<p>None stated</p>	<p>First, self-reported information was used to identify mental health conditions among PWID. Second, outcome was determined from a question that was constructed in a way that compared people who needed but did not receive services to both those who did not need a service and those who needed and received services. Therefore, researchers could not separately examine the degree of increased self-reported inability to access services attributed to increased needs of services or increased barriers to access services. Third, although they have controlled for a number of covariates that are potentially associated with the outcome, they cannot rule out unmeasured confounding in the relationships they've tested. Finally, caution must be exercised in applying estimates to PWID populations in different settings, which may feature substantially different levels and quality of health and social services available to populations of PWID.</p>	<p>Researchers limited their purpose to examining whether their defined health conditions were associated with barriers to access besides other known factors, rather than make any causal inference, which is also consistent with their objective to identify access variations by health condition. (Not sure if here or in study limitations)</p>	<p>24/42=57.14%</p>	<p>22/42 = 52.38%</p>	<p>23/42=54.76%</p>		
<p>The sample population provides a unique opportunity to study the impact of HCV status notification among active injectors likely to have engaged in recent risky behaviors and potentially amenable to change</p>	<ol style="list-style-type: none"> <li>1. Cannot be generalized to the PWID population in Montreal (participants not randomly selected, HIV-infected not included)</li> <li>2. loss to follow-up</li> <li>3. long-term changes should be interpreted with caution</li> <li>4. bias due to self-reporting</li> <li>5. no information on HCV treatment uptake after positive test</li> <li>6. small sample size</li> <li>7. possibility that PWID staying HCV seronegative had already modified his or her behavior before enrollment</li> <li>8. seropositive participants received individualized care and counseling but not taken into consideration</li> </ol>	<p>The identification of health events, meaningful for PWID at the time of HCV status notification, whether results are positive or negative, could enhance the impact of counseling and the willingness to initiate changes</p>	<p>29/42= 69%</p>	<p>27/42=62%</p>	<p>69+62/2=65.6%</p>		



1	2014	McNeil, R.; Dilley, L.B.; Guirguis-Younger, M.; Hwang, S.W.; Small, W.	Journal of the International AIDS Society	Impact of supervised drug consumption services on access to and engagement with care at a palliative and supportive care facility for people living with HIV/AIDS: a qualitative study	Empirical	Qualitative	BC - Vancouver	Other- Dr. Peter Centre (DPC), HIV/AIDS care facility	HIV
2	2013	Newman, A.I.; Beackstead, S.; Beking, D.; Finch, S.; Knorr, T.; Lynch, C.; MacKenzie, M.; Mayer, D.; Melles, B.; Shore, R.	Can. J. Gastroenterol.	Treatment of chronic hepatitis C infection among current and former injection drug users within a multidisciplinary treatment model at a community health centre	Empirical	Cohort - prospective	ON - Kingston	Clinic (The Street Health Centre)	HCV
3	2010	Grebely, J.; Knight, E.; Genoway, K.A.; Vijoen, M.; Khara, M.; Elliott, D.; Gallagher, L.; Stoms, M.; Raffa, J.D.; DeVlaming, S.; Duncan, F.; Conway, B.	European Journal of Gastroenterology & Hepatology	Optimizing assessment and treatment for hepatitis C virus infection in illicit drug users: a novel model incorporating multidisciplinary care and peer support	Empirical	Chart review - retrospective	BC - Vancouver	Community (Pender Community Health Centre)	HCV
4	Needle Exchange Programs / Clean Needle Programs / Syringe Exchange Programs / Kit Distribution Programs n=9								

Palliative and supportive care	Palliative and supportive care services including comprehensive harm reduction services (including supervised drug consumption sites) for PLHIV	DPC residents	13	PLHIV	N/A	to explore how the integration of comprehensive harm reduction services, including supervised drug consumption services, into a Canadian palliative and supportive care facility for PLHIV shapes access to and engagement with care
Multidisciplinary care	SHC program developed to provide an accessible, supportive, multidisciplinary model of care in which a team of clinicians would assess and address medical, psychiatric and social stability before initiating HCV treatment. Patients are carefully monitored during treatment.	Patients who were self-referred to the hepatitis C treatment team or were referred through other SHC services (including MMT, needle exchange, counselling or primary care) were invited to participate in the study.	34	PWID with chronic HCV	A convenience sample of 34 patients was enrolled in the study between June 2006 and December 2008. Patients who were self-referred to the hepatitis C treatment team or were referred through other SHC services (including MMT, needle exchange, counselling or primary care) were invited to participate in the study. To be eligible for the study, patients were SHC clients with chronic HCV infection, ≥18 years of age and had an interest in undergoing HCV treatment. HCV infection was confirmed by a positive HCV-RNA test, including genotype, during initial treatment assessment. Psychiatric comorbidities or ongoing illicit drug use did not exclude patients from the study or from proceeding to treatment. All patients were former or current IDUs.	The purpose of the present study was to assess uptake and success of hepatitis C treatment among a group of former and current IDUs with chronic HCV infection at the SHC within SHC's multidisciplinary, integrated and collaborative treatment model of care centred on primary care professionals.
Integrated care facility	The Pender Community Health Centre provides primary care for an estimated 1,500 clients in the area. It also offers addiction services including methadone maintenance therapy, needle exchange, and counseling. There are up to seven physicians, four registered nurses (including a dedicated HCV research nurse), six drug and alcohol counselors and on-site infectious diseases specialists. Beginning in January 2002, this clinic initiated a program for the treatment of HCV infection among current and former illicit drug users.	HCV-positive illicit drug users	204	HCV+	From March 2005 to 2008, HCV-infected individuals were referred to a weekly peersupport group and assessed for HCV infection. A retrospective chart review of outcomes three years following the initiation of the group was conducted (including HCV assessment and treatment)	Evaluated the uptake of assessment and treatment for HCV infection among illicit drug users referred to a weekly peer-support group over a three year period at a multidisciplinary community health centre in Vancouver

<p>Analysis of transcripts focused on how the harm reduction supports provided by the DPC Residence shaped access to and engagement with palliative and supportive care services</p>	<p>N/A</p>	<p>the harm reduction approach was critical in (a) fostering an environment in which PLHIV who use drugs felt welcome, (b) improving healthcare interactions by minimizing drug-related stigma and (c) enabling safer drug use practices by promoting harm reduction, increased access to healthcare and environmental supports, including HAART, resulted in improved HIV treatment outcomes and survival</p>	<p>To integrate palliative and treatment approaches for HIV/AIDS, to include harm reduction services with HIV care; our findings illustrate how changes to the structural-environmental context of healthcare services delivery (i.e. accommodating illicit drug use in accordance with a harm reduction approach) improve access to and engagement with care among PLHIV who use drugs</p>	<p>Further studies are needed to determine whether this approach improves access to care at the population level and in other healthcare settings (e.g. hospitals), further research is needed to identify the impact of this programme on improvements in health (e.g. HAART adherence)</p>
<p>Sustained virological response (SVR): undetectable HCV viral load 24 weeks after completion of antiviral therapy for all genotypes</p>	<p>Demographics, injection drug use history, exposure to HCV risk factors, medical and clinical characteristics, psychiatric characteristics, alcohol use during treatment</p>	<p>Seventy per cent of study patients had no postsecondary education, 85% were unemployed and one-third were unstably housed. A majority of study patients self-reported mental health problems. Of the 14 patients who initiated antiviral treatment in the study period, eight (57%) achieved sustained virological response. Regardless of virological outcome, patients who initiated treatment showed positive trends toward increased social and psychiatric stability, and decreases in high-risk behaviours.</p>	<p>Study supports the use of a collaborative, multidisciplinary model for HCV treatment of current and former IDUs. Furthermore, the benefits of such a treatment model may extend beyond narrowly defined virological outcomes to improvements in other social determinants of health.</p>	<p>Future research should explore the most effective mix of services within a multidisciplinary approach to increase the likelihood of compliance and success of HCV treatment. Furthermore, outcomes, such as the prevention of HCV re-infection and other drug-related harms, should be evaluated through long-term follow-up of this population.</p>
<p>Uptake of HCV assessment and treatment</p>	<p>Factors associated with successful treatment for HCV infection, reasons for deferral/no indication for treatment</p>	<p>204 HCV antibody-positive illicit drug users accepted referral to a weekly HCV peer-support group. Assessment for HCV occurred in 53% (n=109), with 13% (n=14) having initiated or completed treatment for HCV infection prior to attending the support group, evaluation ongoing in 10% (n=11) and treatment deferred/not indicated in 25% (n=27). The major reasons for HCV treatment deferral included early disease (30%), drug dependence (37%), other medical (11%) or psychiatric co-morbidities (4%). Sixty-eight percent of those deferred for reasons other than early liver disease demonstrated multiple reasons for treatment deferral. The first four weeks of support group attendance predicted successful HCV assessment (OR 6.03, 95% CI 3.27-11.12, p&lt;0.001). Overall, 28% (n=57) received treatment. Among individuals having completed pegylated-interferon and ribavirin therapy with appropriate follow-up (n=19), the rate of SVR was 63% (12/19), despite illicit drug use in 53%. A high proportion of illicit drug users accepting referral to a weekly HCV peer-support group at a multidisciplinary health centre were assessed and treated for HCV infection. Peer-support coupled with multidisciplinary care is an effective strategy for engaging illicit drug users in HCV care</p>	<p>The results from this study demonstrate that a peer-based HCV support group can fit within the constraints of other settings and can be a powerful tool to significantly improve access to HCV care among current and former illicit drug users who may already be engaged in care for reasons unrelated to HCV infection.</p> <p>It is clear that the passive recruitment approach for engaging illicit drug users in HCV care is insufficient. In order to make progress, the next critical steps need to include efforts towards improved awareness and active referral of HCV-infected IDUs to multidisciplinary settings such as ours. For these programs to be maximally successful, strategies will be required to 1) improve patient education about HCV infection; 2) identify those most motivated to receive treatment; and 3) improve the proportion completing and responding to therapy. This may be partly achieved through the integration of HCV peer-support groups into existing multidisciplinary programs providing HCV care. Increasing the proportion of HCV infected illicit drug users assessed and treated for HCV infection is a crucial and necessary component towards reducing the future disease and health burden of HCV (and other</p>	<p>None stated</p>

<p>Generates preliminary insights into the potential role of harm reduction approaches to minimize barriers to inpatient healthcare services</p>	<p>Study relies on a small sample size that may not be representative of the experiences of all PLHIV who use drugs and are in need of palliative and supportive care, limited transferability to settings where healthcare is organized differently</p>	<p>Existing drug laws have prevented the scaling up of harm reduction approaches and thus limited evaluations of models of harm reduction healthcare</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>		
<p>In terms of drug use, the comparison of urine toxicology screens to self-reported illicit drug use suggests reasonably high reliability of the self-reported data</p>	<p>Small sample size; weak external validity and the results may not be generalizable to other centres; relied heavily on self-reported data and face-to-face interviews, leading to recall bias and the reporting of socially desirable responses</p>	<p>None stated</p>	<p>28/42 = 66.7%</p>	<p>24/42 = 57.1%</p>	<p>26/42 = 61.9%</p>		
<p>This study also demonstrates the first successful application of a weekly peer-based HCV support group model developed by Sylvestre and colleagues [29] to a pre-existing multidisciplinary model for the treatment of HCV.</p>	<p>There are several limitations to the study methodology in this report. First, the results may not be generalizable to other populations of illicit drug users in Canada or elsewhere. However, the demographic characteristics in this study is similar to that of a large, community-based sample of illicit drug users in Vancouver [8], and our results may at least be applicable in a setting where a high concentration of IDUs in a well-defined geographic setting, where a program established in a single setting may be able to draw on a significant target population. Second, demographic information for those attending the group was collected by retrospective chart review and we were unable to specifically ascertain recent risk behavior information for individuals referred to the HCV support group. This limited our ability to make detailed comparisons of risk behaviours among those who did and did not follow through with formal assessment for treatment. It may well be that such attendance is a marker for specific illicit drug use behaviors or other factors and we will be able to evaluate this in further, ongoing prospective studies in our centre. Third, there may be significant biases associated with the fact that this study was performed among those accepting referral to an HCV peer-support group. This may have led to a bias towards the inclusion of individuals that access care more frequently and are engaged in the healthcare system, and that a significant proportion of our target population may not ever benefit from this intervention.</p>	<p>None stated</p>	<p>26/42 = 61.90%</p>	<p>25/42=64.3%</p>	<p>63.10%</p>		

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2019	Correctional Service Canada	Government of Canada	Prison Needle Exchange	Non-empirical	Report	Canada	Other - prisons	HCV, HIV
2018	Miskovic, M.; Carusone, S.C.; Guta, A.; O'Leary, B.; dePrinse, K.; Strike, C.	Am. J. Public Health	Distribution of Harm Reduction Kits in a Specialty HIV Hospital	Empirical	Interventional / program evaluation	ON - Toronto	Hospital (Casey House, hospital for people living with HIV)	Cellulitis, HIV, HBV, HCV and other bloodborne pathogens
2017	van der Meulen, E.	Substance Use and Misuse	"It Goes on Everywhere": Injection Drug Use in Canadian Federal Prisons	Empirical	Qualitative	ON	Other - Prison	HCV, HIV

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NEP	Needle exchange program	None	N/A	Inmates	N/A	Objectives of PNEP: -reduce the sharing of needles and the number of contraband needles in circulation in institutions -facilitate referral to available drug-dependence treatment programs, including mental health services and opiate agonist treatment (OAT) -reduce the transmission of blood-borne viral infections, including HIV/AIDS and HCV -reduce the occurrence of skin infections related to injection drug use and decrease the need for health care interventions related to injection-site abscesses
Harm reduction kit distribution	harm-reduction injection and smoking kit distribution and disposal program	Casey House clients who use drugs and also their visitors	N/A	All (not necessarily restricted to HIV individuals, though provided in HIV hospital, since kit-distribution program was accessible to anyone)	N/A	In 2012, the Harm Reduction Advisory Group, comprising Casey House staff, recommended implementation of a kit-distribution program to increase client knowledge of drug-related harms and access to new equipment, reduce drug-related harms (e.g., cellulitis; transmission of HIV, hep- atitis B and C, and other bloodborne pathogens), promote the safe disposal of used harm-reduction equipment, and to encourage clients to speak with staff members about drug-related harms. Program evaluation.
Harm reduction programming, specifically prison-based needle and syringe programs (PNSPs)	Harm reduction programming, specifically prison-based needle and syringe programs (PNSPs)	18 or older that have been incarcerated in a Canadian federal prison within the past six years, and had knowledge about injection drug use in prison, former prisoners from Ontario	30	Men and women who have been in prison previously for 2 years or more and have admitted to injecting drugs in prison or witnessing the injection of drugs including people who self-identify as trans, 2-spirit	N/A	To develop recommendations for improved harm reduction programming, specifically prison-based needle and syringe programs (PNSPs), from people who have lived experience of incarceration.

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N/A	N/A	None stated	None stated	None stated
Number of injection and smoking kits distributed	Qualitative interviews regarding the structure of the program	Receptionists who monitor the foyer through security cameras and are sometimes engaged in conversations by people picking up the kits estimated that most of the kits from this location were obtained by individuals who were not Casey House clients, were male, and were older than 35 years, and most kits were picked up between 5 PM and midnight and on weekends. When asked about interactions with those obtaining the kits, receptionists noted that they were often asked for and provided information about drug treatment, housing, social assistance, services for abused women, and naloxone kits. From November 14, 2014, to June 30, 2017, the program distributed 15 948 injection kits and 4907 smoking kits. Staff training helped. Sustainability was difficult but manageable through enlisting clients and sponsors to help with kit making. Neighbors complained about finding other contents of kits discarded on properties but no reports of used needles or glass stems.	Evaluation of the program points to the promise of hospital-based kit distribution programs as a structural intervention to reduce drug-related harms among inpatients and among other people who use drugs in the vicinity.	Furthermore, more formal evaluation of this and similar programs is needed to fully understand if and how different models of kit distribution influence access (e.g., distributed by clinical staff vs unsupervised distribution), reach, equipment sharing, and public order issues. This small evaluation contributes to the call for evaluation of implementation of needle-and-syringe programs in hospital settings.
Experience with injection drug use in federal prisons	None	Participants also talked about the kinds of equipment they used to inject, sometimes gained through illicit means and sometimes homemade, as well as the frequency of drug use overall. Injection equipment was usually shared among many prisoners, and in the rare instances in which supplies were disposed of, the toilet and garbage were reported as the most common receptacles. Given the availability of drugs, the frequency of injection drug use, and the customary sharing of injection supplies, the resulting high rates of HIV and HCV in Canadian federal prisons are not surprising. What is surprising, however, is the general lack of support from the prison service for harm reduction programs.	PNSPs can improve the overall safety of prisons, for both prisoners and staff, specifically reduction in needle sharing and transmission of HIV and hepatitis C. Advocate for the use of a multimodel approach which has been successful in other settings and could be applied in the Canadian context. Prisoners in the study also expressed support for this.	Inclusion of younger participants in the research as this may impact the results and recommendations. Correctional Service of Canada (CSC) should continue to examine the feasibility of needle exchange programs.

None stated	None stated	None stated	N/A	N/A	N/A		
None stated	None stated	Gaps in evaluation and implementation of needle-and-syringe programs	15/42 = 35.7%	11/42 = 26.2%	13/42 = 31.0%		
The approach in the study was instrumental to the study, as it allowed for hypotheses and assumptions to be altered and revised throughout process, and for the emerging themes and findings to be validated by those with community-relevant knowledge	Inability to hold interviews or focus groups with current prisoners. Recruitment was restricted only to those who were not incarcerated or on parole at the time of data collection. Sample also comprised of an older group, ranging from 35–62 in age; inclusion of younger participants would have been beneficial, and may have impacted some of the results and recommendations. All of the former prisoners were recruited in Ontario, and so their experiences and recommendations may not be nationally representative.	Researchers reached saturation with the 30 former prisoner participants, with greater resources and a longer study time frame could have increased the sample size and targeted additional recruitment towards specific populations of interest, for example, people in their 20s. A larger sample size could have also been beneficial for analyzing gendered and racial differences in responses.	29/42=69%	24/42 = 57.14%	32/42 = 76.19%		

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2012	Hyshka, E.; Strathdee, S.; Wood, E.; Kerr, T.	Int J Drug Policy	Needle exchange and the HIV epidemic in Vancouver: Lessons learned from 15 years of research	Non-empirical	Literature review	BC - Vancouver	Community (mobile vans)	HIV
2011	Bruneau, J.; Daniel, M.; Abrahamowicz, M.; Zang, G.; Lamothe, F.; Vincelette, J.	American Journal of Epidemiology	Trends in human immunodeficiency virus incidence and risk behavior among injection drug users in montreal, Canada: a 16-year longitudinal study	Empirical	Cohort - prospective	QC - Montreal	Clinic (HIV post-test counseling and referrals) and Community (direct street-level recruitment)	HIV

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NEP	Needle exchange program	N/A	N/A	N/A	N/A	To review 15 years of peer-reviewed research on Vancouver's NEP to describe what has been learned through this work.
NEP	St. Luc Cohort program for PWID support systems in Montreal NEP participation, safe syringe acquisition	HIV-seronegative participants who injected drugs in the past 6 months	2137 HIV-seronegative IDUs	All : significant discussion on MSM	"St Luc Cohort: an open cohort of PWID started in Montreal in 1988 to study factors of HIV transmission. From 2001 to November 2004, recruitment of new participants was not carried out due to loss of funding. The 4 year gap in recruitment yielded 2 distinct waves of follow-up, 1988-2001 and 2004-2008. The current analyses include both waves of follow-up; however, first-wave participants recruited prior to 1992 were excluded because of changes in the questionnaire used since 1992. Eligibility: PWID who had injected drugs in the past 6 months and were 18 or more years of age. Cohort visits were scheduled after 3 months for the first follow-up visit and at 6-month intervals thereafter. Behavioral questionnaires were administered by trained interviewers with venous blood samples being drawn at each visit for HIV antibody testing. Participants were asked to return within 2 weeks for their serostatus test results, at which time when posttest counseling and referrals were provided. "	Primary purpose was to investigate secular trends in HIV incidence and to evaluate changes in risk behavior and HIV infection among IDUs followed between 1992 and 2008 in St. Luc Cohort based in Montreal. Secondary purpose was to examine associations between NEP participation, safe syringe acquisition and HIV seroconversion.

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N/A	N/A	<p>1) NEP attendance is not causally associated with HIV infection, 2) frequent attendees of Vancouver's NEP have higher risk profiles which explain their increased risk of HIV seroconversion, and 3) a number of policy concerns, including needle exchange vs. needle distribution and policing practices, and the high prevalence of cocaine injecting contributed to the failure of the NEP to prevent the outbreak. Keys to success include refocusing the NEP away from an emphasis on public order objectives by separating distribution and collection functions, removing syringe distribution limits and decentralizing and diversifying NEP services</p>	<p>Shifting the focus of the NEP away from public order objectives by separating NEP distribution and exchange functions, and removing all distribution limits improved access to sterile syringes in the DTES. Decentralizing NEP sites, promoting peer-run initiatives, and diversifying syringe distribution methods helped the NEP better access hard-to-reach populations of IDU with high risk profiles. Involving people who use drugs in the delivery of NEPs can help extend the reach of conventional NEPs and ensure those at highest risk of HIV infection are being reached. Program staff, researchers and policymakers should pay considerable attention to local context when designing and implementing NEP. Understanding how internal aspects (program policies, logistics, etc.) and external aspects (local IDU population characteristics, policing practices, drug markets, etc.) impact the NEP is crucial for success.</p>	<p>Ongoing evaluation and monitoring of the NEP and its changing context using both quantitative and qualitative methods can identify factors that constrain and promote sterile syringe access. In assessing the merits of an NEP as a public health intervention, implementation and local environmental features and their impacts need to be considered on the program's ability to reach IDU and prevent the spread of HIV</p>
<p>The outcome was defined as the time from entry into the cohort until seroconversion, assumed to have occurred at the midpoint between the dates of the participant's visits corresponding to the last negative and the first positive HIV test</p>	<p>Except for baseline age, gender, education, and time of recruitment, all variables were modeled as time-dependent covariates. Thus, at any time during follow-up, we used the values from the most recent visit. To examine and account for secular trends in annual HIV incidence, the effect of calendar time was represented by a binary indicator of recruitment period (2004–2008 vs. 1992–2001) Variables used in Cox regression model: age, gender, living in unstable housing conditions, cocaine use in the past month, heroin use in the past month, sharing a syringe with a person known to be HIV-positive, "Booting", having sex with a person known to be HIV-positive, period of recruitment, Needle Exchange Program participation, obtaining 100% of syringes from a safe source</p>	<p>Of 2,137 HIV-seronegative IDUs at enrollment, 148 became HIV-positive within 4 years (incidence: 3.3 cases/100 person-years; 95% confidence interval: 2.8, 3.9). An annual HIV incidence decline of 0.06 cases/100 person-years prior to 2000 was followed by a more rapid annual decline of 0.24 cases/100 person-years during and after 2000. Behavioral trends included increasing cocaine and heroin use and decreasing proportions of IDUs reporting any syringe-sharing or sharing a syringe with an HIV-positive person. In multivariate analyses, HIV seroconversion was associated with male gender, unstable housing, intravenous cocaine use, and sharing syringes or having sex with an HIV-positive partner. Always acquiring syringes from safe sources conferred a reduced risk of HIV acquisition among participants recruited after 2004, but this association was not statistically significant for participants recruited earlier. In conclusion, HIV incidence has declined in this cohort, with an acceleration of the reduction in HIV transmission after 2000.</p>	<p>the stability of the continued high prevalence of high-risk drug and injection behaviors suggests a need for primary prevention in order to reduce initiation of injection drug use</p>	<p>None stated</p>

None stated	None stated	NEPs represent an important tool in an arsenal of HIV prevention, drug treatment and health services and have the potential to drastically reduce HIV incidence if implemented effectively.	N/A	N/A	N/A		
None stated	<ol style="list-style-type: none"> <li>1. participants were not randomly selected so cannot be considered representative of all IDUs in Montreal</li> <li>2. males and chronic cocaine-using IDUs are overrepresented in the sample</li> <li>3. loss to follow-up</li> <li>4. residual confounding :</li>   <li>5. data were not available on the size of the IDU population and the level of syringe coverage relative to the true needs of this community</li>   <li>6. small number of seroconversions occurring during wave 2 and the related lack of statistical power</li> <li>7. lead-time bias</li> </ol>	None stated	27/42=64.2%	33/42=78.5%	71.4+71.4/2=71.4%		

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2010	Ivsins, A.; Chow, C.; Marsh, D.; Macdonald, S.; Stockwell, T.; Vallance, K.	Centre for Addictions Research of British Columbia	Drug use trends in Victoria and Vancouver, and changes in injection drug use after the closure of Victoria's fixed site needle exchange	Non-empirical	Report	BC - Vancouver and Victoria	Community - Fixed site needle exchange	HIV and other blood-borne viruses
2010	Gagnon, H��l��ne; Godin, Gaston; Alary, Michel; Bruneau, Julie; Otis, Joanne	AIDS and Behavior	A Randomized Trial to Evaluate the Efficacy of a Computer-Tailored Intervention to Promote Safer Injection Practices Among Drug Users	Empirical	Randomized controlled trial	QC - Montreal and Quebec City	Community	HCV, HIV

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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16</p> <p>NEP</p>	<p>Needle exchange program</p>	<p>Participants had lived in BC for at least 6 months, were at least 19 years old, and injected/used drugs at least once a month for the previous 3 months.</p>	<p>464 (226 in Vancouver, 238 in Victoria).</p>	<p>All</p>	<p>N/A</p>	<p>To examine trends in drug use and changes both before and after the fixed-site needle exchange closed in Victoria, using Vancouver, which has seen no similar disruption of harm reduction services, as a comparison.</p>
<p>17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>NEP</p>	<p>Theory based intervention to increase the use of NEPs</p>	<p>Injection drug users (IDUs)</p>	<p>260</p>	<p>aged 18 or older, used a NEP and had injected themselves at least once during the month before the survey.</p>	<p>N/A</p>	<p>The aim of this study was to evaluate the efficacy of a theory-based intervention to increase the use of a new syringe for each injection among injection drug users (IDUs).</p>

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None	None	<p>Victoria had significantly lower rates of crystal meth, heroin and marijuana use than Vancouver and significantly higher rates of injection of the prescribed opioids: dilaudid and morphine. Drugs whose use is increasing include methadone and crack in Vancouver and ecstasy in Victoria. Some changes were noted after the closure of the fixed site needle exchange in Victoria, June 2008. Although there was a substantial reduction in the number of clean needles distributed in Victoria, daily drug injection increased significantly over time. Conversely, in Vancouver, where clean needles were more accessible, daily drug injection significantly decreased. Across the whole study period, Victoria had significantly higher rates of needle sharing than Vancouver but significant trends over time were not observed for either city. Vancouver has several fixed site needle exchanges distributed across the metropolitan area and this may account for significantly lower rates of needle sharing intensity compared with Victoria. Across both cities, after tobacco, crack cocaine was the most widely used substance. The significant increase in the use of crack cocaine over the period of our study in Vancouver, as well as the overall increasing prevalence of this substance warrants other preventive and harm reduction initiatives.</p>	<p>Authors recommend an immediate abolishment of the "no-go zone" in downtown Victoria, to enable outreach workers and health service providers to adequately respond to the health needs of injection and other drug users. They further strongly recommend that in accordance with optimal best practice put forward elsewhere one or more fixed site needle exchanges be reintroduced in Victoria as part of a comprehensive plan of attending to the health needs of injecting drug users and preventing the spread of HIV and hepatitis C.</p>	None stated
<p>Two behavioral variables were studied: (1) proportion of dirty syringes used over the last week and (2) prevalence of safe behavior over the last week.</p>	<p>The first group of variables covered age, gender, recruitment site, randomization blocks and group. The psychosocial variables were intention, attitude and perceived behavioral control.</p>	<p>At baseline, 52.3% of participants reported that they had not always used new syringes in the previous week. The results indicate that it is possible for IDUs to adopt safer injection practices. One month after the intervention began, participants in the experimental group were using fewer dirty syringes compared to the control group (RR: 0.47 CI95% 0.28–0.79; P = .004). This short-term effect was no longer present 3 months later.</p> <p>These results suggest that the intervention developed and implemented during this evaluative study had a positive short-term effect on the adoption of safer injection practices among IDUs who visit NEPs. The proportion of dirty syringes used decreased and the proportion of participants who always used new syringes, or did not inject at all, increased.</p>	<p>As suggested by Des Jarlais and Friedman, including drug users in the design and operational decision-making of the prevention program may lead to much more effective programs. In this respect, we believe that community participation was indeed a key element in the short term effect of this intervention.</p>	<p>Additional studies in different settings and cultural contexts and further controlled research will be necessary to confirm the positive shortterm impact observed in this study</p>

None stated	These distinct observations in each research site underscore the value of data collection in multiple cities, since results from one jurisdiction cannot be generalized to another jurisdiction.	None stated	N/A	N/A	N/A		
Notwithstanding the above limitations, this intervention seems to be useful in modifying injection behavior in the short term. The results suggest that IDUs can adopt safer injection practices when they are exposed to a tailored intervention in addition to the usual interventions offered by NEPs.	A few limitations must be acknowledged. First, given the study design, there was more contact with experimental participants than control participants. This may have introduced some bias in the dropout rate between the two groups. Likewise, the higher frequency of contact could have contributed to the behavioral change observed. A design including an attention-control condition might have been preferable. Secondly, it is possible that the attrition rate of 33% at the second post-test may have slightly decreased the statistical power of the analysis of long-term effect. Follow-up procedures are important, particularly when working with hard-to-reach populations. In spite of the efforts displayed to ensure a good follow-up of the participants, new techniques such as combining electronic and traditional tracking methods should be considered in future studies [33]. Thirdly, participants were recruited at two NEPs in the province of Quebec, Canada. Yet, in this province, more than 820 centers, located in 16 regions, provide access to injection material (community organizations, health establishments, drugstores) [34]. Moreover, some IDUs do not visit NEPs and cannot be contacted through these sites. Consequently, the results of this study cannot be applied to all IDUs or organizations that provide injection material.	None stated	31/42 = 73.81%	33/42 =78.6 %	76.20%		



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2010	Kerr, T; Small, W.; Buchner, C.; Zhang, R.; Li, K.; Montaner, J.; Wood, E.	Am J Public Health	Syringe sharing and HIV incidence among injection drug users and increased access to sterile syringes	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2009	Chu, S.	HIV/AIDS Policy Law Review	Clean switch: the case for prison needle and syringe programs	Non-empirical	Editorial literature review	Canada	Other - Federal Prisons	HCV, HIV
<b>Broad harm reduction strategies n=6</b>								
2019	Day, E.; Broder, T.; Bruneau, J.; Cruse, S.; Dickie, M.; Fish, S.; Grillon, C.; Luhmann, N.; Mason, K.; McLean, E.; Trooskin, S.; Treloar, C.; Grebely, J.	International Journal of Drug Policy	Priorities and recommended actions for how researchers, practitioners, policy makers, and the affected community can work together to improve access to hepatitis C care for people who use drugs	Non-empirical	Other - Synopsis of a round table discussion at the Harm Reduction Conference in Montreal on May 13th 2017	QC - Montreal	N/A	HCV

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SEP	Health authority in Vancouver modified is SEP policies in 2000 and 2002 on sterile syringe distribution making syringes more accessible	PWID in downtown Vancouver	1228 participants from the VIDUS cohort with 472 (38.4%) women and 351 (28.6%) individuals of aboriginal ancestry	All	Participants were from VIDUS ongoing prospective cohort study recruited through self referral and street outreach since May 1996. All participants complete an interviewer administered questionnaires and provide blood samples at baseline and semiannually follow up visits so that drug use, HIV risk behaviour and HIV incidence can be tracked longitudinally	Evaluate the effects of a syringe exchange program policy on rates of HIV risk behaviour and HIV incidence among injection drug users
NEP	Description and argument as for clean needle program in prisons	Prisoners in Canadian Prisons	N/A	Prisoners	N/A	Pose an legal argument for why PWID held in Canadian Prisons should have access to clean needles
For peer review only						
Harm reduction	Highlights the key priorities enhancing global coverage of harm reduction services; punitive drug polices; affordable diagnosis and treatment; improving evidence base for HCV prevention, testing, linkage to care and treatment programs; implimenting intergrated HCV programs; peer based models of care; and tackling social determinants of health inequalities	PWID infected with HCV globally	N/A	All	N/A	Highlights the key priorities enhancing global coverage of harm reduction services; punitive drug polices; affordable diagnosis and treatment; improving evidence based for HCV prevention, testing, linkage to care and treatment programs; implementing integrated HCV programs; peer based models of care; and tackling social determinants of health inequalities

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21</p> <p>Main outcome of the study was the investigation of patterns of rates of syringe borrowing and syringe lending</p>	<p>Factors that remained independently associated with syringe borrowing included age,daily heroin injection,daily cocaine injection,HIV-positive serostatus and the period following the change in SEP policy.Factors that remained independently associated with syringe lending included age, gender, Aboriginal ancestry, daily heroin injection, daily cocaine injection , HIV-positive serostatus , and the period following the change in SEP policy.Factors that remained independently associated with HIV incidence included Aboriginal ancestry, daily cocaine injection , and the period following the change in SEP policy</p>	<p>Increase access to sterile syringes was independently associated with substantial reduction in syringe borrowing, syringe lending and HIV incidence among local IDU</p>	<p>To maximizethe benefits of SEPs, efforts must be made to ensure that policies and programmatic limitations do not undermine SEP effectiveness</p>	<p>None stated</p>
<p>22 23 24</p> <p>N/A</p>	<p>N/A</p>	<p>The author describes legal precedents for the introduction of clean needle programs in prisons</p>	<p>safe access to clean needles within Canadian prisons must be met to ensure that the rights enshrined</p>	<p>None stated</p>
<p>25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>N/A</p>	<p>N/A</p>	<p>1) Enhancing Global coverage of harm reduction services through; addressing stigma; increasing financial support of harm reduction services;provide education to practitioners 2)Addressing drug policies and criminalization through;policy reform; alternatives to imprisonment; decriminalize use of clean needles; delivery of OST and overdose prevention 3)Ensure access to affordable HCV diagnosis and treatment through; simplification of diagnostics; broader access to HCV testing; negotiate lower prices 4)Implementation of intergrated HCV prevention and care programs through; knowledge exchange and dissemination of research on integrative models of care; make services accessible; use cascade of care model; educate and empower practitioners to treat HCV; improve data collection and dissemination 4) Advance peer based models of care through;increased financial support from government; data collection tools and guidelines; peer worker training; remove criminal record checks for peers to work in health services; peer based models into framework for networking 5)Improving the evidence based for testing, prevention, linkage of care and treatment through; uptodate population size estimates; facilitate partnerships; importance of data in supporting advocacy efforts; develop policy briefs; research studies using real world data 6) Tackling power structures and social determinants of health inequalities for PWID</p>	<p>Obtain WHO target to eliminate HCV as a major global health threat by 2030</p>	<p>None stated</p>

None stated	Our study has limitations. First, this is an observational study, and therefore we cannot infer causation. Second, it is likely that the new SEP policies studied herein were not implemented in a uniform fashion, and it is difficult to know which specific policy changes accounted for the changes in syringe sharing and HIV incidence observed in the present study. Third, although it would have been ideal to incorporate a robust measure of SEP use, previous studies have shown that because high-risk IDU may over-report SEP use, statistical evidence of program benefits may be diminished. Further, we have previously shown that frequent SEP users tend to possess other behavioral characteristics that render them more vulnerable to HIV infection, and therefore measures of intensity of SEP use tend to be fraught with selection bias. Fourth, VIDUS is not a random sample, and therefore the IDU participating in the present study may not be representative of local IDU. Fifth, the observed declines in HIV risk behavior and HIV incidence may reflect a cohort effect whereby lower-risk IDUs are less likely to be lost during follow-up. However, VIDUS is an open, prospective cohort study, and ongoing enrollment has been employed to address problems related to this type of cohort effect. Sixth, although studies have indicated that IDU may underreport some behaviors, self-reports of illicit drug use behaviors by IDU have been shown to be valid.	None stated	29/42=69%	31/42=73.8%	71.40%		
None stated	None stated	None stated	N/A	N/A	N/A		
None stated	None stated	None stated	NA	N/A	N/A		

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2018	Skinner, S.; Cote, G.; Khan, I.	Implementation Science	Hepatitis C virus infection in Saskatchewan First Nations communities: Challenges and innovations	Non-empirical	Literature review	SK	Community (FNs communities)	HCV
2017	Boyd, J.; Fast, D.; Hobbins, M.; McNeil, R.; Small, W.	Harm Reduction Journal	Social-structural factors influencing periods of injection cessation among marginalized youth who inject drugs in Vancouver, Canada: an ethno-epidemiological study	Empirical	Qualitative - ethnoepidemiological	BC - Vancouver	Not specified	HIV
2016	Rutherford, A.R.; Ramadanovic, B.; Ahrenberg, L.; Michelow, W.; Marshall, B.D.L.; Small, W.; Deering, K.; Montaner, J.S.G.; Vasarhelyi, K.	Proceedings of the 2016 Winter Simulation Conference	Control of an HIV epidemic among injection drug users: simulation modeling on complex networks	Empirical	Mathematical modelling	BC - Vancouver (Downtown Eastside)	Community	HIV

For Peer review only

<p>Harm reduction</p>	<p>Extending the in-community and community-driven programs to other FN's communities and to the prison population Includes harm reduction (NEP, know your status programs), mobile HCV clinics</p>	<p>HCV infection in FN's people</p>	<p>N/A</p>	<p>First Nations</p>	<p>N/A</p>	<p>To analyse the challenges and innovations of Hepatitis C virus infection in Saskatchewan First Nations communities.</p>
<p>Harm reduction</p>	<p>No specific focus: mention OAT, drug treatment programs, harm reduction, social support, access to housing</p>	<p>marginalized youth who inject drugs</p>	<p>22 (purposely recruited) street-involved youth who inject drugs</p>	<p>Age ranged from 20 to 31 with a mean age of 26; 8 identified as women and 14 as men; 3 identified as Indigenous</p>	<p>Participants for this ethno-epidemiological study were recruited from the At-Risk Youth Study (ARYS) - a prospective cohort of street-involved and drug-using youth between 14 and 26 years of age at the time of enrolment. Self-report of the use of illicit drugs during the past 30 days. Baseline and biannual follow-up visits consist of interviewer-administered questionnaire and blood tests for HIV and HCV antibodies.</p> <p>For this study, 22 youth were recruited from ARYS cohort who had a history of injection drug use and who reported cessation of injection drug use for a minimum of one 6-month period at a biannual visit. Semi-structured interviews were carried out in two waves between May 2013 and September 2015.</p>	<p>To examine how street-involved young people who inject drugs in Vancouver transitioned into periods of injection cessation and perceived barriers to injection cessation.</p>
<p>Harm reduction</p>	<p>A network model of an inner-city community was constructed and strategies were simulated to address the HIV epidemic in this community. Simulations were used to assess 4 strategies: reduced syringe sharing, reduced time to diagnosis, reduced time to treatment initiation, improvements to treatment retention (providing clean syringes, SIS, TasP, testing)</p>	<p>PWID and women involved in sex work in Vancouver's Downtown East Side</p>	<p>N/A- focus groups were used to develop the models but the study was based on network model simulations and no actual participants were recruited. # of focus group participants unknown</p>	<p>PWID, female sex workers. The model was based on 4 vertex states: gender risk, HIV status, IVDU status, prison status. Transgender individuals were not included due to data limitations.</p>	<p>N/A - data from cohort studies and public health surveillance was used to develop the network but not part of this study itself</p>	<p>Assess potential strategies to control the HIV epidemic in Vancouver's downtown east side</p>

N/A	None	<p>There are multiple factors associated with the high rates of HCV in FN communities, including barriers to access preventive services, early diagnosis and treatment. These access issues predominantly relate to remoteness, transportation, education and awareness and a health care system designed around urban health. Instigation of new and innovative ways of delivering information and services, such as the mobile hepatitis C clinic and the community-driven STBBI Know Your Status model of care, are proving invaluable in remote FN communities. Extending these programs to other FN communities and to the prison population, which often has a disproportionately high population of both FN individuals and HCV-infected individuals, could prove to be invaluable in addressing HCV infection and helping Canada meet the global goal of HCV elimination.</p>	<p>Partnerships between on and off reserve programs are needed to optimize care and provide outreach support and awareness campaigns across various national and provincial jurisdictions. It will be important to address attitudes that may interfere with the prevention, treatment and care activities, and to reduce HCV and HIV-related stigma and discrimination across the spectrum of services. Targeted HCV initiatives by and for FN inmates are needed in Saskatchewan. The FN HCV programs already present at the community level could be linked to care in prisons. Interventions targeting modifiable risk factors, such as substance use, smoking, proper adherence to antiretroviral therapy and timely provision of HCV therapy could substantially reduce complications and lower death rates.</p>	<p>Further research is needed to evaluate the extent and the determinants associated with HCV infection, obtain population-based estimates of HCV prevalence and incidence in the Saskatchewan FN population, develop FN community-led programs to prevent new infection, better understand HCV infection, and implement more effective methods of addiction management in HCV-positive patients.</p>
Experiences with drug injection cessation and barriers to cessation	HIV and HCV testing every 6 months following baseline	<p>Results show that the factors that influenced periods of injection cessation were access to harm reduction -informed youth-focused services, transitions in route of administration (e.g. from injecting to smoking), and the provision of housing and social supports (e.g. friends, family, care providers). Conversely, participants indicated that inadequate social supports and, for some, abstinence-focused treatment methods hindered efforts to stop injecting.</p>	<p>It is necessary to include the views of young people who inject drugs in policy discussions and concentrate on socio-economic roots of poverty, drug policy, and related social and health harms. Comprehensive system of care for young PWID with a focus on better treatment access for young marginalized populations and developing youth oriented services attentive to diversity and youth perspectives. Increased consideration of the promotion of non-injection routes of drug administration, rather than more singular emphasis on abstinence.</p>	<p>Further study of innovative means of engaging youth</p>
Changes in equilibrium HIV prevalence in the network simulations	None stated	<p>HIV prevalence was reduced by all control strategies. Syringe sharing contributes significantly to HIV prevalence in the DTES and affects non-IVDU due to sexual transmission. Close connections between syringe sharing and sexual networks in closely linked communities may be avenues for rapid HIV transmission. Earlier diagnosis, increased treatment retention and (to a lesser extent) shorter time to treatment also reduced equilibrium HIV prevalence in the model.</p>	<p>A combination of both harm reduction and treatment measures would be most effective in the DTES. Harm reduction programs which reduce syringe sharing could reduce new HIV infections. Treatment as Prevention could be the most effective strategy, if there was a robust testing program and effective patient retention in treatment. This analysis also shows that network modeling can provide insight into epidemic control strategies.</p>	<p>Network modeling may be a useful tool for operational public health research</p>

None stated	None stated	There are significant limitations in HCV surveillance. Access to testing is not available in the some of FN communities in Saskatchewan and many do not have access to primary care. National surveillance data are insufficient for determining the number of cases of hepatitis C among FNs populations, largely because many provinces do not collect information according to ethnicity.	N/A	N/A	N/A		
Results of qualitative interview were triangulated with the results of a longitudinal program of ethnographic research with street youth who inject drugs.	<ol style="list-style-type: none"> <li>1. social desirability bias (self-report of the use of illicit drugs)</li> <li>2. may not be reflective of the experiences of the larger injection drug using youth community either locally or nationally.</li> <li>3. the underrepresentation of Indigenous participants</li> <li>4. only 22 participants and not really youth at mean age of 26yo</li> </ol>	None stated	26/42=61.9%	21/42=50%	61.9+50/2=56%		
Network modelling allowed authors to consider complex and multiple interacting factors that drive the epidemic and influence effectiveness of interventions.	Simplications were made to ensure model reliability and tractability (not capturing full range of interacting factors, just a subset). Only 1 network was generated. The model does not consider situations in which IV drug use and needle sharing are independent (decoupled), and assumes that they always occur together. Not enough data to include transgender individuals. General limitations of network modeling: needs significant data and resources, analytics	Future research about network-based strategies requires simulation with more accurate underlying social network. Future studies: simulation of potential gains achieved by combining resource allocation and treatment strategies. Analysis of control strategies on HIV incidence (better short-term measure than prevalence). Lack of data about transgender individuals, more data from other cohort studies could be used to expand this	24/48 = 50% (interpreted this as mixed methods but unsure)	32/48=66.7%	30/48=64.58%		



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2013	Strike, C.; Hopkins, S.; Watson, T.M.; Gohil, H.; Leece, P.; Young, S.; Buxton, J.; Challacombe, L.; Demel, G.; Heywood, D.; Lampkin, H.; Leonard, L.; Lebounga Vouma, J.; Lockie, L.; Millson, P.; Morissette, C.; Nielsen, D.; Petersen, D.; Tzemis, D.; Zurba, N.	Working Group on Best Practice for Harm Reduction Programs in Canada	Best practice recommendations for Canadian harm reduction programs that provide service to people who use drugs and are at risk for HIV, HCV, and other harms: part 1	Empirical	Evidence Review / systematic review	Canada	Not specified	HIV, HCV, HBV
2011	P.R.W. Kendall Prepared by Gilbert, M.; Buxton, J.; Tupper, K. (multiple contributing authors)	Office of the Provincial Health Officer	DECREASING HIV INFECTIONS AMONG PEOPLE WHO USE DRUGS BY INJECTION IN BRITISH COLUMBIA: Potential explanations and recommendations for further action Report from the Office of the Provincial Health Officer	Non-empirical	Report	BC	Multiple-hospital, clinic, community	HIV, HCV
<b>Mobile Care Initiatives / Telehealth n=5</b>								
2017	Cooper, C.L.; Hatashita, H.; Corsi, D.J.; Parmar, P.; Corrin, R.; Garber, G.	Annals of Hepatology	Direct-Acting Antiviral Therapy Outcomes in Canadian Chronic Hepatitis C Telemedicine Patients	Empirical	Cohort - retrospective	ON - Ottawa	Other (Telemedicine through Ottawa Hospital and Regional Viral Hepatitis Program)	HCV

Harm reduction	Best Practice Recommendations for Canadian Harm Reduction Programs that provide Service to People Who Use Drugs and are at Risk for HIV, HCV, and Other Harms (relating to IDU equipment distribution, handling and disposal, safer drug use education and overdose prevention)	N/A	N/A	All	N/A	To improve the effectiveness of harm reduction programs that deliver prevention services to people who use drugs and are at risk for human immunodeficiency virus (HIV), hepatitis C (HCV), hepatitis B (HBV), and other harms. and other harms
Harm reduction	This report summarizes the discussion of this expert working group. Part 1 analyzes the trends in HIV and hepatitis C (HCV) infections in IDU in BC. Part 2 reviews the potential hypotheses for what factors might underlie these trends and evidence where it is available to support or refute each hypothesis. The report concludes by summarizing the opinions of the working group on the most likely explanations for the decrease in new positive HIV tests among IDU, reviewing the current understanding of the nature of addiction and rationale for alternatives to enforcement-based drug policies, and recommending future actions to prevent further transmission of blood-borne infections, including HIV, among IDU in BC.	All PWID within British Columbia	N/A	All	N/A	This report provides a review of ecological data and considers a broad range of evidence and data sources of varying data quality and relationship to the hypotheses in question.
Telemedicine	Development of a telemedicine program staffed by multidisciplinary team of HCV healthcare professionals with a comparisons between TM and non-TM populations.	TM connected clinics throughout Ontario (1583 sites)	157 TM and 1130 non-TM patients	History of IDU 70.1% in TM and 54.9% in non-TM group	Telemedicine program development for HCV treatment from Jan 2012 to Aug 2016 compared to non-TM populations. Inclusion criteria 18yo with chronic HCV infection. Clinical outcome included pre-treatment access to biopsy, transient elastography, initiation and type of HCV treatment, and SVR (free of virus >12 wks after treatment)	Evaluate the effectiveness of the TM health care delivery model for chronic HCV

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Multiple	Multiple	Recommended best practice policies about:1.Needle and syringe distribution; 2.Cooker distribution; 3.Filter distribution; 4.Ascorbic acid distribution; 5.Sterile water distribution; 6.Alcohol swab distribution; 7.Tourniquet distribution; 8.Safer crack cocaine smoking equipment distribution; 9.Disposal and handling of used drug use equipment; 10.Safer drug use education; 11.Opioid overdose prevention: education and naloxone distribution ;	Policies that limit the number of needles distributed limit the effectiveness of NSPs to prevent HIV and HCV transmission.There are also few empirical studies that address injecting equipment distribution policies and coverage was lacking. Policy and practice guidelines developed from evidence summary for each chapter.	Studies that are well designed to measure the magnitude of risk of HIV, HCV, and other bloodborne pathogen transmission from sharing each item of injecting equipment are needed.
N/A	N/A	Full participation in harm reduction programs, including needle distribution and methadone maintenance therapy (MMT), has been found to be associated with decreased risk for HIV and HCV. These harm reduction programs are available across BC and may be having an impact on observed HIV trends in IDU.	In addition to expanding access to HAART, this response includes the delivery of effective harm reduction services (including established interventions such as needle distribution and substitution therapy, and innovations such as supervised injection facilities and prescription opioids) and community-based HIV prevention services. This provincial response needs to be sustained and new opportunities for further prevention of HIV in IDU explored. This success also challenges the health system in BC to ensure that equivalent sustained, multi-level HIV prevention responses exist equally in all populations affected by HIV and HepC.1) Expand access to, uptake of, and adherence to, HAART. 2) Expand harm reduction programs 3)Improve data and monitoring systems 4)Ensure equity of access to services 5)Expand testing for HIV and HCV 6)Support initiatives that address the determinants of health	Further research in these areas would be informative; for example, research into the HIV testing patterns of IDU over time, changes in the age distribution of IDU, and access of younger IDU to health and harm reduction services.
Main clinical outcome was Sustained Viral Response (free of virus >12 wks after treatment)	Clinical outcome included pre-treatment access to biopsy, transient elastography, initiation and type of HCV treatment	TM patients more frequently indigenous (7.0% vs 2.2), IDU (70.1% vs 54.9%), alcohol use (69.4% vs 56.9%) and incarceration (46.5 vs 35.5%) and materially deprived (31.8% vs 17.0%); TM patients less likely to have liver biopsy (15.9% vs 39.2%) and less likely to initiate anti-retroviral treatment (5.1% vs 19.5%); TM equally likely to have a fibroscan (59.2% vs 61.8%).	Multidisciplinary TM approach can engage and retain patients in remote areas in the treatment of HCV. TM program offers increase access to specialty care for isolated populations. Reported that TM saved patients time, diminished distance traveled and missed work days with high satisfaction	None stated

None stated	Found limitations of their evidence base, including lack of program evaluation of education initiatives, variance in study design and sample size and representativeness.	Although the evidence base has grown in recent years, there are notable gaps in the literature on other injecting equipment. Studies that are well designed to measure the magnitude of risk of HIV, HCV, and other blood-borne pathogen transmission from sharing each item of injecting equipment are needed. There are also few empirical studies that address injecting equipment distribution policies and coverage was lacking.	36/48=75%	30/48=62.5%	68.75%		
None stated	None stated	<p>a. Monitoring systems for community-based prevention services are needed in order to evaluate their impact. An HIV/HCV Outcomes for BC Working Group has been established and is working on provincial process evaluation tools and data collection systems for community-based HIV and HCV prevention services.</p> <p>b. Better data are needed on the population dynamics of IDU in BC, to address the question of whether the decrease in new positive HIV tests among younger IDU is related to less injection, or less engagement of younger IDU with harm reduction and testing services.</p> <p>c. Improvements to provincial HIV surveillance data are needed in order to track HIV infections that may be related to non-injection drug use. Linkage of provincial HIV surveillance to HIV drug treatment data is required in order to characterize trends in the rates of infection at</p>	N/A	N/A	N/A		
	The TM sample was too small to comment on SRV outcomes relative to non-TM	Not all marginalized populations benefited equally. Indigenous population SVR rates with DAA treatment was lower suggesting they need more attention ie peer navigators.	33/42=78%	28/42=66.6%	69.0+71.4/2=70.2%		

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2016	Jongbloed, K.; Friedman, A.J.; Pearce, M.E.; Van Der Kop, M.L.; Thomas, V.; Demerais, L.; Pooyak, S.; Schechter, M.T.; Lester, R.T.; Spittal, P.M.	Trials	The Cedar Project WeITel mHealth intervention for HIV prevention in young Indigenous people who use illicit drugs: study protocol for a randomized controlled trial	Empirical	(pre-)RCT (protocol paper)	BC - Vancouver and Prince George	Community	HCV, HIV
2011	Deering, K.N.; Kerr, T.; Tyndall, M.W.; Montaner, J.S.G.; Gibson, K.; Irons, L.; Shannon, K.	Drug and Alcohol Dependence	A peer-led mobile outreach program and increased utilization of detoxification and residential drug treatment among female sex workers who use drugs in a Canadian setting	Empirical	Cohort - prospective survey	BC - Vancouver	Community	HCV, HIV, STI
2010	Hayashi, K.; Wood, E.; Wiebe, L.; Qi, J.; Kerr, T.	Int J Drug Policy	An external evaluation of a peer-run outreach- based syringe exchange in Vancouver, Canada	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV

mHealth	The Cedar Project WeiTel mHealth intervention uses a structured mobile-phone initiative to connect young Indigenous people who use drugs with Cedar Case Managers in a community-based setting.	young Indigenous people who use illicit drugs	Planned sample size - 200	Indigenous youth	Cedar Project - a cohort study addressing HIV and hepatitis C vulnerability among young Indigenous people who use drugs in Vancouver and Prince George, BC; Started 2003-2007 and reopened in 2011. 738 participants enrolled; eligibility criteria - 14-30 yo, informed consent, Indigenous ancestry, smoking or injecting drugs at enrollment; enrollment visit and follow-ups every 6 mo; data - questionnaires for demographic, behavioural and health intervention, blood sample for HIV/Hep C.	To measure the effect of a culturally safe, strengths-based two-way supportive text-message intervention to reduce HIV vulnerability among young Indigenous people who use illicit drugs
Mobile Care Initiative	A peer-lead mobile outreach program among street-based sex workers using a prospective cohort data available over an 18 month period to evaluate the relationship between use of MAP program and utilization of addiction treatment. Baseline and biannual interview questionnaires and voluntary HIV screening.	Street based female sex workers in Vancouver, BC	242 FSW with 479 observations and the median number of observations per person was 2.	Street based female sex workers, 122 self reported as being Caucasian, 102 aboriginal ancestry, 16 were other ethnic heritage	Study was between April 2006 to May 2008 Inclusion Criteria: woman age 14 or older who smoked (excluding marijuana) or injected illicit drugs in the last month and engaged in street-level sex work in Vancouver. Primary outcome measure time updated dichotomous variable describing use of mobile outreach program in the previous 6 months period. Secondary outcome: drug treatment outcomes 1) methadone maintenance therapy 2) addiction counselling 3) inpatient detoxification and 4) residential drug recovery houses	Impact of peer outreach program on PWID FSW
Mobile Care Initiative	The Alley Patrol was established in 2000 by the Vancouver Area Network of Drug Users (VANDU), a local drug user organization. Trained peer-volunteers were paired up and worked 4-hour shifts to distribute sterile injection equipment and condoms, collect used syringes and provide harm reduction education to IDU in public places in Vancouver's Downtown Eastside, where public drug use was concentrated. The program ended in 2005 but an Injection Support Team was created to support IDU experiencing difficulty with injecting in the open drug scene.	Participants in the Vancouver Injection Drug Users Study (VIDUS) who reported having injected drugs during the prior 6 months.	854 IDU were eligible for the analysis	All	Vancouver Injection Drug Users Study (VIDUS), prospective cohort study of IDU recruited through self-referrals and street outreach since May 1996. Eligibility criteria include injecting drugs a minimum of once in the previous month, residing in the greater Vancouver region and providing written informed consent. Participants complete an interviewer-administered questionnaire and provide a blood sample semi-annually. Drug use, HIV risk behaviour and HIV incidence is tracked longitudinally.	To conduct an external evaluation of a peer-run outreach-based syringe exchange programme (SEP) initiated by the Vancouver Area Network of Drug Users (VANDU), a local drug user organization.

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HIV propensity score at 6 months	HIV propensity at 1 year, HIV risk, resilience, psychological distress, access to drug-related services, and connection to culture measured at 6 months and 1 year	N/A - no results yet as protocol paper	Innovative, culturally safe interventions that address the barriers to HIV prevention while supporting the strength of young Indigenous people who use drugs are urgently needed	N/A
Primary outcome measure time updated dichotomous variable describing use of mobile outreach program in the previous 6 months period	Secondary outcome: drug treatment outcomes 1) methadone maintenance therapy 2) addiction counseling 3) inpatient detoxification and 4) residential drug recovery houses	FSWs servicing a higher volume of clients per week (10+ compared to <10) and those soliciting clients in more isolated public spaces (alleys, side streets and industrial settings compared to main streets, commercial, or residential settings) were more likely to use the mobile program. At the same time, youth (<24 years) were less likely than older women (25+ years) to access the mobile outreach program. Of particular importance, reporting use of the mobile outreach program in the last 6 months (compared to not reporting use) was independently associated with a four-fold elevated proportional odds of using inpatient addiction treatment, even after adjusting for individual drug use and environmental-structural factors and accounting for repeated measures on the same individual.	Unsuccessful attempt to access drug treatment is associated with elevated odds of violence against female sex workers (FSWs); that peer-based mobile outreach remain a critical strategy for facilitating utilization of addiction treatment services. Indeed, previous research has shown that FSWs, particularly those who use drugs, often exist outside of conventional public health programs and services; programs are a critical 'safer environment intervention', modifying the physical and social environments by reaching sex workers where and when they work and therefore reducing barriers to accessing harm reduction supplies and health and social services, including addiction treatment; mobile outreach programs have the opportunity to play an important role in HIV/STI prevention through distribution of resources to some of the most vulnerable women in sex work, including those with higher numbers of clients. Higher client volume has also been identified as an important driver of STI/HIV transmission among FSWs in several international settings.	Future research should concentrate on understanding how specific characteristics of mobile outreach programs may facilitate entry into inpatient addiction treatment or connect women to other services. This will have important implications for the development and scale up of peer-based outreach programs in this and similar settings
Use of the VANDU Alley Patrol SEP during 6 months prior to the interviews.	Explanatory variables - age, gender, Aboriginal ancestry, HIV ser-status, unstable housing, sex work, daily heroin and cocaine injection, injecting in public, injecting with others, requiring help injecting, having difficulty accessing sterile syringes, borrowing syringes, average needle reuse (>once vs once), syringe disposal, and non-fatal overdose.	Of 854 IDU eligible for analysis, 350 (41%) were female, 292 (34.2%) were of Aboriginal ancestry. 233 (27.3% participants reported obtaining syringes from VANDU Alley Patrol volunteers during the study period. The proportion of use increased during the study period. Service use was associated with unstable housing (Adjusted Odds Ratio [AOR] = 1.83, 95% CI: 1.39–2.40), frequent heroin injection (AOR = 1.31, 95% CI: 1.01 – 1.70), frequent cocaine injection (AOR = 1.34, 95% CI: 1.03 – 1.73), injecting in public (AOR = 3.07, 95% CI: 2.32– 4.06), and needle reuse (AOR = 0.65, 95% CI: 0.46 – 0.92).	Needle reuse was independently and negatively associated with the use of the VANDU Alley Patrol SEP, even though this population was high risk for factors that typically increase needle reuse, showing that this program may have contributed to reducing needle reuse among local IDU. Peer-based outreach programs can reach subpopulations of IDU that are high risk of HIV infection. Importantly, the Alley Patrol SEP continued to serve this vulnerable population during periodic policy crackdowns. The findings highlight the important role that drug user-led initiatives can play in extending the reach of conventional public health programs.	None stated

None stated	Over-sampling in the intervention arm to adjust for refusals to participate or difficulty locating participants may result in a dilution of the effect of the intervention in ITT analysis.	Same as policy implications	31/42=73.8%	36/42 = 85.7%	31/42=73.8%		
<p>e mobile outreach program was designed explicitly for street-based FSWs, and thus our prospective cohort offers a good representative sample of FSWs both using and not using MAP for external evaluation; time-space sampling was used to systematically sample women at staggered times and locations based on street-level solicitation spaces identified through mapping, therefore helping attract a representative sample; targeted a difficult-to-access, hidden and marginalized population with high health care and drug treatment needs; r primary association between using the mobile outreach program and accessing inpatient addiction treatment was very strong (&gt;4-fold), even after adjusting for individual drug use and environmental-structural factors, and outpatient addiction treatment</p>	<p>study population included only women in street-level sex work; since sex work is conducted across many other types of venues (e.g., massage parlours, brothels), the results may not be generalizable to sex workers in other venue; sampling frames are difficult to construct for hidden populations, the sample was not randomly generated and may not be representative of street-based FSWs in other settings; sample size was relatively small; self-reported behaviour may be subject to social desirability bias or higher non-response rates; the study design is observational in nature and thus cannot determine causal relationships</p>	<p>it is important that innovative evidence-based structural interventions that support the ability of FSWs to engage in HIV risk reduction practices and improve their access to and utilization of health and social services continue to be developed and evaluated.</p>	40/42=95%	31/42=73.8%	80.9+78.5/2=79.7%		
None stated	<p>As an observational study, causation cannot be established. VIDUS is not a random sample, so findings may not be generalizable to other IDU populations. Self-reported data could be affected by socially desirable reporting. However, participants and interviewers were blinded to use of data, so this reporting bias may not have been a large concern. It is unknown if Alley Patrol SEP users would have used other SEPs in the area if this program did not exist.</p>	None stated	28/42 = 66.7%	28/42=66.7%	66.70%		



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2009	Hilton, B.A.; Thompson, R.; Moore- Dempsey, L.	Canadian Journal of Nursing Research	Evaluation of the AIDS Prevention Street Nurse Program: One step at a time	Empirical	Qualitative - participatory research and responsive evaluation	BC - Vancouver	Multiple - streets and established sites of contact, such as jails, detoxification centres, clinics, and drop-in centres, door-to-door, on foot or via mobile van	HIV, STIs
<b>Peer-delivered services n=3</b>								
2014	Jozaghi, E.	Journal of Substance Use	The role of drug users' advocacy group in changing the dynamics of life in the Downtown Eastside of Vancouver, Canada	Empirical	Qualitative - community-based case study	BC - Vancouver (Downtown Eastside)	Community	HCV, HIV
2014	Markwick, N.; Ti, L.; Callon, C.; Feng, C.; Wood, E.; Kerr, T.	J Epidemiol Community Health	Willingness to engage in peer-delivered HIV voluntary counselling and testing among people who inject drugs in a Canadian setting	Empirical	Cohort - retrospective	BC - Vancouver	Suggested community locations: InSite, Vancouver Area Network of Drug Users (VANDU)	HIV

peer review only

<p>Mobile Care Initiative</p>	<p>The AIDS Prevention Street Nurse Program, uses specially prepared community health nurses to work "on the street," piloted in Vancouver, BC in January 1988 directed in response to the HIV/AIDS epidemic. The nurses work with challenging clients and complex situations in an expanded nursing practice role that includes several delegated medical functions.</p>	<p>marginalized, hard-to-reach, and high-risk street-involved adults and youth, non-street involved gay, lesbian, bisexual and transgendered populations, and refugees and immigrants at risk for HIV and STD who may or may not be street-involved.</p>	<p>63 interviews and focus groups with 84 participants, including clients, street nurses, other service providers, and representatives of other HIV/STD programs in the province of BC.</p>	<p>marginalized, hard-to-reach, and high-risk street-involved adults and youth</p>	<p>N/A</p>	<p>To describe the work of the street nurses and the challenges posed by that work from the perspective of the nurses and others, and to identify changes resulting from the nurses' work. To articulate the roles and contributions of the nurses and to identify ways in which the program might be made more effective.</p>
<p>Peer-delivered counseling and advocacy</p>	<p>Former and current drug users mobilized in an effort to prevent ongoing spread of HIV and overdose among their peers in DTES, which led to the creation of the Vancouver Area Network of Drug Users (VANDU) in 1997. VANDU has an office in DTES and operates a variety of programs in the DTES tailored towards drug-user harm reduction programs.</p>	<p>VANDU volunteers living in DTES</p>	<p>11</p>	<p>VANDU volunteers, including VANDU Board members and IDUs who used the services at VANDU, living in DTES</p>	<p>N/A</p>	<p>To assess how drug user organizations such as VANDU intervene to help shape the neighbourhoods and capture the transformative role of peer led intervention in the lives of IDUs in the DTES</p>
<p>Peer delivered counselling and testing</p>	<p>peer delivered voluntary counselling and testing (VCT)</p>	<p>VIDUS participants who completed a survey between December 2011 and May 2012</p>	<p>600; 7 observations with missing data were excluded from analysis</p>	<p>HIV-negative IDU</p>	<p>Vancouver Injection Drug Users Study (VIDUS): a prospective cohort of HIV-negative IDU recruited through street outreach and self-referral since 1996, collects demographic data, info on drug use, HIV risk behaviours, blood samples collected for serologic testing</p>	<p>to characterize IDU's willingness to receive peer-delivered VCT</p>

<p>Themes around the roles and contributions of the nurses and to identify changes resulting from the nurses' work.</p>	<p>N/A</p>	<p>Major areas of impact on clients: knowing more about HIV/AIDS/STDs, their own situation, and their options; receiving essential supplies to reduce harm and promote health; changing behaviour to reduce disease transmission, improve resistance, and promote health and well-being; connecting with help or care; changing feelings about themselves and others; feeling supported; influencing others; receiving earlier attention, thereby reducing the severity of problems; being healthier with or without HIV; making major changes in drug use; and changing indicators likely reflective of decreased morbidity and mortality.</p>	<p>The program's benefits progressed through a series of stages, consistent with the "hierarchy of changes" by Cohen and Kibel (1993) (first generate interest and prove "effects", then turn effects into "gains", to get the client to buy-in, "capacity enhancements" changes lead to "outcomes" and the fifth level are "impacts" and consistent with the process of empowerment. It is important to empower clients to make changes, by providing resources, skills, and opportunities within an atmosphere of mutual trust and respect, education and support, participation and commitment, and power-sharing.</p>	<p>None stated</p>
<p>Themes around work as a peer IDU at VANDU, the impact they believe their work has had in the community, the DTES situation prior to VANDU, the DTES after the establishment of VANDU and suggestions related to the ways risky behaviours could be reduced</p>	<p>N/A</p>	<p>Themes include: The DTES change, Changes in behaviour, Change in stigmatization. VANDU helped shape the neighborhood by advocating for harm reduction but also social and environmental changes in the neighborhood. Drug users feel empowered and increase their self-esteem. Women particularly are at risk of violence relating to drug use, and VANDU set up groups to be in the alleys to help IDUs. IDUs also learn about safe injecting and the importance of not sharing, which lowers transmission of ID. Lastly, by advocating, VANDU has been able to help decrease stigma around IDU.</p>	<p>VANDU has been able to reduce risky injection behaviour and reduce risk of overdose death by establishing unsanctioned safe injection site (SIF) and the social support provided by a drug organization like VANDU, helps IDUs maintain lower-risk injection behaviour. VANDU has given a political voice to the most marginalized members of society who otherwise would not be represented. Peer-led organizations for IDU may help increase the reach of harm reduction to the most marginalized and give IDU a political voice.</p>	<p>None stated</p>
<p>Willingness to receive peer-delivered pretest counselling, peer-delivered rapid HIV testing and peer-delivered post-test counselling.</p>	<p>None</p>	<p>309 individuals (51.5%) indicated willingness to receive peer-delivered pre-test counselling, 244 (40.7%) to receive peer-delivered rapid HIV testing, and 257 (42.8%) indicated willingness to receive peer-delivered post-test counselling.</p>	<p>implementing peer-delivered VCT within already established peer-run organizations to increase access to VCT within the community; Potential for peer-based services to help address issues such as lack of trust in the healthcare system, physicians' unfamiliarity with the social conditions surrounding IDU, and discomfort awaiting test results</p>	<p>study could be extended by future longitudinal and intervention research assessing how reported willingness compares to actual willingness to receive peer-delivered VCT.</p>

<p>Sample is reasonably representative of the thoughts and concerns of nurses, other providers and clients.</p>	<p>Only those clients who consented participated in the study, which may have introduced bias, even though variation was sought. Ex-clients were not able to be reached because there was no way to contact them.</p>	<p>For maximal effectiveness, all parties concerned should take advantage of every opportunity for partnering, coordinating, collaborating on current and future healthcare delivery. This is a good example of successful community collaborating and partnering.</p>	<p>33/42 = 78.6%</p>	<p>38/48=79.2%</p>	<p>78.90%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>16/42=38.1%</p>	<p>17/42 = 40.5%</p>	<p>39.30%</p>		
<p>Findings are consistent with research in Melbourne, Australia, also investigated a program of peer-delivered hepatitis C counselling and testing among IDU and found improvement in risk behaviours and knowledge of hepatitis C.</p>	<p>sample was built using snowball sampling methods and was not randomly selected; therefore, residual confounding may exist and results may not be generalizable, self-reporting may subject results to response bias</p>	<p>None stated</p>	<p>23/42 = 54.8%</p>	<p>19/42 = 45.2%</p>	<p>21/42 = 50.0%</p>		

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2014	McNeil, R.; Small, W.; Lampkin, H.; Shannon, K.; Kerr, T.	AIDS Behav.	"People Knew They Could Come Here to Get Help": An Ethnographic Study of Assisted Injection Practices at a Peer-Run 'Unsanctioned' Supervised Drug Consumption Room in a Canadian Setting	Empirical	Qualitative - ethnographic	BC - Vancouver	Community (VANDU unsanctioned drug consumption room (DCR))	HIV, HCV
<b>Infective Endocarditis Surgical v. Medical Management n=2</b>								
2018	Rodger, L.; Dresden Glockler-Lauf, S.; Shojaei, E.; Sherazi, A.; Hallam, B.; Koivu, S.; Gupta, K.; Hosseini-Moghaddam, S.M.; Silverman, M.	JAMA Network Open; Infectious Diseases	Clinical Characteristics and Factors Associated with Morality in First-Episode Infective Endocarditis Among Persons Who Inject Drugs	Empirical	Case series	ON - London	Hospital (3 acute care hospitals)	Infective Endocarditis

Peer delivered injections	Peer assisted injections at VANDU's DCR	23 participants, including 11 women and 12 men. Participants were an average of 40 years of age (range 27–59 years), with 35% self-identifying as a member of a visible minority (i.e. Aboriginal, African-Canadian, or Indo-Canadian). 17 participants reported that they had injected drugs within the past thirty days, with the most frequently injected drugs being heroin (12), hydromorphone (8), and cocaine (6). 15 of these participants (11 women, 4 men) reported that they regularly required help injecting, including 8 who always required help injecting (6 women, 2 men). 8 participants (3 women, 5 men) worked as peer volunteers at VANDU and regularly provided manual assistance injecting.	23	All	NA	To explore how people who require help injecting experience assisted injection support within this unsanctioned DCR, with an emphasis on how these assisted injections differed from those received within the street-based drug scene
Surgical vs medical management	Surgical vs medical management	PWID treated for a first episode of infective endocarditis	202	All	All patients were adult (aged 18+) inpatients admitted between April 1 2007-March 30 2016, last follow-up time was Nov 2017. Study population included only patients with a definite IE per the modified Duke criteria; criteria have been demonstrated to accurately classify IE among PWID. Of 370 total first-episode cases of IE, 202 were in PWID.	To compare clinical characteristics in first-episode infective endocarditis in PWID who are surgically vs medically managed and to identify variables associated with mortality.

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22</p> <p>Interview guide addressed a range of topics, including but not limited to: a) factors that shaped assisted injection practices within the local drug scene; b) how the unsanctioned DCR shaped assisted injection practices, particularly in comparison to other injection settings; and, c) the social context of assisted injections performed within this unsanctioned DCR</p>	<p>Population characteristics (e.g. age, gender, ethnicity, last drug injection, etc.)</p>	<p>Findings underscore how people who require assistance injecting, and especially women and people with disabilities, are vulnerable to an array of health harms due to intersecting social and structural factors that constrain access to the sanctioned SIF. We found that, by providing assistance injecting in a regulated environment and in accordance with a harm reduction policy, this peer-run 'unsanctioned' supervised drug consumption facility mitigated these barriers, and in tum was functioning to establish safer injecting routines and provide an escape from everyday violence. Furthermore, our findings emphasize how VANDU disrupted social practices that produce HIV and HCV risks, while reinforcing overdose prevention messages. Rules prohibiting assisted injections were a structural-environmental barrier that constrained access to the sanctioned SIF. <b>In addition, our findings demonstrate that drug user-led organizations can play a central role in the delivery of harm reduction programs - people who require help injecting may more readily respond to peer volunteers who share similar life experiences.</b></p>	<p>Changes to supervised drug consumption facilities are urgently needed to accommodate a wider range of drug-using subjects, and thereby minimize structural vulnerabilities to drug-related harm (need for changes to legal frameworks and SCF regulations to accommodate assisted injections), consideration of peer based delivery models for SCF.</p>	<p>Greater attention is needed to how harm reduction programs emphasize particular bodies (e.g. autonomous, self-injecting) at the expense of others (e.g. women, people with disability)</p>
<p>23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Survival among PWID</p>	<p>causative organisms, site of infection, and cardiac as well as noncardiac complications; referral to addiction services, and survival vs medical management. Demographic information collected for each patient included age, sex, comorbid conditions (eg, HIV or hepatitis C infection), and predisposing conditions (eg, heart disease, chronic venous access, intracardiac devices, or prosthetic valve).</p>	<p>Of the 202 patients included, 105 (52%) were male, the median (interquartile range) age was 34 (28-42) years, and patients were predominantly positive for the hepatitis C virus (69.8% [141 of 202]). Right-sided infection was more common (61.4% [124 of 202]), and most infections were caused by Staphylococcus aureus (77.2% [156 of 202]). Surgery occurred in 19.3% of patients (39 of 202). The all-cause mortality rate was 33.7% (68 of 202). Adjusting for age and sex, survival analysis demonstrated that surgery was associated with lower mortality, as was referral to addiction treatment (HR, 0.29; 95% CI, 0.12-0.73; P = .008). Higher mortality was associated with left-sided infection and bilateral involvement.</p> <p>Our data are in keeping with previous studies showing that PWID with IE have predominantly right-sided disease caused by S aureus and high mortality.</p>	<p>Surgery appeared to be associated with significantly lower mortality, but we cannot rule out the presence of other unmeasured confounders. It is notable that presently the American Society for Thoracic Surgery consensus guidelines recommend using the same criteria for surgery in patients who inject drugs and those who do not. An optimal approach to surgical treatment of PWID involves a multidisciplinary team, in which involvement of ethics or patient commitment to rehabilitation prior to operation should be considered part of a complete treatment plan.</p> <p>Our findings support the recent recommendations from the National Academies of Sciences, Engineering, and Medicine that emphasize the importance of integrating treatment for opioid use disorder with acute care for infectious diseases.</p>	<p>Further study to identify PWID who would benefit from surgery is warranted. Should also explore increased use of addiction treatment.</p>

<p>None stated</p>	<p>Findings are not be representative of the experiences of all those who require help injecting within the local drug scene, especially those who do not access this facility, and might therefore overlook important factors that shape access to this supervised DCR; people who use drugs may give socially desirable responses during research interviews; because of the unique combination of social, structural, and spatial factors that shape injection drug use in any particular locale, our findings might not be transferable to supervised drug consumption facilities in all settings</p>	<p>None stated</p>	<p>33/42 = 78.6%</p>	<p>35/42 = 83.3%</p>	<p>34/42 = 81.0%</p>		
<p>To our knowledge, this is one of the largest, most contemporary cohorts of PWID with IE. In contrast to previous studies, our analysis of a large cohort of PWID with IE allowed assessment of the association between surgery and survival by comparing PWID treated surgically vs nonsurgically.</p>	<p>1) Retrospective in nature                  2) Results limited to patients who fulfilled modified Duke criteria; results cannot be generalized to population of patients since patients with possible endocarditis were excluded.                  3) Data regarding specifics of medical treatment following discharge (agent, duration and completion) were not collected. Homecare notes regarding IV treatment was unavailable.                  4) We cannot rule out the possibility that the patients selected for surgery were felt to have less severe addiction issues and therefore were a select group with better addiction prognosis, although it is important to note the association with lower mortality identified in the multivariable model                  5) Surgery was associated with lower mortality in multivariable models that included referral to addictions services and discharge with OST. Although surgery was associated with a reduction in mortality, we cannot rule out that unmeasured variables (such as a clinical impression of low risk for relapse of drug use) led to selection of patients with improved prognosis for surgery                  6) Owing to sample size, it was not possible to assess the impact of valve repair vs valve replacement; this is significant when considering surgery in PWID because of the risk of reinfection of a prosthetic valve. It is likely that reinfection of a repaired valve may not have the same grave prognosis as prosthetic valve endocarditis</p>	<p>Factors associated with mortality in PWID populations have not been well described.</p>	<p>30/42 = 71.4%</p>	<p>30/42 = 71.4%</p>	<p>30/42 = 71.4%</p>		

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2016	Shetty, N.; Nagpal, D.; Koivu, S.; Mrkobrada, M.	Journal of Cardiac Surgery	Surgical and Medical Management of Isolated Tricuspid Valve Infective Endocarditis in Intravenous Drug Users	Empirical	Cohort - retrospective	ON - London	Hospital (London Health Sciences Centre (LHSC), a care facility that sees high rates of IVDU-related complications)	Infective Endocarditis
<b>Other n=4</b>								
2018	Jaworsky, D.; Phillips, P.; Cui, Z.; Chau, W.; Colley, G.; Dutta, R.; Yip, B.; Kremer, H.; Eyawo, O.; Montaner, J.S.G.; Hull, M.W.	AIDS Care	Trends in discharges from the HIV/AIDS ward at a tertiary Canadian hospital from 2005 to 2014	Empirical	Chart review - retrospective	BC - Vancouver	Hospital	HIV, HCV, opportunistic infections, other infections
2015	Bertrand, K.; Roy, É.; Vaillancourt, É.; Vandemeersch, J.; Berbiche, D.; Boivin, J.F.	Addiction	Randomized controlled trial of motivational interviewing for reducing injection risk behaviours among people who inject drugs	Empirical	Randomized controlled trial	QC - Montreal	Community	HIV

For peer review only

Surgical vs medical management	Medical or surgical management of native cases of tricuspid valve infective endocarditis associated with IVDU	Patients admitted with native TV IE related to IVDU at LHSC	38	Patients admitted with native TV IE as proven by transthoracic or transesophageal echo.	38 participants. All had diagnosis of isolated native TV IE treated at LHSC between March 2008-December 2011. Excluded: age < 18, noninfective cause of endocarditis, suspected endocarditis w/o echo evidence of vegetation, prosthetic valve endocarditis, involvement of aortic/mitral valve/intracardiac device	To assess the long-term outcomes of native tricuspid valve infective endocarditis cases associated with IVDU that were managed medically or surgically at LHSC.
Tertiary hospital - St. Paul's dedicated HIV/AIDS ward	St. Paul's Hospital is a tertiary-level acute care centre in Vancouver, BC. It opened a ward in 1997 dedicated to HIV/AIDS, which supports clinical care, teaching and research and is staffed by physicians, nurses and allied health practitioners with expertise in HIV/AIDS management and substance use-related conditions. In July 2014, the ward was repurposed to the "Urban Health Infection Unit" and expanded to include HIV-negative individuals with infectious conditions arising from addictions comorbidities.	Individuals 18 or over with documented history of HIV infection who were admitted or transferred to the HIV/AIDS ward at St. Paul's Hospital between July 1, 2005-June 30, 2014.	1595 individuals	People with HIV admitted to a hospital ward	N/A	To examine trends over time in causes for hospital admission to the St. Paul's Hospital HIV/AIDS ward in Vancouver, Canada from 2005-2014. And, to describe antiretroviral use and associated virologic suppression among individuals admitted during this period.
Motivational interviewing	PWID were randomized to receive individualized 90min motivational interviewing or educational interviewing and efficacy of the interventions on high risk injection behaviours	participants who have injected drugs in the previous month to recruitment, have shared drug injection equipment (syringe, container, filter, water) or shared drugs by backloading or frontloading in the same month and be 16 years old or more	219	All	N/A	To examine the efficacy of Motivational Interviewing on high-risk injection behaviors among PWID by comparing it with educational intervention

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<p>Incidence of death at 2 years from diagnosis</p>	<p>Outcome (death) related to timing of surgery (ex. perioperative vs. 2 months after)</p>	<p>No difference in patient characteristics or 2-year mortality for surgical vs. medical management. Same outcomes for early vs. late surgery. Highest risk for mortality associated with recurrent endocarditis due to repeated IVDU.</p>	<p>This research supports focusing on addictions management resources for patients with infective endocarditis (medically and surgically managed) to reduce morbidity and mortality.</p>	<p>None stated</p>
<p>Annual proportion of participants admitted to the HIV/AIDS ward due to a stage 3 defining opportunistic illness in HIV.</p>	<p>Most frequent discharge diagnoses, proportion of participants admitted due to AIDS-defining malignancies compared to non-AIDS-defining malignancies, proportion on ART at time of admission, proportion with virologic suppression at time of admission and median CD4 count at admission.</p>	<p>3919 discharges were captured for 1,595 unique participants. There were 497 deaths reported over the study period (31.2% of participants). 1,014 (63%) of individuals and 2,957 (75.5%) of admissions were in people with IDU. And, 985 (61.8%) of individuals and 2,851 (72.7%) of visits were in people who were HCV antibody positive. Median length of stay declined from 9 days in 2005-6 to 7 days in 2013-4. Opportunistic infections accounted for 10.7% of admissions over the study period. Adjusted for calendar year, participants with a history of IDU were more likely to have a discharge diagnosis of bone and joint infections (aRR 3.07, 95% CI: 1.44,6.54) and endocarditis/bacteremia (aRR 2.21, 95% CI: 1.25,3.91), and less likely to have a discharge diagnosis of opportunistic infections (aRR 0.35, 95% CI: 0.25, 0.48) or any malignancy (aRR 0.29, 90% CI: 0.20,0.43)</p>	<p>As people with HIV age, comprehensive HIV care programs should consider offering services in smoking cessation, screening for lung disease and optimization of treatment for existing obstructive lung disease, since pulmonary infections are so common in PLHIV. The decreased proportion of discharge diagnoses reported as AIDS defining illnesses correspond to dedicated regional and provincial programs designed to improve rates of HIV diagnosis and enhance access to ART, known as the Seek and Treat for Optimal Prevention of HIV/AIDS in BC (STOP HIV/AIDS in BC) initiative. Even though improvement in clinical markers are shown with highly active ART, there are still PLHIV presenting to hospital with opportunistic illnesses. Efforts are needed to identify populations at risk of opportunistic illnesses and to optimize their HIV management. HIV screening programs can be scaled up in order to reduce late HIV diagnosis. Improved preventive medicine and early ambulatory care for respiratory infections may help to reduce hospitalizations. Increased uptake of routine pneumococcal and influenza vaccinations and low-barrier access to urgent primary care is needed. High rates of admission for complications related to IDU is a target for intervention. Increased access to harm reduction and addictions services are needed in this population to optimize health outcomes,</p>	<p>Future studies focused on hospital-wide administrative data can be considered to better capture reasons for hospitalization among PLHIV.</p>
<p>having any of these risk behaviors at 6 months (having shared syringes, containers, filters or water to inject drugs in the previous month, backloading/frontloading and using equipment excluding syringe)</p>	<p>Each risk behavior was examined separately as secondary outcomes</p>	<p>The probability of reporting a risk injection behavior decreased in both educational intervention (EI) and motivational interviewing (MI) groups. At 6-month follow-up participants who reported any risk behaviors were 50% (odds ratio = 0.50, CI: 0.13-0.87) less likely to be in the MI group than in the EI group. Similar results were observed for those who reported sharing containers (odds ratio = 0.50, CI: 0.09-0.90). Those who reported sharing equipment excluding syringes were 53% less likely to be in the MI group (odds ratio = 0.47, CI: 0.11-0.84).</p>	<p>EI could be used by people working in Needle Exchange Program. MI could be considered for PWID who go to NEP regularly and who present recurrent injection risk behaviors</p>	<p>Important to conduct effectiveness studies in a natural environment to examine the feasibility of applying this intervention model in the community</p>

None stated	Small sample size in surgically treated group. Small # of surgical cases limits ability to detect statistically significant differences between the outcomes of both groups. Retrospective design means that unmeasured biases exist, and no definite conclusions can be drawn.	None stated	17/42 = 40.48%	14/42=33.3%	16/42 = 38.10%		
One of few studies to report trends of hospitalization in dedicated HIV/AIDS ward. Data on ART utilization and virologic suppression are very complete given a centralized distribution of ART through BC.	This program runs in a region with a publicly-funded program providing access to antiretroviral therapies at no cost to patients. There might be enrolment bias since the ward is not equipped with telemetry or critical care capabilities, leading to potential for underrepresentation of cardiac disease and critical illness, trauma, cancer, or psychiatric comorbidities. As it is located in an area surrounded by high IDU, the prevalence of individuals admitted to the ward with a history of IDU is higher than other provincial estimates. Lack of validated case definitions may lead to under-reporting of AIDS-defining conditions and opportunistic infections may be missed if not the primary discharge diagnosis. Data on cause of death were missing for 23.7% of deaths.	Same as implications for policy and practice: especially High rates of admission for complications related to IDU is a target for intervention. Increased access to harm reduction and addictions services are needed in this population to optimize health outcomes, reduce substance use-related deaths, and decrease hospital utilization.	30/42 = 71.4%	31/42=73.8%	72.60%		
The MI and EI interventions meet the 'bona fide' criteria, which is consistent with the fact that they have similar effects on some injection risk behaviors; trial demonstrates the feasibility of carrying out thorough studies of PWID in the community; attrition rates were low given the target population's characteristics	1. Adding a third comparison group (no intervention) would have enhanced the results 2. Self-reported data may lead to recall and social desirability bias 3. Unable to document long-term maintenance of change (beyond 6 months); 4. trial does not shed light on the process that explain the possible effects of MI and EI	None stated	31/42=73.8%	31/42=73.8%	73.8+73.8/2=73.8%		

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2014	Hammett, T.M.; Phan, S.; Gaggin, J.; Case, P.; Zaller, N.; Lutnick, A.; Kral, A.H.; Federova, E.V.; Heimer, R.; Small, W.; Pollini, R.; Beletsky, L.; Latkin, C.; Des Jarlais, D.C.	BMC Health Services Research	Pharmacies as providers of expanded health services for people who inject drugs: a review of laws, policies, and barriers in six countries	Empirical	Mixed methods - qualitative interviews, quantitative surveys, review of legal and policy documents	Multi-country: US, Russia, Vietnam, China, Canada and Mexico	Community (pharmacies)	HIV, HBV, abscess
2012	Fairbairn, N.; Milloy, M.-J.; Zhang, R.; Lai, C.; Grafstein, E.; Kerr, T.; Wood, E.	Journal of Emergency Medicine	Emergency Department Utilization Among a Cohort of HIV-Positive Injecting Drug Users in a Canadian Setting	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV

For peer review only

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15</p> <p>Pharmacies providing expanded services to PWID</p>	<p>Pharmacies as providers of expanded health services for people who inject drugs - needle and syringe sales/distribution; needle &amp; syringe disposal; HIV testing; HBV/Other vaccination; MMT/OST; Naloxone overdose prevention; abscess treatment</p>	<p>Key stakeholders - government officials, health care providers, pharmacists, PWID</p>	<p>Not specified</p>	<p>PWID generally who would use pharmacy services</p>	<p>N/A</p>	<p>To assess feasibility of expanded pharmacy services for PWID</p>
<p>16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Emergency department</p>	<p>Community-recruited open prospective cohort study of HIV-positive IDU through the AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS) to examine the prevalence and correlates emergency department use, primary ED diagnoses and hospital admission rates.</p>	<p>Self referral and street outreach from Vancouver's Downtown Eastside neighborhood with a large open drug scene with an estimated 4700 IDU residing in the area</p>	<p>437 HIV positive IDU were recruited with nine individuals excluded for lack of baseline CD4 count. 428 eligible participants.</p>	<p>All- age (36-47); Female Gender 170 (39.72%); Aboriginal Ethnicity 178 (41.59%); DTES resident 291 (68%)</p>	<p>Recruitment was between 5 December 2005, and 30 April 2008 Participants were eligible for the study if they were 18 years of age or older, resided in the greater Vancouver region, tested HIV-positive upon entry, had injected an illegal drug during the previous month, and provided informed consent. The primary endpoint of interest in the present analysis was time to first ED visit among cohort participants and we were particularly interested in the potential role of clinical characteristics and unstable housing on ED use. Factors associated with time to first ED visit. DTES residence, unstable housing, inability to access needed health services and history of physical assault were each significantly associated with less time to first ED visit. Most common ED diagnosis, admission rates and discharge data was also collected.</p>	<p>Examination of the prevalence and correlates of ED use, as well as primary ED diagnoses and hospital admission rates, among a community-recruited cohort of HIV-positive IDU.</p>

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<p>Qualitative description of laws, policies, attitudes, practices, behaviours surrounding possibility of expanding pharmacy services for PWID</p>	<p>None</p>	<p>For Vancouver, Canada - Needle &amp; syringe sales, distribution and disposal - no legal barriers but individual stores set own policies and many stores did not sell; Provincial requirements for pre-/post-test counseling may constrain pharmacy-based testing for HIV and not offered; HBV/Other vaccination - no legal barriers, but requires sufficient and trained staff; MMT/OST - do not prescribe but can dispense methadone; Naloxone - there were regulatory barriers to prescribing to individuals at the time of the paper; Abscess treatment - no legal barriers but usually refer to health clinics; Brief counseling/materials - no legal barriers but often not available; Referrals - no legal barriers and done currently.</p>	<p>The most commonly identified challenges occur at the macro-level where legal and policy provisions block provision of some services and medications in pharmacies and persistent stigma and its internalization by PWID reduce uptake of services that do exist. Meso-level - variations in policy and practice related to services for PWID across police agencies and pharmacy chains. Micro-level - differences in knowledge and attitudes create barriers to providing services to PWID.</p>	<p>None stated</p>
<p>The primary endpoint of interest in the present analysis was time to first ED visit among cohort participants and we were particularly interested in the potential role of clinical characteristics and unstable housing on ED use.</p>	<p>Other factors associated with time to first ED visit. DTES residence, unstable housing, inability to access needed health services and history of physical assault were each significantly associated with less time to first ED visit. Most common ED diagnosis, admission rates and discharge data was also collected.</p>	<p>Our study demonstrates high rates of ED use among a cohort of HIV-positive IDU. Interestingly, living in unstable housing and being unable to obtain needed health care services were both independently associated with time to first ED visit during the study period, whereas baseline CD4 cell count and viral load did not predict ED use. SSTI, including abscesses and cellulitis (17.6%), and medication refills and aftercare (17.5%) accounted for the greatest proportion of ED visits. Of the 2461 visits to the ED, 419 (17.6%) were admitted to hospital. A key finding of the present study is the independent association between residing in unstable housing environments and shorter time to first visiting the ED. SSTI, a common injection-related complication, was the most common ED diagnoses.</p>	<p>Living in unstable housing may act as a barrier for IDU to access primary care services, as the immediate sustenance needs implicit in being homeless must compete with health care needs. unstable housing among IDU is associated with hazardous and unhygienic injecting practices that may also predispose individuals to infection. The high cumulative incidence of ED visits among local IDU and the association with unstable housing indicates a pressing need for affordable housing. Inability to access needed health services was also independently associated with time to ED use. Primary care services (SSI and MMT) that implement an integrated model of care, including harm reduction and drug treatment, may be viewed as less stigmatizing of drug use and prove to be more effective in reducing perceived barriers to health care access.</p>	<p>Future studies should assess the impact of interventions for this population in the ED on subsequent health care utilization patterns including return to the ED.</p>

None stated	None stated	Need for advocacy based on context and including multiple stakeholders. Macro-level may require advocacy to change laws and policies. Community-level efforts to deal with stigma, discrimination and resistance to harm reduction interventions. No legal or policy changes are required for expanded provision of counseling and information materials, but insurance coverage may need to change to compensate pharmacists for these interventions. More attention needs to be paid on implementation of laws and policies as these are variable.	19/48 = 39.6%	25/48=52.1%	21/48 = 43.8 %		
None stated	This study has several limitations. First, we may have underestimated the level of ED use as participants may have sought care at other facilities in the city. Second, the current study relies on self-report of drug use and other stigmatized behaviors (e.g. sexual behaviors) and may be susceptible to socially desirable reporting. In this regard, it is noteworthy that CD4 and viral load information were not susceptible to this concern. Third, although ED usage was ascertained through a linkage to an external database, migration away from the city or other reasons for loss of participants to follow-up may nevertheless introduce some degree of bias into the study results. Fourth, although our cohort includes an estimated 20 per cent of all IDU living in the Downtown Eastside, our sample may not be representative of all IDU in the area. Finally, our study was unable to access follow-up information on health care use after discharge from the ED.	None stated	35/42=83%	31/42=73.8%	76.1+76.1/2=76.1%		

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## Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	6
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence <sup>§</sup>		the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	7
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	7-8 (See Fig.1)
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-9
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8 (See Supplementary Table 1)
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8-18
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8-18
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	23
Limitations	20	Discuss the limitations of the scoping review process.	23-24
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	26
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	27

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467–473. doi: 10.7326/M18-0850.

# BMJ Open

## Health programs and services addressing the prevention and management of infectious diseases in people who inject drugs in Canada: a systematic integrative review

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-047511.R2
Article Type:	Original research
Date Submitted by the Author:	21-Aug-2021
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<b>Primary Subject Heading</b>:	Infectious diseases
Secondary Subject Heading:	Public health, Addiction, Health policy, Health services research
Keywords:	PUBLIC HEALTH, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Substance misuse < PSYCHIATRY

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3 **1 Health programs and services addressing the prevention and management of infectious**  
4 **2 diseases in people who inject drugs in Canada: a systematic integrative review**  
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44 87 **WORD COUNT** - Abstract: 286, Body of text: 5988

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46 89 **Health programs and services addressing the prevention and management of infectious**  
47 90 **diseases in people who inject drugs in Canada: a systematic integrative review**

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4 93 **ABSTRACT**

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7 94 **Objectives:** People who inject drugs (PWID) experience a high burden of injection drug use-  
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9 95 related infectious disease and challenges in accessing adequate care. This study sought to  
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11 96 identify programs and services in Canada addressing the prevention and management of  
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13 97 infectious disease in PWID.

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16 98 **Design:** This study employed a systematic integrative review methodology. Electronic databases  
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18 99 (PubMed, CINAHL, Web of Science Core Collection) and relevant websites were searched for  
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20 100 literature published between 2008 and 2019 (last search date was June 6, 2019). Eligible articles  
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22 101 and documents were required to address injection or intravenous drug use and health programs or  
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24 102 services relating to the prevention or management of infectious diseases in Canada.

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27 103 **Results:** This study identified 1607 unique articles and 97 were included in this study. The  
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29 104 health programs and services identified included testing and management of HIV and HCV  
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31 105 (n=27), supervised injection facilities (n=19), medication treatment for opioid use disorder  
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33 106 (n=12), integrated infectious disease and addiction programs (n=10), needle exchange programs  
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35 107 (n=9), harm reduction strategies broadly (n=6), mobile care initiatives (n=5), peer-delivered  
36  
37 108 services (n=3), management of IDU-related bacterial infections (n=2) and others (n=4). Key  
38  
39 109 implications for policy, practice and future research were identified based on the results of the  
40  
41 110 included studies, which include addressing individual and systemic factors which impede care,  
42  
43 111 furthering evaluation of programs and the need to provide comprehensive care to PWID,  
44  
45 112 involving medical care, social support and harm reduction.

46  
47  
48 113 **Conclusions:** These results demonstrate the need for expanded services across a variety of  
49  
50 114 settings and populations. Our study emphasizes the importance of addressing social and  
51  
52 115 structural factors which impede infectious disease care for PWID. Further research is needed to  
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3 116 improve evaluation of health programs and services and contextual factors surrounding accessing  
4  
5 117 services or returning to care.  
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7  
8 118 **PROSPERO registration number** – CRD42020142947  
9

## 10 119 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

- 11  
12 120 • A systematic integrative review allowed for the inclusion of empirical, non-empirical and  
13  
14 121 grey literature and enabled a broad overview of health programs and services available  
15  
16 122 for PWID in Canada.  
17  
18 123 • Article screening, data extraction and quality assessment was performed independently  
19  
20 124 by two reviewers, improving reproducibility and limiting bias.  
21  
22 125 • This review is limited to published literature, which may exclude programs or services  
23  
24 126 not published.  
25  
26 127 • This review was limited to Canada, reducing the generalizability of these results,  
27  
28 128 however improving the specificity of policy and practice recommendations derived from  
29  
30 129 these results.  
31  
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33  
34

## 35 130 **KEYWORDS**

36 131 Infectious diseases, people who inject drugs, substance misuse, public health, organization of  
37  
38 132 health services  
39  
40

## 41 133 **BACKGROUND**

42 134 Injection drug use (IDU) and intravenous drug use (IVDU) are major public health  
43  
44 135 problems in Canada, with the number of people who inject drugs (PWID) increasing over the last  
45  
46 136 decade (1). IDU is associated with adverse health and social outcomes including overdoses, poor  
47  
48 137 access to medical care and social support, and spread of infectious disease (2). PWID are at  
49  
50 138 increased risk for viral blood-borne infections, such as human immunodeficiency virus (HIV)  
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3 139 and hepatitis C virus (HCV), bacterial infections, including endocarditis and skin and soft tissue  
4  
5 140 infections, and fungal infections. According to the Public Health Agency of Canada (PHAC),  
6  
7  
8 141 68% of PWID in Canada have been infected or are currently infected with HCV (3).  
9  
10 142 Additionally, PWID are 59 times more likely to contract HIV than people who do not use  
11  
12 143 injection drugs (4).

14  
15 144 The high incidence of infectious disease amongst PWID, and other adverse health  
16  
17 145 outcomes, have resulted in increased emphasis on harm reduction efforts. These include  
18  
19 146 supervised injection facilities (SIFs) and needle exchange programs (NEPs). The use of  
20  
21 147 medication treatment as management for opioid use disorder has been associated with a  
22  
23 148 reduction in IDU (5–7). These harm reduction efforts are well-established methods of preventing  
24  
25 149 infectious disease in PWID (8–10). Additionally, guidelines are well established for the  
26  
27  
28 150 treatment of infectious diseases commonly associated with IDU, such as anti-retroviral therapy  
29  
30  
31 151 (ART) for HIV or direct-acting antivirals (DAA) for HCV (11–14).

32  
33 152 PWID may experience a range of healthcare trajectories, barriers to care and  
34  
35 153 fragmentation between social and health systems, which impede infectious disease prevention or  
36  
37 154 management (2). PWID are frequently hospitalized, have higher rates of patient-initiated or self-  
38  
39 155 discharge and face system barriers that make it difficult to assess clinical outcomes (15,16). The  
40  
41 156 scope of health care services and programs across Canada that aim to prevent and treat infectious  
42  
43  
44 157 diseases in PWID remains unclear. The purpose of this study is to describe literature available on  
45  
46  
47 158 health programs and services in Canada relating to the prevention and management of infectious  
48  
49 159 diseases in PWID, with the hope of informing policy, practice and future research. This research  
50  
51 160 employed an integrative systematic review methodology, allowing for the inclusion of a variety  
52  
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54 161 of study designs, including experimental and non-experimental research. The diversity and  
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3 162 broadness of studies included in this type of review is well-suited to informing evidence-based  
4  
5 163 policy and practices (17).  
6

## 7 164 **METHODS**

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10 165 This research followed an integrative systematic review as outlined by Whittmore and  
11  
12 166 Knafl (17) and has been previously described elsewhere (18). An integrative systematic review  
13  
14 167 may be used to gather diverse and broad evidence, allowing the inclusion of varying  
15  
16 168 methodologies to understand the breadth of a health issue (18). This manuscript follows the  
17  
18 169 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines  
19  
20 170 adapted for scoping reviews (19).  
21  
22

### 23 171 *Literature search*

24  
25  
26 172 PubMed, CINAHL and Web of Science Core Collection electronic databases were  
27  
28 173 searched for empirical literature between 2008 and June 6, 2019 (one additional year from that  
29  
30 174 indicated in the published protocol paper (18) to include studies from at least 10 years).  
31  
32 175 Additionally, PHAC, the Canadian Institute for Substance Use Research, and Canadian Centre  
33  
34 176 on Substance Use and Addiction websites were searched. The search strategy included terms for  
35  
36 177 infectious diseases (infecti\*, endocarditis, hepatitis, HIV, AIDS, pneumonia, abscess,  
37  
38 178 osteomyelitis, septicemia, tetanus), drug use (drug use\*, drug abuse, drug misuse, injection drug,  
39  
40 179 drug inject\*, IDU, IVDU, PWID, intravenous, overdose, illicit) and geography (Canada, Alberta,  
41  
42 180 British Columbia, BC, Manitoba, New Brunswick, Newfoundland Labrador, Nova Scotia,  
43  
44 181 Ontario, Prince Edward Island, Quebec, Saskatchewan, Nunavut, Northwest Territories, Yukon).  
45  
46 182 The full search strategy is described in Supplementary File 1. References of included articles  
47  
48 183 were hand-searched for additional relevant articles.  
49  
50  
51  
52

### 53 184 *Inclusion/exclusion*

1  
2  
3 185 For eligibility, articles and documents were required to address injection or intravenous  
4  
5 186 drug use and health programs or services relating to the prevention or management of infectious  
6  
7 187 diseases in Canada. Articles or documents reporting drug efficacy trials, published prior to 2008,  
8  
9 188 or not in English or French were excluded.  
10  
11

12 189 More than 55 articles (over 5%) were reviewed for inclusion/exclusion by the entire data  
13  
14 190 collection team to ensure consistency. Titles and abstracts were screened independently by two  
15  
16 191 reviewers. Conflicts were resolved by consensus or a third reviewer when necessary. Full-text  
17  
18 192 screening for remaining articles was conducted by two independent reviewers with consensus or  
19  
20 193 review by a third individual when necessary. A list of articles excluded at the full-text stage is  
21  
22 194 available upon request.  
23  
24

#### 25 195 *Data extraction*

26 196 A data extraction form was used to collect the following: bibliographic data, type of  
27  
28 197 research study and design, location, site of health program or service (community, clinic,  
29  
30 198 hospital, etc.), infection(s) discussed, description of health program or service, population of  
31  
32 199 study within PWID, description of cohort (if part of a cohort study), purpose of study, outcomes  
33  
34 200 measured, summary of findings, implications for policy, practice or research and gaps according  
35  
36 201 to authors. Data extraction was performed by a primary data collector, followed by independent  
37  
38 202 review by a secondary data collector.  
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#### 44 203 *Data analysis and quality appraisal*

45 204 Data were organized in tables to categorize certain characteristics, such as, the study  
46  
47 205 design, types of health programs or services, infectious diseases, locations, and PWID sub-  
48  
49 206 populations. Implications for policy and practice, and areas for future research were identified.  
50  
51 207 There was too much diversity in study types and outcomes to conduct a meta-analysis, therefore  
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3 208 narrative descriptions are provided and an overall conclusion on efficacy of interventions could  
4  
5 209 not be determined.  
6

7  
8 210 Quality appraisal was performed according to the Quality Assessment Tool for Studies  
9  
10 211 with Diverse Designs (QATSDD) (20). This tool was chosen due to its applicability to diverse  
11  
12 212 study types, including quantitative and qualitative methodologies. The tool was validated by  
13  
14 213 health service researchers, increasing the reliability of its use in this study (20). Each included  
15  
16 214 empirical study was appraised by two reviewers and a final score was determined by consensus.  
17  
18

## 19 215 **RESULTS**

### 20 216 *Characteristics of included studies*

21  
22  
23  
24 217 We identified 1142 citations from the database searches and 465 citations from manually  
25  
26 218 searching the references of included documents and other sources (Figure 1). Of the 1607  
27  
28 219 citations identified, 419 duplicates were removed, leaving 1188 studies for potential inclusion.  
29  
30 220 Articles were excluded through title and abstract screening (1047 documents) or full text  
31  
32 221 screening (44 documents). A total of 97 studies were included in the study for data extraction.  
33  
34

35 222 Empirical studies, non-empirical studies and grey literature were included, resulting in a  
36  
37 223 variety of methodologies and study designs (Table 1). Additionally, Table 1 provides a  
38  
39 224 breakdown of the infections discussed, jurisdiction of health program or service, and population  
40  
41 225 within PWID discussed in included studies, QATSDD scores of empirical studies ranged from  
42  
43 226 31% - 83.3%. Study sizes ranged from 11 to 36,077 participants.  
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**230 Table 1.** Description of included studies (study design, infectious disease, health program or  
**231** service, jurisdiction and population).

	Description	Total studies: 97 n (%)
Study Design	Cohort	45 (46%) 28 prospective, 17 retrospective
	Commentary, report, non-systematic literature review, roundtable discussion	14 (14%)
	Qualitative (ethno-epidemiological, ethnographic, interviews, participatory research)	12 (12%)
	Cost-benefit and cost-effectiveness analysis	7 (7%)
	Mathematical modelling of disease transmission	5 (5%)
	Randomized controlled trial (RCT) / protocol for RCT	3 (3%)
	Survey	3 (3%)
	Chart review - retrospective	2 (2%)
	Mixed methods	2 (2%)
	Systematic review	2 (2%)
	Case series	1 (1%)
	Interventional	1 (1%)
Infections Discussed	HIV	43 (44%)
	HCV	21 (21%)
	HIV and HCV	22 (22%)
	Combinations of infectious diseases (HIV, HCV, HBV, cellulitis, bloodborne pathogens, STIs)	9 (9%)
	Infective endocarditis	2 (2%)
Health Program / Service	Services providing testing for and prevention or treatment with antivirals for HIV or HCV (ART / DAA / HAART / PEP / Seek and Treat Initiatives / TasP / POCT / PrEP)	27 (28%)
	Supervised injection facilities / safe injection facility / safe injection site	19 (19%)
	Medication treatment for opioid use disorder (MMT / OST / OAT / HAT / MAT)	12 (12%)
	Integrated infectious disease and addiction programs	10 (10%)
	Needle exchange programs / Syringe exchange programs / Kit distribution programs	9 (9%)
	Broad harm reduction strategies	6 (6%)

	Mobile care initiatives / Telehealth	5 (5%)
	Other (motivational interviewing for high risk IDU behaviours, pharmacies as providers of expanded health services, PWID emergency department use, hospital providing acute care for addiction related infectious conditions)	4 (4%)
	Peer delivered services	3 (3%)
	Infective endocarditis surgical vs. medical management	2 (2%)
Jurisdiction	Multi-country	5 (5%)
	Canada	5 (5%)
	British Columbia	63 (64%)
	Ontario	11 (11%)
	Quebec	9 (9%)
	Alberta	2 (2%)
	Saskatchewan	2 (2%)
Population within PWID	All PWID	48 (49%)
	Persons with HIV	18 (18%)
	Persons with HCV	6 (6%)
	Persons in prison	4 (4%)
	PWID using specific health services (including NEP, SIF, OAT, pharmacies)	4 (4%)
	Not applicable	3 (3%)
	HIV and HCV-positive	2 (2%)
	HIV-negative	2 (2%)
	Indigenous	2 (2%)
	PWID with infective endocarditis	2 (2%)
	Hard to reach street youth and adults	2 (2%)
	Female sex workers	2 (2%)
	PWID leaving hospital due to self-discharge	1 (1%)
Vancouver Area Network of Drug Users volunteers	1 (1%)	

232 Abbreviations: ART, antiretroviral treatment; DAA, direct-acting antivirals; HAART, highly active antiretroviral  
 233 treatment; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus; IDU, injection  
 234 drug use, NEP, needle exchange program; OAT, opioid agonist therapy; PEP, post-exposure prophylaxis; PrEP, pre-  
 235 exposure prophylaxis; PWID, people who inject drugs; RCT, randomized controlled trial; SIF, supervised injection  
 236 facility; STI, sexually transmitted infection; TasP, treatment as prevention

### 237 *Health programs and services*

238 Included studies were categorized by health programs and services discussed to analyze  
239 their relevant features. Supplementary Table 1 provides data extracted from articles and can be  
240 found here:  
241 [https://docs.google.com/spreadsheets/d/1DUqwdFp06dRItagkxiiKaBqppnPshN1GbSNSbTJgAq](https://docs.google.com/spreadsheets/d/1DUqwdFp06dRItagkxiiKaBqppnPshN1GbSNSbTJgAqI/edit?usp=sharing)  
242 [I/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1DUqwdFp06dRItagkxiiKaBqppnPshN1GbSNSbTJgAqI/edit?usp=sharing). Findings for each program or service type are presented with a description of  
243 included studies and main outcome measures. Implications for policy, practice and further  
244 research as identified by the authors of the included articles are described for each health  
245 program or service. Table 2 presents a summary of these results.

### 246 Services providing testing, prevention or treatment with antivirals for HIV or HCV

247 Many studies addressed the provision of antiviral treatment and testing (n=27, 28%) (21–  
248 47). The programs and services all addressed treatment and prevention of HIV (n=17) (21,22,24–  
249 26,28–30,32,35–38,40,43,46,47), HCV (n=7) (23,27,31,33,34,39,41) or both (n=3) (42,44,45).  
250 Treatments provided through these programs and services included ART, (also referred to as  
251 highly active antiretroviral treatment [HAART]) (n=13) (22,24–26,28–30,32,35,37,38,40), HCV  
252 treatment (including cascade of care) (31,33,34,39,41) or DAA (n=9) (23,27,44,45), post-  
253 exposure prophylaxis (n=1) (43), pre-exposure prophylaxis (n=1) (21), and antiretroviral  
254 treatment as prevention (TasP) (n=1) (46). Services included HIV and HCV testing, including  
255 seek and treat initiatives (n=2) (36,42) and peer-administered point-of-care testing (POCT) (n=1)  
256 (47). When indicated, the majority of health services were situated in the community (n=17).

257 Some of the main outcome measures for these studies included experiences of PWID  
258 receiving ART (24); factors related to testing, ART initiation, treatment adherence or  
259 discontinuation (21,25,26,29,30,32,35,37,38); self-reported difficulties with taking ART (22);



1  
2  
3 260 and plasma viral load (21,24). As with ART, adherence and willingness to use DAA was  
4  
5 261 examined (44,45). Other studies examined patterns of mortality for PWID with HIV (28,40,42),  
6  
7 262 initiation of post-exposure prophylaxis when delivered by registered nurses (43), uptake of point-  
8  
9  
10 263 of-care testing in the community (47), ART initiation during a community wide TasP initiative  
11  
12 264 (46), and the use of a seek-and-treat program to improve testing and treatment for marginalized  
13  
14  
15 265 PWID (36).

16  
17 266 Included articles also discussed HCV care. Studies aimed to characterize the HCV  
18  
19 267 cascade of care (33,41), and examined outcomes of HCV treatment when received via physician  
20  
21 268 or self-referral (39). Mathematical modelling studies were conducted to determine the burden of  
22  
23  
24 269 HCV in a variety of care scenarios, including increased testing and antiviral regimens (n=3)  
25  
26 270 (23,27,41). Two survey studies examined HCV care behaviors of physicians, where the main  
27  
28  
29 271 outcome was physician provision of HCV care to PWID (31,34).

30  
31 272 Authors identified implications for practice and policy, particularly emphasizing the need  
32  
33 273 to address social and structural factors which impede HIV and HCV testing, treatment initiation  
34  
35 274 and adherence. To improve antiviral treatment adherence, authors suggested the need for  
36  
37  
38 275 improved housing stability for PWID and supportive housing models with harm reduction  
39  
40 276 services. Other strategies to improve adherence included more welcoming clinical environments  
41  
42 277 for PWID and integrated, multidisciplinary care to manage comorbid conditions and reduce  
43  
44  
45 278 barriers, which contribute to treatment discontinuation. Authors mentioned the need for targeted  
46  
47 279 approaches to reach particularly marginalized PWID, such as females and sex workers.

48  
49 280 Additionally, authors mentioned scaling up ART, TasP, testing and care linkages. Strategies  
50  
51 281 mentioned included expansion of community-based testing and seek-and treat campaigns for  
52  
53  
54 282 PWID unaware of HIV or HCV status, and follow-up for patients who engage in post-exposure

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2  
3 283 prophylaxis services. The need for policies to support MOUD services for inclusive HIV  
4  
5 284 treatment strategies and to improve HCV treatment adherence were also highlighted.

6  
7 285 Further research surrounding reasons for treatment discontinuation, factors associated  
8  
9 286 with adherence, and the effect of incarceration on HIV treatment adherence and access was  
10  
11 287 suggested. There is a need to understand how stigma and marginalization create barriers in  
12  
13 288 accessing treatment. Authors also suggested the evaluation of interventions like integrated,  
14  
15 289 multidisciplinary HIV and HCV care, supportive housing models and addiction treatments.  
16  
17 290 Further research is needed to determine the optimal timing of treatment for PWID receiving  
18  
19 291 MOUD, and how these programs affect antiviral treatment and access. There is a need to develop  
20  
21 292 community-based testing initiatives which use peers to reach PWID who may not seek testing  
22  
23 293 and treatment in conventional health care settings.

#### 24 294 Supervised injection facilities

25  
26 295 Supervised injection facilities (SIFs), also known as safe injection facilities, or safe  
27  
28 296 injection sites (SIS), were also represented in our sample as an important health program  
29  
30 297 addressing the prevention of infectious disease in PWID (n=19, 19%) (48–66). Studies addressed  
31  
32 298 the prevention of HIV (n=10) (50–55,58,60,62,64), HCV (n=1) (49) or both (n=6)  
33  
34 299 (56,59,61,63,65), with only two studies mentioning skin infections or abscesses in combination  
35  
36 300 with HIV and HCV (48,57). Most SIF programs identified were community-based (n=17),  
37  
38 301 however some discussed SIF use in hospitals (n=1) (49), clinics (n=1) (49), care facilities (n=1)  
39  
40 302 (55) and prisons (n=1) (48). The majority of studies examined SIFs in Vancouver, BC (n=12)  
41  
42 303 (50–58,62,64,65) with a portion specifically looking at InSite (n=7), Canada's first sanctioned  
43  
44 304 SIF, which provided precedence for SIF expansion (51–54,57,62,65). Other studies addressed  
45  
46 305 SIFs in Ottawa (n=2) (61,63) or both Ottawa and Toronto (n=1) (59) in ON; Montreal, QB (n=1)

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2  
3 306 (66); Saskatoon, SK (n=1) (60); Drumheller, AB (n=1) (48); and Canada broadly (n=1) (49).  
4  
5 307 Main outcome measures for cost-effectiveness and cost-benefit studies included prevented  
6  
7 308 number of HIV and/or HCV infections and overdose deaths, and others, such as quality adjusted  
8  
9 309 life years (QALYs) and life years gained (51,53,54,56,59,60,63,66). Considerations used in these  
10  
11 310 models ranged from IDU population factors (e.g., number of IDU in populations, prevalence of  
12  
13 311 HIV infection), injection-related factors (e.g., injections per IDU per year, injections with shared  
14  
15 312 equipment), and facility factors (e.g., annual operating cost, number of injections per year at  
16  
17 313 site). Other outcome measures involved self-reported use or potential use of SIFs by IDU,  
18  
19 314 perspectives on use of and access to SIFs, and benefits and acceptability of SIFs. Authors  
20  
21 315 described the benefits of SIFs as improving access to care, reducing public health care costs and  
22  
23 316 reducing IDU/IVDU-related harms.  
24  
25  
26  
27

28 317 Overall, authors discussed policy and practice implications of SIFs. SIFs were discussed  
29  
30 318 as saving lives from overdose deaths, decreasing infections, improving health outcomes,  
31  
32 319 providing points of contact for the highest risk PWID, and facilitating access to care. However, it  
33  
34 320 was pointed out that SIFs could also be used to deliver a wider range of services, including HIV  
35  
36 321 testing and treatment. Even though every study showed that SIFs were cost-saving in the  
37  
38 322 Canadian contexts in which they were conducted, there was variability in the service models.  
39  
40 323 Other benefits of SIFs included enhanced public order, fewer public injections and reduced  
41  
42 324 injection-related litter. For implementation of SIFs, the authors recommended consideration of  
43  
44 325 risk perceptions and priorities of IDUs when designing harm reduction interventions, the need to  
45  
46 326 create a more enabling environment for SIFs through amendment of federal legislation, and  
47  
48 327 highlighted that community support is fundamental for sustaining a SIF.  
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3 328 Research implications and gaps in research were also described. These included the need  
4  
5 329 to routinely collect accurate, geographically specific and up-to-date data in order to inform  
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7  
8 330 policy; understand harm reduction needs of people who inject alone in private residences, social  
9  
10 331 determinants of injection drug users, individual or context-specific barriers and reasons for not  
11  
12 332 accessing SIF services; and social and behavioral effects of SIFs (e.g., sharing practices). Several  
13  
14 333 points were noted regarding the evaluation of SIF services. There is a need to develop and  
15  
16 334 implement monitoring and evaluation programs for SIFs once they open, and to consider more  
17  
18 335 than one potential benefit in cost-benefit analysis for public health. These considerations could  
19  
20 336 include diagnostics, immunization, referral to detoxification facilities, decreased use of other  
21  
22 337 medical services, and assessing expansion of services to determine cost-benefits of increased  
23  
24 338 operating hours. Authors noted the challenge in evaluating an intervention without a traditional  
25  
26 339 control group and the need to consider intermediate outcomes, such as changes in injecting  
27  
28 340 practices, along with epidemiological data. There is also a gap in understanding needs and use of  
29  
30 341 SIFs by street-involved youth.

#### 35 342 Medication treatment for opioid use disorder

36  
37 343 A number of studies (n=12, 12%) addressed the provision of medication treatment for  
38  
39 344 opioid use disorder (MOUD), sometimes referred to as opioid agonist therapy (OAT) (67),  
40  
41 345 opioid substitution therapy (OST) (68,69) or medication assisted treatment (MAT) (70), with  
42  
43 346 seven studies focused specifically on methadone maintenance therapy (MMT) (15,71–76) and  
44  
45 347 one on heroin-assisted treatment (HAT) (77). Five studies addressed HCV (67,69,71,75,76), four  
46  
47 348 addressed HIV (72–74,77), and three addressed both HCV and HIV (15,68,70). The programs  
48  
49 349 were situated in communities (n=5) (70,72,73,75,76), hospitals (n=1) (15), clinics (n=2) (67,74)  
50  
51 350 or unspecified locations (n=4) (68,69,71,77). All programs were in BC (n=10), except two,  
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3 351 which included multiple countries (67,70). Community provision of MMT in BC was  
4  
5 352 specifically discussed as methadone is readily available through primary care physicians and  
6  
7 353 dispensed through community pharmacies in this jurisdiction (74). These programs were  
8  
9  
10 354 examined as a protective factor for limiting HIV and HCV transmission. Authors examined the  
11  
12 355 effect of these programs on HIV and HCV care, including access to a regular physician. Studies  
13  
14 356 also examined eligibility of PWID for HAT in the local community, perceptions of HCV care  
15  
16 357 among physicians working in MOUD clinics, and use of prescription opioids in hospitals to  
17  
18 358 prevent patient-initiated discharge. Studies found that these types of programs improved  
19  
20  
21 359 regularity of access to care and antiviral treatment outcomes, and reduced risk of infection and  
22  
23 360 other IDU-related harms.

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25  
26 361 Authors identified the need for expansion of MOUD and harm reduction services by  
27  
28 362 addressing system-level factors, such as decriminalization policies, accessibility and funding of  
29  
30 363 services, decreasing barriers which limit physicians' ability to prescribe these medications,  
31  
32 364 enhancing physician education in providing these services, improving referral systems, and  
33  
34 365 developing new pharmacotherapies for opioid use disorder. Authors also suggested the  
35  
36 366 integration of MOUD services with infectious disease care and addiction treatment. PWID  
37  
38 367 should be included in policy-making surrounding the availability and delivery of MOUD  
39  
40 368 services, including the expansion of these services as harm reduction in hospitals. Future  
41  
42 369 research is needed to assess the impact of MOUD in combination with other harm reduction  
43  
44 370 services and counseling, and their effects on infectious disease care, re-infection and treatment  
45  
46 371 retention and adherence. Specifically, experimental designs are needed, and studies need to  
47  
48 372 examine certain population groups, such as women. Other avenues of investigation include  
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373 exploring perspectives of hospital staff regarding care of PWID and the potential integration of  
374 harm reduction services into hospitals.

375 Integrated infectious disease and addictions services

376 Programs (n=10) incorporated infectious disease treatment with addictions treatment or  
377 other services, such as counseling (78–87). Studies were conducted in Vancouver, BC (n=7)  
378 (78,79,81–83,87), Montreal, QB (n=2) (80,84), and Kingston, ON (n=1) (86). Programs were  
379 community based (n= 2) (83,84), in established community health centers (n=4) (81,85–87),  
380 offered through multiple sites (n= 3) (78–80) or not specified (n=1) (82). Studies addressed HIV  
381 (n=3) (81,82,85), HCV (n=5) (79,80,84,86,87), or HIV and HCV (n=2) (78,83). Main outcome  
382 measures can be classified as use of services (n=5), such as documented or self-reported use of  
383 existing integrated services, and how use of services shaped access to and engagement with other  
384 supportive care services, behavior change (n=2), and treatment response (n=3). Treatment  
385 completion, post-treatment follow-up and re-infection were other outcomes used. Study findings  
386 supported a multi-disciplinary model of treatment which included medical, psychiatric, social  
387 support and access to more individualized care.

388 Authors stated that concurrent mental health and nonprescribed drug use may act as  
389 barriers to adequate HIV care, and changes to the structural-environmental context of services  
390 (such as incorporating nonprescribed drug use within a harm reduction approach) can improve  
391 engagement with care among people living with human immunodeficiency virus (PLHIV) who  
392 use drugs. The policy and practice implication that most resonated across these studies was the  
393 benefits of collaborative, multidisciplinary models, which include counseling and/or peer-based  
394 support groups. These models of HCV or HIV treatment in IDUs may extend beyond virological  
395 outcomes to improve social determinants of health. Specifically, receiving HCV treatment was

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3 396 associated with lower likelihood of reporting IDU (80), and integrating HCV treatment within  
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5 397 primary care and addictions clinics, which treat individuals already engaged with MOUD, may  
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7  
8 398 help improve follow-up after treatment (79).  
9

10 399 Future research could examine the impact of policy change on uptake of HCV and/or  
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12 400 HIV treatment and care among PWID. Authors also called for research on the impact of diverse,  
13  
14 401 innovative, integrated delivery strategies to improve uptake of HCV and/or HIV care in PWID,  
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16 402 but also to investigate which aspects of care are likely to support changes in drug use patterns.  
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18 403 Further exploratory studies recommended including individual's ideas, beliefs and feelings after  
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20 404 HCV treatment and reasons for not returning for care, or PWID experiences of effects of  
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22 405 integrated care models on health and social inequities.  
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26 406 Needle Exchange Programs  
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3 407 Needle exchange programs (NEPs) (also known as clean needle programs, syringe  
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5 408 exchange programs) and harm reduction kit distribution programs were also identified (n=9, 9%)  
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7 409 (88–96). Studies addressed HIV (n=3) (91,92,95), or both HIV and HCV (n=4) (88,90,94,96),  
8  
9 410 with the remaining studies broadly addressing blood-borne infections and cellulitis (89,93).  
10  
11 411 These studies described NEPs, implementation of a kit distribution program (n=1) (89) and  
12  
13 412 introduction of NEPs in prisons (n=3) (88,90,96). We included two prospective cohort studies,  
14  
15 413 which examined the relationship between NEP use, HIV seroconversion, and rates of syringe  
16  
17 414 borrowing and lending, and both reported a reduction in HIV incidence among PWID (92,95).  
18  
19 415 One RCT was included, which evaluated a theory-based intervention to increase NEP use.  
20  
21 416 Participants in the experimental group used fewer borrowed syringes compared to the control  
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23 417 group (RR: 0.47 CI95% 0.28–0.79; P = .004) (94). This effect was no longer present three  
24  
25 418 months later.

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30 419 Authors identified implications for practice, policy and research. The included studies  
31  
32 420 called for expansion of NEPs and kit distribution programs, particularly in prisons and hospitals.  
33  
34 421 Decentralizing NEPs, promoting peer-run initiatives, and diversifying distribution methods are  
35  
36 422 needed to reach more marginalized PWID. Authors also indicated the importance of including  
37  
38 423 PWID and community members in programmatic decision-making and consideration of local  
39  
40 424 context when initiating NEPs. Researchers found gaps in evaluation of NEPs, therefore future  
41  
42 425 research should focus on ongoing evaluation and monitoring of programs. Authors also indicated  
43  
44 426 the need to examine different models of distribution across settings and cultural contexts.

#### 45 427 Broad harm reduction strategies

46  
47 428 We identified six studies which provided reviews, recommendations or assessments of a  
48  
49 429 range of harm reduction services (97–102). Studies focused on HIV (n=2) (99,100), HCV (n=2)



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2  
3 430 (97,98), or both +/- HBV (n=2) (101,102). One mathematical modelling study created a  
4  
5 431 community model to simulate the effect of strategies on HIV prevalence, including providing  
6  
7 432 clean syringes, introduction of SIFs, introduction of TasP to improve treatment initiation and  
8  
9 433 retention and increased HIV testing (100). One qualitative study examined factors influencing  
10  
11 434 injection and perceived barriers to injection cessation among marginalized youth, focusing on  
12  
13 435 HIV. The study mentioned health programs and harm reduction services, including MOUD, drug  
14  
15 436 treatment programs, and social support programs (99). These studies discussed HIV, HCV and  
16  
17 437 HBV and highlighted efforts, recommendations and challenges to improving harm reduction  
18  
19 438 efforts. One of these studies specifically discussed community-driven programs to improve HCV  
20  
21 439 testing and care in Indigenous communities who are at greater risk for adverse IDU-related  
22  
23 440 health outcomes (98).

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28 441 These studies identified a broad range of implications for policy and practice. The authors  
29  
30 442 support the expansion of harm reduction services, increased financial support for these services  
31  
32 443 and their combination with HIV and HCV testing and treatment strategies. Additionally, authors  
33  
34 444 indicated the advancement of peer-based models of care, the re-assessment of punitive drug  
35  
36 445 policies, and the need for improved evaluation and monitoring for harm reduction programs.  
37  
38 446 Increased support is needed for initiatives which address social harms affecting PWID and the  
39  
40 447 social determinants of health. Equity of access to harm reduction services should be ensured.  
41  
42 448 Authors specifically mentioned the need to involve marginalized groups of PWID, youth and  
43  
44 449 Indigenous communities, in planning harm reduction programs. Youth should be included in  
45  
46 450 policy decisions, with targeted services to improve access to care for this group. Similarly,  
47  
48 451 Indigenous PWID require more targeted services, which includes links between on- and off-  
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50 452 reserve programs and to Indigenous PWID in prison.  
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3 453 Authors also identified gaps and associated research implications related to youth and  
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5 454 Indigenous PWID. Indigenous people in Canada may lack access to primary care and HCV  
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8 455 testing. Since many provinces do not collect ethnicity data, national data on HCV prevalence  
9  
10 456 does not extend to Indigenous communities. Further research is needed to understand HCV  
11  
12 457 prevalence and determinants related to HCV transmission amongst Indigenous PWID. Further  
13  
14 458 study is also needed to understand youth engagement and access to harm reduction services.  
15  
16 459 Finally, it was noted that few studies examine injection equipment distribution policies and  
17  
18 460 coverage, and more research is needed to understand the risks from sharing injection equipment  
19  
20 461 using robust study designs.  
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#### 23 462 Mobile care initiatives and Telehealth

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25  
26 463 Mobile care initiatives and telehealth seek to expand the reach of traditional programs.  
27  
28 464 Studies included mobile care initiatives (n=3) (103–105) and telehealth (n=2) (106,107) and  
29  
30 465 focused on HIV (n=1) (104), HCV (n=1) (106), HIV and HCV (n=1) (107), or STIs in addition  
31  
32 466 to HIV (n=2) (103,105). Two of the three mobile care initiatives were peer-led (103,104). Mobile  
33  
34 467 care initiatives used peer volunteers to distribute sterile injection equipment and to provide harm  
35  
36 468 reduction education and outreach. Another mobile care initiative deployed nurses to provide  
37  
38 469 medical attention in addition to equipment and education (105). Main outcomes measured for  
39  
40 470 mobile care initiatives included use of the program in the previous six months and description of  
41  
42 471 roles and contributions of healthcare staff delivering the program.  
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46  
47 472 Mobile health and telemedicine initiatives included efforts to support HCV and HIV care  
48  
49 473 remotely for those with difficulty accessing care (106,107). The telehealth programs measured  
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51 474 HIV propensity scores at six months and sustained viral response as their main outcome  
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3 475 measures. These studies also evaluated secondary drug treatment outcomes and use of related  
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5 476 health services.

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8 477 Implications for policy and practice included that peer-led mobile initiatives can play an  
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10 478 important role in extending the reach of conventional public health programs. Specifically for  
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12 479 hard-to-reach female sex workers who use drugs, unsuccessful attempts to access drug treatment  
13  
14 480 can be associated with increased odds of violence. Mobile outreach programs can serve a role in  
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16 481 HIV and STI prevention. Overall, it is important to empower clients to make changes, by  
17  
18 482 providing resources, skills, and opportunities within an atmosphere of mutual trust and respect,  
19  
20 483 education and support, participation and commitment, and power-sharing. Telehealth saved  
21  
22 484 patients time, travel, and missed work days with high levels of satisfaction. Multidisciplinary  
23  
24 485 telehealth approaches can engage and retain patients in remote areas in the treatment of HCV.  
25  
26 486 Lastly, innovative and culturally safe interventions that address the barriers to HIV prevention  
27  
28 487 while supporting the strength of populations (for example, young Indigenous people) who use  
29  
30 488 drugs are urgently needed. Future research could concentrate on understanding how specific  
31  
32 489 characteristics of mobile outreach programs may facilitate entry into inpatient addiction  
33  
34 490 treatment or connect women to other services. Research could also address methods of including  
35  
36 491 and evaluating community partnering, coordinating and collaborating in current and future  
37  
38 492 healthcare delivery models for PWID.

#### 44 493 Peer-delivered services

46  
47 494 Studies discussed peer delivered services such as counselling and testing (n=2) (108,109)  
48  
49 495 and peer-delivered injections (n=1) (110). These include one cohort study (109) and two  
50  
51 496 qualitative studies (108,110), all programs were conducted in a community setting in Vancouver,  
52  
53 497 BC, These addressed HIV (n=1) (109) or both HIV and HCV (n=2) (108,110). The studies  
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3 498 explored experiences as a peer injection drug user with the Vancouver Area Network of Drug  
4  
5 499 Users (VANDU), how VANDU shaped the social context and injection practices in that  
6  
7 500 community, and willingness to receive peer-delivered services. These studies indicate that peer-  
8  
9 501 based services can improve delivery of care for PWID and address issues such as lack of trust  
10  
11 502 and unfamiliarity with the healthcare system and healthcare professionals (109). Additionally,  
12  
13 503 peer-delivered services enabled delivery of care and infectious disease prevention efforts to  
14  
15 504 harder-to-reach, more marginalized PWID. For example, one study examining PWID's use of an  
16  
17 505 unsanctioned peer-delivered injections service indicated that those who require assistance  
18  
19 506 injecting, including women and people with disability, are at greater risk of harm and experience  
20  
21 507 barriers which inhibit their use of sanctioned SIFs. These findings underscore the need for harm  
22  
23 508 reduction initiatives to assess their accessibility to certain, less autonomous PWID populations  
24  
25 509 (110). Peer-led organizations for IDU, such as VANDU, may also give PWID a political voice.  
26  
27 510 Lastly, legal and regulatory frameworks need to accommodate assisted injections and  
28  
29 511 consideration for peer-based delivery models.  
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### 35 512 Treatment of Infective Endocarditis

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37 513 Only two studies (2%) addressed the treatment of infective endocarditis in a hospital  
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39 514 setting, comparing mortality associated with surgical versus medical management (111,112). The  
40  
41 515 main outcomes of these studies were the incidence of death two years following diagnosis or all-  
42  
43 516 cause mortality. Rodger and authors additionally collected data related to site of infection,  
44  
45 517 complications and referral to addiction treatment services (111). This study showed that surgery  
46  
47 518 was related to lower mortality (111), while the other found no difference (112). Neither study  
48  
49 519 looked at the prevention of infectious diseases or quality improvement for the delivery of these  
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51 520 services. Both studies identified the need for integration of addiction treatment with infectious  
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3 521 disease care, including multidisciplinary care teams and patient commitment to addiction  
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5 522 rehabilitation. Authors suggested further research include increased use of addiction treatment  
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7  
8 523 and noted gaps in understanding of factors associated with PWID mortality.  
9

10 524 Other health programs and services

11  
12 525 One study included a randomized controlled trial in QB on motivational interviewing  
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14 526 (MI) for high risk IDU behaviors, which showed that both MI and educational interviewing  
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16  
17 527 decreased risk behaviors, but individuals in the MI group had lower odds of risk behaviors at six  
18  
19 528 months (113). A cohort study in BC evaluated first time emergency department use by PWID  
20  
21 529 along with most common diagnoses, admissions and discharge data (114). A mixed methods  
22  
23  
24 530 study provided a qualitative description of laws, policies, attitudes, practices, and behaviors  
25  
26 531 surrounding the possibility of expanding pharmacy services for PWID in six countries (115).  
27  
28 532 Lastly, performed a chart review to describe trends in admission in a dedicated HIV/AIDS ward  
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30  
31 533 in a tertiary hospital in BC, which was repurposed in 2014 and expanded to include HIV-  
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33 534 negative individuals with infectious conditions arising from addictions comorbidities (116).  
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35 535 These papers highlight that increased access to harm reduction and addictions services,  
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37 536 urgent primary care, immunizations, ambulatory and integrated care, and stable housing are  
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39  
40 537 needed in the PWID population to optimize health outcomes, reduce substance use-related  
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42 538 deaths, and decrease hospital utilization. Macro-, meso-, and micro- changes in policies, laws,  
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45 539 attitudes and behaviors are needed in order to decrease barriers for PWID to access services.  
46  
47 540 Also, mental health interventions could be incorporated into harm reduction services to support  
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49 541 behavior changes. Authors called for further studies on reasons for hospital admissions and  
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51 542 emergency room (ER) use in PWID/PLHIV. Lastly, studies are needed to determine  
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543 effectiveness of mental health interventions in the community and interventions in ER settings to  
544 prevent further ER visits and admissions.

For peer review only

**Table 2.** Policy, practice and research implications indicated in included studies and organized by health program or service.

Health Program/Service	Policy and Practice Implications	Gaps and Research Implications
Services providing testing, prevention or treatment with antivirals for HIV or HCV	<ul style="list-style-type: none"> <li>• Address social and structural factors which impede HIV and HCV testing, treatment initiation and adherence</li> </ul> <p>Suggested strategies to improve treatment adherence include:</p> <ol style="list-style-type: none"> <li>(1) Improved housing stability for PWID, supportive housing models with harm reduction services</li> <li>(2) Integrated, multidisciplinary care to manage comorbid conditions and reduce barriers</li> </ol> <ul style="list-style-type: none"> <li>• Scale up ART, TasP, testing and care linkages</li> <li>• Increase targeted approaches to reach marginalized PWID (e.g. females and sex workers)</li> <li>• Create policies to support MOUD services to promote inclusive HIV treatment and to improve HCV adherence</li> </ul>	<ul style="list-style-type: none"> <li>• Research reasons for treatment discontinuation, factors associated with adherence, and the effect of incarceration on HIV treatment adherence and access</li> <li>• Understand how stigma and marginalization create barriers in accessing treatment</li> <li>• Evaluate interventions like integrated, multidisciplinary HIV and HCV care, supportive housing models and addiction treatments</li> <li>• Determine the optimal timing of treatment for PWID receiving MOUD, and how these programs affect antiviral treatment and access</li> <li>• Develop community-based testing initiatives which use peers to reach PWID who may not seek testing and treatment in conventional health care settings</li> </ul>
Supervised injection facilities	<ul style="list-style-type: none"> <li>• Use of SIFs to deliver a wider range of services (e.g. HIV testing and treatment)</li> <li>• Consider risk perceptions and priorities of PWID when designing harm reduction interventions</li> <li>• Amend legislation to create a more enabling environment for SIFs</li> <li>• Community support is fundamental for sustaining a SIF operation</li> </ul>	<ul style="list-style-type: none"> <li>• Collect geographically specific and up-to-date data to inform policy</li> <li>• Understand harm reduction needs of PWID in private residences and social determinants of IDU</li> <li>• Research individual or context-specific barriers and reasons for not accessing SIF services</li> <li>• Research social and behavioral effects of SIFs (e.g., sharing practices)</li> <li>• Gap in understanding needs and use of SIFs by street-involved youth</li> <li>• Further evaluation of SIFs: <ol style="list-style-type: none"> <li>(1) Develop and implement monitoring and evaluation programs for SIFs</li> <li>(2) Consider more potential benefits in cost-benefit analysis (e.g. diagnostics, immunization, referral to detoxification facilities, decreased use of other medical services, expansion of services, increased operating hours)</li> <li>(3) Consider intermediate outcomes (e.g. changes in injecting practices) with epidemiological data due to challenge in evaluating an intervention without a traditional control group</li> </ol> </li> </ul>
Opioid Agonist Therapy	<ul style="list-style-type: none"> <li>• Expansion of MOUD and harm reduction services by addressing system-level factors: <ol style="list-style-type: none"> <li>(1) decriminalization policies</li> <li>(2) accessibility and funding</li> <li>(3) decrease barriers which limit physicians' ability to prescribe these medications</li> <li>(4) enhance physician education in providing these services</li> <li>(5) improve referral systems</li> <li>(6) develop new pharmacotherapies for opioid use disorder</li> </ol> </li> <li>• Integrate MOUD services with infectious disease care and addiction treatment</li> <li>• Include PWID in policy-making surrounding the availability and delivery of MOUD services, including the expansion of these services as harm reduction in hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the impact of MOUD in combination with other harm reduction services and counseling, effects on infectious disease care</li> <li>• Need experimental designs</li> <li>• Studies need to assess impact of MOUD for certain population groups (e.g. women)</li> <li>• Explore perspectives of hospital staff regarding care of PWID and integration of harm reduction services into hospitals</li> </ul>
Integrated infectious disease and addictions services	<ul style="list-style-type: none"> <li>• Collaborative, multidisciplinary models, which include counseling and/or peer-based support groups extend beyond virological outcomes to improve social determinants of health</li> </ul>	<ul style="list-style-type: none"> <li>• Examine the impact of policy change on uptake of HCV and/or HIV treatment and care among PWID</li> <li>• Research the impact of diverse, innovative, integrated delivery strategies to improve uptake of HCV and/or HIV care in PWID</li> <li>• Investigate which aspects of care are likely to support changes in drug use</li> </ul>

		<ul style="list-style-type: none"> <li>patterns</li> <li>Include individual's ideas, beliefs and feelings after HCV treatment and reasons for not returning for care, or PWID experiences of effects of integrated care models on health and social inequities</li> </ul>
Needle Exchange Programs	<ul style="list-style-type: none"> <li>Expansion of NEPs and kit distribution programs, particularly in prisons and hospitals</li> <li>Decentralize NEPs, promoting peer-run initiatives, and diversify distribution methods to reach more marginalized PWID</li> <li>Include PWID and community members in programmatic decision-making and consider local context when initiating NEPs</li> </ul>	<ul style="list-style-type: none"> <li>Gaps in evaluation of NEPs</li> <li>Implement ongoing evaluation and monitoring of programs</li> <li>Examine different models of distribution across settings and cultural contexts</li> </ul>
Broad harm reduction strategies	<ul style="list-style-type: none"> <li>Expansion of harm reduction services, increased financial support for these services and their combination with HIV and HCV testing and treatment strategies, equity of access</li> <li>Advance peer-based models of care</li> <li>Re-assess punitive drug policies</li> <li>Improve evaluation and monitoring for harm reduction programs</li> <li>Support initiatives which address social harms affecting PWID and the social determinants of health</li> <li>Involve marginalized groups of PWID (e.g. youth and Indigenous) in program planning</li> </ul>	<ul style="list-style-type: none"> <li>Indigenous people in Canada may lack access to primary care and HCV testing</li> <li>Since many provinces do not collect ethnicity data, national data on HCV prevalence does not extend to Indigenous communities</li> <li>Understand HCV prevalence and determinants related to HCV transmission amongst Indigenous PWID</li> <li>Understand youth engagement and access to harm reduction services</li> <li>Examine injection equipment distribution policies and coverage, understand the risks from sharing injection equipment using robust study designs</li> </ul>
Mobile care initiatives and Telehealth	<ul style="list-style-type: none"> <li>Peer-led mobile initiatives play an important role in extending the reach of conventional public health programs</li> <li>Important to empower clients to make changes, by providing resources within an atmosphere of mutual respect, education, support, participation, commitment, power-sharing</li> <li>Multidisciplinary telehealth approaches can engage and retain patients in remote areas in the treatment of HCV</li> <li>Culturally safe interventions that address the barriers to HIV prevention while supporting the strength of populations (e.g. young Indigenous people) are urgently needed</li> </ul>	<ul style="list-style-type: none"> <li>How specific characteristics of mobile outreach programs may facilitate entry into inpatient addiction treatment or connect women to other services.</li> <li>Methods of including and evaluating community partnering, collaborating in healthcare delivery models for PWID</li> </ul>
Peer-delivered services	<ul style="list-style-type: none"> <li>Improve delivery of care for PWID and address lack of trust and unfamiliarity with the healthcare system and healthcare professionals</li> <li>Enable delivery of care and infectious disease prevention efforts to harder-to-reach, more marginalized PWID</li> <li>Legal and regulatory frameworks need to accommodate assisted injections and consideration for peer-based delivery models</li> </ul>	<ul style="list-style-type: none"> <li>Need for harm reduction initiatives to assess their accessibility to less autonomous PWID</li> </ul>
Treatment of Infective Endocarditis	<ul style="list-style-type: none"> <li>Integrate addiction treatment with infectious disease care</li> </ul>	<ul style="list-style-type: none"> <li>Gaps in understanding factors associated with PWID mortality</li> </ul>
Other health programs and services	<ul style="list-style-type: none"> <li>Increased access to harm reduction and addictions services, urgent primary care, immunizations, ambulatory and integrated care, and stable housing are needed to optimize health outcomes, reduce substance use-related deaths, and decrease hospital utilization</li> <li>Incorporate mental health interventions with harm reduction services to support behavior changes</li> </ul>	<ul style="list-style-type: none"> <li>Further studies on reasons for hospital admissions and ER use in PWID/PLHIV</li> <li>Determine effectiveness of mental health interventions in the community</li> <li>Determine effectiveness of interventions in ER settings to prevent further ER visits and admissions</li> </ul>

545 Abbreviations: ART, antiretroviral treatment; ER, emergency room; HCV, hepatitis C virus; HIV, human immunodeficiency virus; IDU, injection drug use, NEP, needle exchange  
546 program; MOUD, medication treatment for opioid use disorder; PLHIV, People living with human immunodeficiency virus; PWID, people who inject drugs; SIF, supervised  
547 injection facility; TasP, treatment as prevention



## DISCUSSION

### *Main findings*

We identified a number of health programs and services addressing the prevention and management of infectious diseases in PWID in Canada. These included testing and management of HIV and HCV, SIFs, MOUD, integrated infectious disease and addiction programs, NEPs, harm reduction strategies broadly, mobile care initiatives, peer-delivered services, and management of IDU-related bacterial infections in hospital. A broad range of study types and grey literature were included, allowing for elucidation of key recommendations for policy, practice and research.

Discussion of HIV and HCV infections far outweighed other IDU-related infectious diseases. The majority of the health programs and services included in our study addressed the provision of antiviral treatment and viral testing.. Studies addressed the cost-benefit and cost-effectiveness of SIFs. MOUD programs were shown to reduce risk of infection and improve antiviral treatment outcomes. Studies discussed harm reduction services broadly, calling for the expansion and combination of these services with HIV and HCV treatment strategies. Interdisciplinary or integrated health programs were shown to provide comprehensive care to PWID. Additionally, we found health programs that attempted to reach more marginalized PWID through telehealth and mobile care initiatives. Peer-delivered services, such as testing, counselling and assisted injections, removed barriers to care for PWID who distrust healthcare providers or require assistance injecting. Only two included studies addressed treatment of infective endocarditis.

### *Strengths and limitations of study*

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3 This study employed a systematic integrative review design which allowed for the  
4 inclusion of empirical, non-empirical and grey literature. Using this study design enabled a broad  
5 overview of health programs and services available for PWID in Canada. Additionally,  
6 documents were screened independently by two reviewers, improving reproducibility and  
7 limiting bias. Similarly, data extraction and quality assessment of included studies were  
8 performed independently by two data collectors.  
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17 Despite these strengths, this study has some limitations. An integrative review limits our  
18 study to published literature, which may exclude programs or services not published.  
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20 Additionally, our study sought to provide an overview of health programs and services for PWID  
21 in Canada, but did not formally evaluate the effectiveness of the included programs and services  
22 in preventing or treating infectious disease in PWID. Our review was limited to Canada,  
23 reducing the generalizability of these results, however improving the specificity of policy and  
24 practice recommendations derived from these results. Limitations were quite diverse due to the  
25 range of study types included in this review. Many of the cohort studies indicated that their  
26 sample was not random due to the use of previously established cohorts and, therefore, may not  
27 be generalizable to larger populations. Similarly, qualitative studies indicated a lack of  
28 generalizability, since experiences are specific to the PWID included in the study. Studies which  
29 relied on PWID self-report indicated limitations in the validity of the data due to social  
30 desirability bias. Cost-benefit analysis and mathematical modelling studies were limited by the  
31 assumptions, which cannot be verified, necessary for mathematical calculations, which may  
32 result in over or under-estimations of disease transmission or cost-savings.  
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51 *Fit within literature*  
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3 This study provides an overview of health programs and services relating to infectious  
4 disease care for PWID in Canada. While there are a number of systematic reviews examining  
5 interventions to treat HIV and HCV in PWID (5,6,8,117,118), our study is unique by focusing on  
6 the Canadian context, including all IDU-related infectious diseases, and including a variety of  
7 study designs. Other reviews examining the prevention and treatment of infectious disease in  
8 PWID found an emphasis on harm reduction efforts and HIV or HCV care. The included studies  
9 indicate the benefits of harm reduction efforts and support their increased use in communities  
10 and across other sites, including hospitals and prisons. Most studies in Canada are also from  
11 Vancouver, BC, which has a long history of empowering and working with PWID. While other  
12 jurisdictions in Canada can learn from Vancouver's work, it is important to conduct research in  
13 other cities and provinces to account for contextual differences.

### 24 *Recommendations for practice and research*

25  
26 The included studies indicate the advantages of multi-faceted care programs for PWID,  
27 which include harm reduction, medical and pharmaceutical treatments, social support and  
28 education. These programs target the social determinants of health, improving the underlying  
29 social and structural barriers which prevent PWID from accessing and adhering to treatments or  
30 health programs (81,82,85,86). Notably, the included studies call for exploratory work in  
31 facilitators and barriers to treatment and care, more robust study designs, and attention to  
32 contextual factors and more complex interventions.

33  
34 There is a need to address social and structural factors which impede continued care for  
35 PWID. These factors relate to the social determinants of health, and include criminalization of  
36 IDU, stigma and discrimination of PWID when accessing health programs or services, and lack  
37 of funding for harm reduction services. Recommendations include the introduction of supportive

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2  
3 housing models for PWID to enable greater adherence and access to infectious disease treatment  
4 or MOUD. Multidisciplinary or integrated care models for infectious disease treatment also  
5  
6 provide PWID with more comprehensive care, addressing medical, social and mental health  
7  
8 challenges.  
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11  
12 Targeted programs and services for marginalized groups of PWID, such as street-  
13  
14 involved adults and youth, sex workers, and Indigenous peoples are needed. NEPs, mobile care  
15  
16 initiatives, telehealth and peer-delivered services sought to improve access to care for these more  
17  
18 marginalized groups. Advancing peer models of care may decrease the stigmatization and  
19  
20 marginalization experienced by PWID and reduce barriers to accessing care. This is a prominent  
21  
22 and promising area for further research and implementation.  
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25

26 A pressing consideration for further research is improved evaluation and monitoring of  
27  
28 health programs and services using more robust research designs. Further research is needed to  
29  
30 understand specific needs of PWID across settings and cultural contexts. These may elucidate  
31  
32 reasons for not accessing services or returning to care and ideas and beliefs of PWID regarding  
33  
34 health programs and services.  
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37  
38 The majority of studies addressed HIV and HCV, which are mainly managed in  
39  
40 outpatient settings, given the advancements in treatment for these two infectious diseases. A  
41  
42 related project by this group is a chart review of PWID admitted to hospital to assess the types of  
43  
44 infectious diseases and concerns around patient-initiated discharges. Preliminary findings show  
45  
46 there is little overlap in these two studies, highlighting the disconnect between community and  
47  
48 hospital-based initiatives which ensure continuity of care in this population. There are few  
49  
50 included studies addressing IDU-related bacterial infections, despite their prevalence amongst  
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52 PWID and leading cause of long-term hospitalizations and emergency department use  
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(114,119,120). This gap indicates the need for further research on PWID care in hospital and health programs which link the community and hospital settings.

## CONCLUSIONS

There are a variety of health programs and services addressing the prevention and management of infections in PWID in Canada. Programs and services should be expanded across geographic settings, healthcare settings and populations of PWID, specifically more marginalized PWID. Improving infectious disease care for PWID requires attention to social and structural barriers and inclusion of PWID in programmatic decision-making.

## SUPPLEMENTARY DATA

### Supplementary File 1

- File format: PDF
- Title of data: Full Search Strategy

### Supplementary Table 1

- File format: PDF
- Title of data: Data Extraction Form
- Description: Data extraction form including bibliographic data (author, year, journal), type of research study and design, location, site of health program or service (community, clinic, hospital, etc.), infection(s) discussed, description of health program or service, population of study within PWID, description of cohort (if part of a cohort study), purpose of study, outcomes or indicators measured, summary of findings, implications for policy, practice or research according to authors and gaps identified by authors and quality appraisal scores. Data is organized by health program or service.

## DECLARATIONS

### Ethics Approval and consent to participate

Not applicable.

### Availability of Data and Materials

All data generated or analyzed during this study are included in this published article.

### Conflicts of Interest

1  
2  
3 The authors have no conflicts of interest.  
4

### 5 **Patient and Public Involvement Statement**

6  
7  
8 Patients and the public were not involved in the design or conduct of this study.  
9

### 10 **Funding**

11  
12 No funding was received for this research project from any funding agency in the public,  
13  
14 commercial or not-for-profit sectors. All data collectors either receive course credit at McMaster  
15  
16 University or volunteer their time for this project.  
17  
18

### 19 **Author's contributions**

20  
21 EA conceived of the topic. CL, LM, ML, RL, J-ET and DK helped develop the research question  
22  
23 and methods. KB, SJ, SP, YQ, HS, MQ and AH helped develop the search strategy and  
24  
25 conducted data collection. KB and EA conducted data analysis and wrote the initial manuscript.  
26  
27  
28 All authors provided substantive comments and approved the final manuscript.  
29  
30

### 31 **Acknowledgements**

32  
33 Annie Wang was involved in the initial discussions of the methods for this study.  
34

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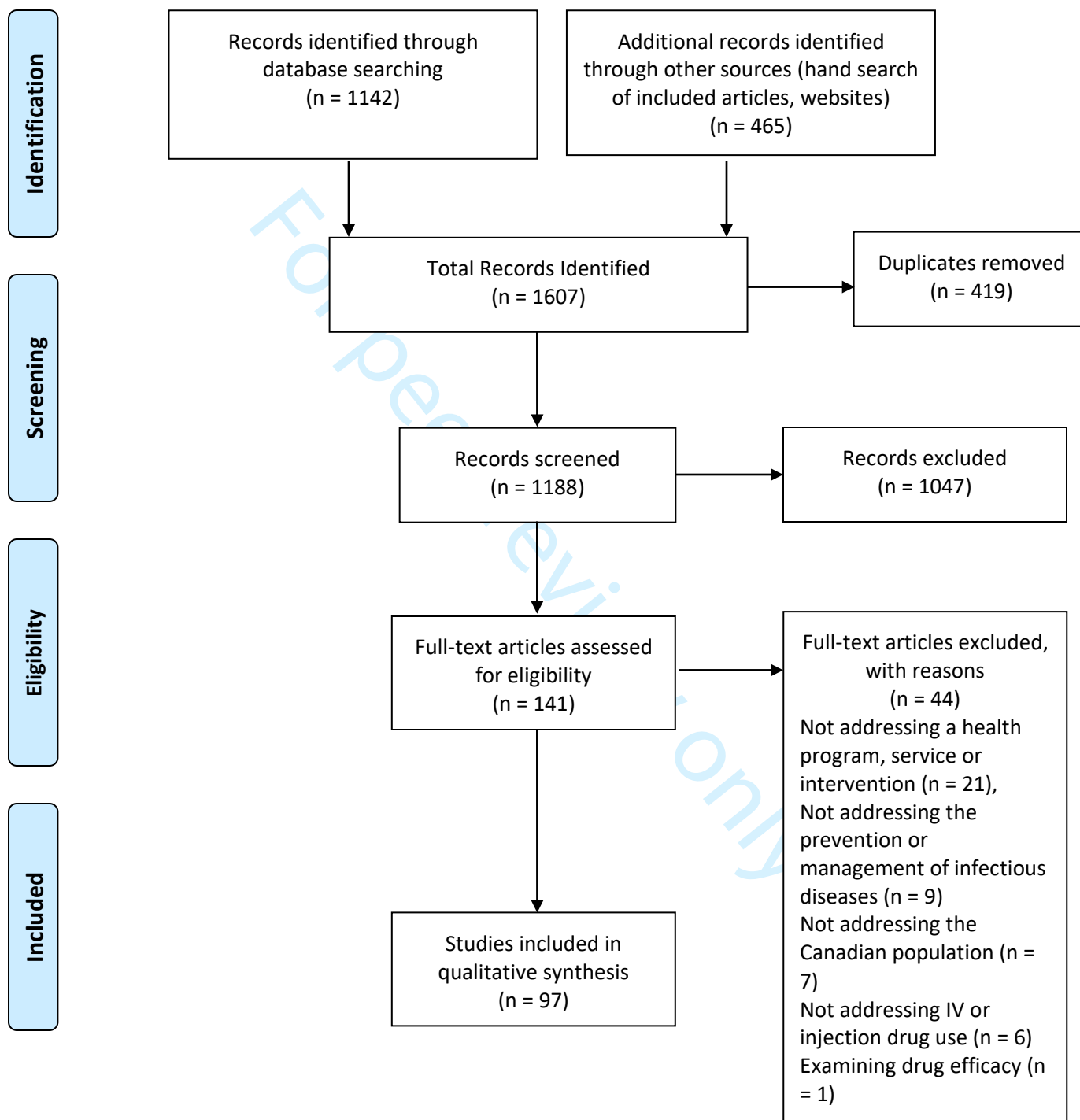
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## 49 FIGURES

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51 **Figure 1.** Flowchart demonstrating identification, screening and inclusion of studies.  
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## PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Year of publication	Authors	Name of publication	Title of article	Study type - empirical OR non-empirical	Type of empirical or non-empirical study	Location of program / service	Site of program or service - hospital; clinic; community; home; other - (specify); Multiple - (specify)	Infection(s) discussed
<b>Services providing testing for and prevention or treatment with antivirals for HIV or HCV (ART / DAA / HAART / PEP / Seek and Treat Initiatives / Treatment as Prevention / Point of care testing) n=27</b>								
2019	Bazzi, A.R.; Drainoni, M.-L.; Biancarelli, D.L.; Hartman, J.J.; Mimiaga, M.J.; Mayer, K.H.; Biello, K.B.	BMC Public Health	Systematic review of HIV treatment adherence research among people who inject drugs in the United States and Canada: evidence to inform pre-exposure prophylaxis (PrEP) adherence interventions	Empirical	Systematic Review	Multi-country: United States (CT- New Haven, MD- Baltimore, MA- Boston, NY- New York, CA- San Francisco, FL- South Florida) and Canada (BC - Vancouver)	None stated	HIV
2019	Yeung, B.; Mohd Salleh, N. A.; Socias, E.; Dong, H.; Shoveller, J.; Montaner, J.S.G.; Milloy, M.-J. S.	AIDS Behav.	Prevalence and correlates of reporting difficulty taking antiretroviral treatment among HIV-positive illicit drug users in Vancouver, Canada: a longitudinal analysis	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV

Health program or service	Description of health program or service	Population of this study	Study size (number enrolled in study)	Population of study within PWID - All; Indigenous; sex workers; immigrants; men who have sex with men (MSM); transgender; minors; others	If part of cohort study, description of cohort - name of cohort, year of inception, number of participants, location, inclusion and exclusion criteria, outcomes measured or purpose of cohort	Purpose of present study
ART, PrEP	ART, Pre-Exposure Prophylaxis	PWID (HIV positive and negative)	average sample size = 465 ; 20 studies (mean n=465)	All	N/A	to synthesize evidence about ART adherence among PWID to inform PrEP adherence interventions for this population
ART	The experience of taking ART among PWID HIV positive individuals	HIV positive PWID who were ART-exposed at baseline or who initiated ART treatment during follow-up. Analytic sample was restricted to participants with $\geq 1$ CD4+ count and $\geq 1$ plasma HIV-1 RNA viral load (VL) within 6 months of their baseline interview.	746	All	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an ongoing longitudinal prospective cohort study of HIV-positive illicit drug users in Vancouver, Canada. Beginning in December 2005, study participants were recruited through extensive street outreach in Vancouver's Downtown Eastside (DTES) neighborhood, an urban area marked by high levels of poverty, illicit drug use, and incidence of HIVinfection among injection drug users. Eligibility for ACCESS is restricted to HIV-positive individuals aged $\geq 18$ years with a history of illicit drug use (other than or in addition to cannabis) in the previous month, who have provided written informed consent. Study participants respond to an interviewer-administered questionnaire and, during an examination by a nurse, provide serum samples for serological analysis at baseline and at every 6-month follow-up. The structured interview collects comprehensive demographic data, along with descriptions of drug use and various related exposures.	To investigate the prevalence and correlates of reporting ART was difficult to take among a cohort of illicit drug users in Vancouver, Canada

Main outcome and indicator, if any	Other outcomes or variables measured and indicators used, if any	Summary of findings	Implications for policy and/or practice, as reported by authors	Implications for research, as reported by authors
ART adherence outcomes were assessed using pharmacy records (prescription refill data), self-report, biological markers (viral load) and electronic monitoring	predisposing factors, enabling factors and need-related factors analyzed based on the Behavioral Model of Healthcare Utilization for Vulnerable Populations: younger age, sex, education level, race/ethnicity, low health literacy, unemployment, substance use barriers, alcohol use, binge drug use and overdose, high addiction severity, SU to cope with stress, homelessness, sexual abuse history	After screening 1049 unique records, we retained 20 studies of PWID (average sample size = 465) with ART adherence-related outcomes (via pharmacy records: n = 9; self-report: n = 8; biological markers: n = 5; electronic monitoring: n = 2). Predisposing factors (patient-level barriers to adherence) included younger age, female sex, and structural vulnerability (e.g., incarceration, homelessness). Enabling resources (i.e., facilitators) that could be leveraged or promoted by interventions included self-efficacy, substance use treatment, and high-quality patient-provider relationships. Competing needs that require specific intervention strategies or adaptations included markers of poor physical health, mental health comorbidities (e.g., depression), and engagement in transactional sex	None stated	Further studies needed to identify more nuanced differences and necessary adaptations of related intervention strategies. In-depth, formative research, including qualitative studies, should explore PrEP adherence challenges in this population.
The primary outcome of interest was self-reported difficulty taking ART, as assessed during the examination by the study nurse.	age (at baseline); time since HIV diagnosis (in years); gender (male vs. non-male); ancestry (Caucasian vs. non-Caucasian); homelessness (yes vs. no); relationship status (legally married/common law/partner vs. other); formal employment (yes vs. no); education (≥ high school completion vs. < high school); injection drug use (yes vs. no); heavy alcohol use (≥ 4 drinks/day vs. < 4 drinks/day); comorbidity with severe depression, as measured by the Center for Epidemiologic Studies-Depression score [27], dichotomized at 16 (yes vs. no); participation in a methadone program (yes vs. no); satisfaction with healthcare provider (yes vs. no); and understanding how to take prescribed HIV medication (yes vs. no).	ART was reported hard to take by 28.0% of participants at baseline and 61.7% throughout the study period. Patients ingesting a great daily pill count and experiencing barriers to healthcare were more likely to report difficulty taking ART. Patients less likely to report satisfaction with HIV physician and achieve a non-detectable HIV viral load were more likely to report finding ART hard to take. Their findings highlight health system level barriers that may underlie poor ART adherence and call for targeted solutions within the health sector, especially for HIV-positive PWUDs who typically contend with a variety of individual, social, and structural barriers to achieving optimal adherence. Further, they identified a link between non-male gender and a greater likelihood of finding ART difficult to take. It is possible that their current results might explain, in part, findings from previous analyses linking nonmale gender with poorer antiretroviral medication adherence among PWUD, a finding also demonstrated among other populations living with HIV.	Their findings have relevance to both clinical practice and public policy. Specifically, renewed efforts are underway in many settings to promote HIV testing and scale-up access and adherence to ART in order to reduce individual and community-level HIV VL. Their finding of a link between finding ART difficult to take and VL detectability suggests a potential opportunity to improve rates of VL non-detectability through more tolerable ART formulations, and more welcoming clinical environments for HIV-positive PWUDs, particularly women. Supports previous findings that lower pill burden and once-daily dosing regimens are associated with higher likelihood of achieving optimal ART adherence and better virological suppression among non-drug-using samples of people living with HIV. Stigma and discrimination which can affect relationship with healthcare provider, as well as mistrust, has detrimental impact on satisfaction and treatment outcomes. Health system level barriers may underlie poor adherence in this population (ex. long wait times, aversive experience w/ clinic staff, limited access to care, unstable housing, limited employment opportunities).	This data suggests several opportunities to inform new treatment initiatives to improve HIV- health outcomes for seropositive illicit drug users.

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Strengths of study, as reported by authors	Limitations of study, as reported by authors	Gaps identified, as reported by authors	Quality appraisal with QATSDD - Primary reviewer	Quality appraisal - secondary reviewer	QUALITY APPRAISAL CONSENSUS		
None stated	1. limited generalizability due to non-random and non-representative sampling 2. variability in outcome measurement (many studies relied only on self-reported medication-taking behaviors) 3. observational study designs are subject to unmeasured confounding 4. systematic review limitation: potential differences between ART and PrEP adherence: both require taking daily medications, but the motivation for adherence to each medication may differ	Innovative strategies may be needed to support adherence among highly vulnerable and marginalized sub-groups of PWID including younger PWID, women, and people experiencing homelessness and social and structural vulnerabilities	30/42=71.4%	30/42=71.4%	71.4+71.4/2=71.4%		
One of the first to identify key demographic prevalence and correlates of difficulty taking ART among HIV-positive PWUDs, they found several factors implicated in finding ART difficult to take. Taken together, their data suggest several opportunities to inform new treatment initiatives to improve HIV- health outcomes for seropositive illicit drug users.	The self-reported nature of some variables may limit the validity of their conclusions. The recruited cohort is not a random sample, and thus, may not be representative of the whole population of HIV-positive illicit drug users in Vancouver, Canada or elsewhere.	None stated	25/42=59.5%	25/42 = 59.52%	25/42=59.52%		

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2018	Young, S.; Wood, E.; Milloy, M-J.; DeBeck, K.; Dobrer, S.; Nosova, E.; Kerr, T.; Hayashi, K.	Subst. Abus.	Hepatitis C Cascade of Care among People Who Inject Drugs in Vancouver, Canada	Empirical	Cohort - prospective	BC - Vancouver	Community	HCV
2017	Cousien, A.; Leclerc, P.; Morissette, C.; Bruneau, J.; Roy, É.; Tran, V.C.; Yazdanpanah, Y.; Cox, J.	BMC Infectious Diseases	The need for treatment scale-up to impact HCV transmission in people who inject drugs in Montréal, Canada: a modelling study	Empirical	Mathematical modelling	QC - Montreal	Not specified	HCV

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	HCV treatment	The cascade of care in Vancouver, Canada to improve HCV treatment access and delivery for PWID 5 steps: 1. chronic HCV 2. linkage to HCV care 3. liver dz assessment 4. initiation of treatment 5. completion of treatment	PWID Participants were eligible for the present study if they completed the baseline interview and at least 1 follow-up visit between December 1, 2005 and May 31, 2015. The sample was further restricted to those who were anti-HCV positive at baseline or became positive during follow-up and completed at least one follow-up visit after anti-HCV seroconversion; reported a history of injection drug use at a visit when their blood sample tested positive for anti-HCV; and did not die during the study period	1571	PWID with chronic HCV	the Vancouver Injection Drug Users Study (VIDUS), the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), and the At-Risk Youth Study (ARYS). VIDUS enrolls HIV-seronegative adults who injected illicit drugs in the month before baseline assessment. ACCESS enrolls HIV-seropositive adults who used an illicit drug other than or in addition to cannabis in the month before the baseline interview. ARYS enrolls street-involved youth aged 14 to 26 who used an illicit drug other than cannabis in the month before the baseline interview. The studies use harmonized data collection and follow-up procedures to allow for combined analyses of the different cohorts.	The purpose of this study is to characterize the HCV cascade of care among PWID in Vancouver, BC, as well as to identify factors associated with undergoing liver disease assessment for HCV treatment in order to improve treatment delivery and decrease transmission of HCV
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	HCV treatment	Development of a computer based dynamic model to simulate 8 cascade of care scenarios in Montreal for the HCV incidence and prevalence after 10 years and cirrhosis after 10-40 years	Starting populatoin was Montreal's active PWID (injected within last 6 months) approximately 4000 people	4000	All	Eligibility criteria: 14 year of age or older, injecting at least once in last 6 months, speaking French or English	Simulate 8 different scenarios based on time to diagnosis, linkage to care, loss to followup rate, treatment eligibility, treatment rates among eligible PWID and %SVR and evaluate HCV transmission and future cirrhosis

<p>Factors associated with undergoing liver disease assessment for treatment (i.e., any of bloodwork, ultrasound, Fibroscan® or liver biopsy related to investigation for HCV treatment)</p>	<p>Demographic characteristics (age, gender, and ethnicity), HIV seropositivity, homelessness, employment status, substance use (including alcohol, heroin, cocaine, methamphetamine, crack, benzodiazepines, and methadone maintenance therapy), HCV risk behaviour (syringe lending, unprotected sex, and sex work), hospitalization incarceration, and ever diagnosed mental health disorder(s). Definitions of the variables were consistent with those previously defined in other studies from these cohorts. All variables except for gender, ethnicity and a history of mental health disorder diagnoses referred to the past six months.</p>	<p>Findings show that at least 80% of PWID with chronic HCV were linked to care with a physician and have undergone investigations related to treatment. This likely reflects the improvements in screening and referral for care noted in Canada and other high income settings. Despite improvements in linkages to care and investigations, there remains a large gap in initiation of treatment, with only 10% having started on treatment and less than half of those finishing treatment.</p>	<p>The most common reasons for declining to take treatment (concern over side effects and feeling that symptoms were not severe enough to warrant treatment) are consistent with previous studies. This highlights the potential for interventions to improve awareness of DAA regimens and their side effect profile as well as provide education related to the effects of HCV and potential morbidity if not treated.</p>	<p>Further research is needed to better understand prescriber and patient factors that contribute to low rates of initiation of HCV treatment among PWID.</p>
<p>HCV transmission in the population and chronic HCV complications</p>	<p>None</p>	<p>Modeling demonstrated that Treatment as Prevention (TasP) increase (5%/y, 10%/y to 20%/y) resulted in a drop in HCV prevalence (55.8% to 47.5% and 36.6%) in 10 years and the number of cirrhosis complications decreased by 21% and 37% over 40 yrs using 10%/y and 20%/y.</p>	<p>A larger decrease in the disease burden using TasP first requires greater access to treatment for PWID once they are diagnosed and linked to care. Without this scale up increased testing or linkage to care would be limited benefit. Delaying treatment for fibrosis &gt;F2 would allow for several years of transmission. Improvements in prevention interventions complemented a TasP strategy.</p>	<p>Estimating the impact of preventive public health strategies, in addition to variations in the HCV cascade of care, would require a more complex model including information on injecting drug use initiation, injection equipment distribution, use of opioid substitution therapies/programs, and supervised injection facilities, expected soon in Montréal. Further investigation is needed to incorporate them in the model.</p>

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None stated	<p>Firstly, the cohort studies from which the data was derived are comprised of a non-random sample and therefore may not be generalizable to local PWID or in other settings. Secondly, while the initial study sample was derived from an anti-HCV test, the remainder of the data was obtained through self-report. While self-report has been shown to be a valid measure among PWID, data is limited by the participant's knowledge and memory of the investigations and treatment they have undergone or been offered. Without obtaining the confirmatory HCV RNA test, their sample of chronic HCV may be over-estimated as participants may be unaware that they had cleared their HCV or the test may not have ever been done. In Vancouver, it is estimated that nearly 75% of people who are anti-HCV positive go on to have RNA testing. Researchers attempted to at least partly control for this by excluding those participants with mismatched self-reported HCV status and anti-HCV serodetection, thereby excluding those who self-report negative because they are aware that they have cleared the infection yet remain anti-HCV positive. Thirdly, data was not obtained on the degree of fibrosis among those who underwent investigations. Therefore, they are unable to determine what percentage of participants were eligible to receive publicly-funded treatment, which may explain some of the loss of participants moving to the treatment step of the cascade. Finally, there may be unmeasured confounders influencing whether or not participants underwent investigations for HCV treatment although their multivariable model</p>	Despite the improvements in linkage to care and investigations, there remains a large gap in initiation of treatment, with only 10% having started on treatment and less than half of those finishing treatment.	23/42=54.8%	20/42 = 47.62%	22/42=52.38%		
Local data through regional surveillance work was used to ensure current situation of HCV infection and care for PWID in Montreal. The model includes the entire cascade of care for chronic infections.	The network model is static and simple. Other comorbidities such as HIV was not considered. No assumptions of risk-taking behaviour changes with diagnosis of HCV. Cost of DAA (\$5000 canadian over 12 weeks) would increase costs to health care system. Improving testing and linkage to care would be associated with costs.	None stated	37/42=88%	33/42=78.5%	78.5+76.1/2=77.3%		



1	2017	Hayashi, K.; Dong, H.; Kerr, T.; Dobrer, S.; Guillemi, S.; Barrios, R.; Montaner, J.S.G.; Wood, E.; Milloy, M.-J.	The Journal of Infectious Diseases	Declining mortality rates in HIV-infected people who inject drugs during a seek - and-treat initiative in Vancouver, Canada, 1996-2014: A prospective cohort study	Empirical	Cohort - prospective	BC - Vancouver	Not specified	HIV, HCV
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19	2017	O'Byrne, P.; MacPherson, P.; Roy, M.; Orser, L.	International Journal of STD & AIDS	Community-based, nurse-led post-exposure prophylaxis: results and implications	Empirical	Cohort - retrospective	ON - Ottawa	Community	HIV
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Seek-and-treat	Seek-and-treat initiatives, but not described what was done	Participants in the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS) cohort of HIV infected people who reported having ever injected drugs	961 participants	PLHIV	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), a prospective cohort of HIV infected people who use illicit drugs in Vancouver, Canada, starting in 1996. Participants recruited through self-referral. Inclusion criteria age 18 or older, residence in greater Vancouver area, HIV seropositive, use of illicit drugs (other than cannabis) in the previous month, and written informed consent.	To identify rates, causes and predictors of mortality among HIV-infected PWID in Vancouver between 1996 and 2014
PEP	STI clinics run by Ottawa Public Health - the Sexual Health Centre and GayZone. Community-based program for delivering post-exposure prophylaxis (PEP) to individuals with significant potential exposures to HIV (based on chance of transmission per contact and probability partner is HIV-positive); trained nurses who were experts in STI care and were authorized to provide PEP - included HIV/STI testing, counselling services, PEP based on US and UK recommendations to give three-drug combinations to all patients	Individuals had to be HIV-negative (at least demonstrated by history and a negative HIV point-of-care test at presentation) and had to have engaged in unprotected vaginal or anal sex (receptor or penetrative), needle-sharing, or other blood-blood contact with a person either (1) known to be HIV-positive, or (2) potentially HIV-positive based on local prevalence data. In Ottawa, this included men who have sex with men and persons who inject drugs.	112	All	Sept 5 2013-Sept 4 2015; 112 participants; Two STI clinics run by Ottawa Public Health (Sexual Health Centre and GayZone); inclusion criteria: individuals had to be HIV-negative (at least as demonstrated by history and a negative HIV point-of-care test at presentation) and had to have engaged in unprotected vaginal or anal sex (receptive or penetrative), needle-sharing, or other blood-blood contact with a person either (1) known to be HIV-positive, or (2) potentially HIV-positive based on local prevalence data. In Ottawa, this included men who have sex with men (MSM) and persons who use injection drugs	Study sought to increase use of HIV PEP by having registered nurses provide these medications, when indicated, in community clinics in Ottawa, Canada. Chart review of patients who accessed services for HIV PEP during Sept 5 2013 and Sept 4 2015. Also, sought to determine the feasibility of initiating PEP in community sexual health clinics.

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<p>Mortality rates through BC Vital Statistics Agency</p>	<p>Underlying causes of death; fixed variables - calendar year of study enrollment, self-reported ethnicity/ancestry, time since first initiation of injection drug use at baseline; time-varying variables - demographic and drug-using variables - age, daily heroin injection, daily cocaine injection, daily methamphetamine injection, daily prescription opioid use, daily crack smoking, any cannabis use, daily alcohol use; social, structural and environmental exposures - unstable housing, engagement in sex work, number of incarceration events, enrollment in opioid agonist therapy (OAT), enrollment in addiction treatment other than OAT; clinical variables - HCV seropositivity, ART access and plasma HIV-1 RNA viral load (VL), years since first record in registry, initiating highly active antiretroviral therapy.</p>	<p>961 participants were followed for a median of 63.8 months. 297 deaths occurred and crude mortality rate was 4.6 deaths/100 person-years. The 3 most common causes of death were identical in both sexes: HIV-related (43.3%), other nonaccidental causes (20.5%), and overdose (19.2%). Liver-related mortality rates were lower in women. All-cause mortality rates per 100 person-years dropped from 6.0 in 1996-2003, 5.3 in 2004-2009, and 3.0 in 2010-2014. Those receiving ART and having undetectable VL (&lt;50 copies/ml) had a 42% lower hazard of all-cause mortality among men and 45% lower hazard among women. Those receiving ART but having detectable VL did not have a significantly lower hazard of death. For women, longer duration of injection drug use predicted mortality. For men, daily prescription opioid use, and white ethnicity/ancestry predicted mortality.</p>	<p>Findings suggest scale-up of "seek-and-treat" HIV treatment interventions served to significantly reduce HIV-related mortality among community-recruited cohort of PWID living with HIV in Vancouver. Helping HIV infected PWID maintain their VL at undetectable levels is important to further reduce mortality. HIV-related mortality declined among both men and women, which is encouraging. Sex-based differences remain in that there were no reductions in overdose or other nonaccidental mortality among women, and men had higher liver-related mortality rates. White ethnicity was an independent predictor of death for men, which is counterintuitive where and when Indigenous population had lower access to ART</p>	<p>Examine potential benefits of expanded access to comprehensive HIV care beyond HIV-related morbidity and mortality and identify the gap in care among PWID living with HIV. Investigate how different patterns of prescription opioid use increase the mortality risk.</p>
<p>The primary outcome measured was initiation of PEP.</p>	<p>Other variables measured included reasons for not initiating PEP, gender, point-of-care testing, and sexual encounters/risk factors for exposure to HIV. Age, STI history, needle sharing, HIV status of partner.</p>	<p>Over the two years of data collection, 112 persons requested HIV post-exposure prophylaxis and 64% (n = 72) initiated these medications. Most (93%, or n = 67, of the 72 initiations) were among men, with 88% (n = 59) of these men reporting same sex sexual partners. Among these 58 men, 31% (n = 18) had sexual contact with other men known to be HIV-positive. Among women (n = 8), five initiated post-exposure prophylaxis: three after needle-sharing contact or sexual contact with a male partner who reportedly shared needles, and two after unprotected vaginal sex with a male partner known to be HIV-positive. Overall, no one was diagnosed with HIV at the four-month HIV testing follow-up, although six persons were diagnosed with HIV from the baseline HIV testing, and an additional four were diagnosed with HIV during routine HIV testing one year after completing post-exposure prophylaxis. In total, nine persons in our sample were thus diagnosed with HIV during the study period, which accounted for 9.4% (n = 10 of 106) of all reported HIV diagnoses in Ottawa during this time.</p> <p>The main reasons for not initiating PEP were as follows: presentation greater than 72h post-exposure (n=7); low-risk contact (n=11); a reactive HIV point-of-care test at presentation (n=4); patients declining PEP after being counselled about testing, follow-up, medication use, duration, and side-effects (n=11); and sexual assault (n=2).</p>	<p>Our project demonstrated the feasibility of a program where PEP can be implemented as part of a program in frontline STI clinics, and highlighted some of its benefits (e.g. the diagnosis of 6 men unaware they were HIV-positive, the possible prevention of an unknown number of infections, and the associated potential health system cost savings). This project also showed the lack of outcomes for STI testing, although we would still advocate for such testing based on findings from previous studies. These findings overall demonstrate the utility of outpatient nurse-led PEP programs across Canada. The four confirmed HIV diagnoses that occurred one year after PEP completion emphasizes the need to do long-term follow-up with patients who use PEP, and highlights the need to consider pre-exposure prophylaxis (PrEP) for patients who qualify for PEP.</p>	<p>Further research on why PEP appealed to persons unaware of being HIV-positive is needed to inform future HIV prevention and testing initiatives.</p>

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None stated	ACCESS participants were not randomly recruited, therefore generalizability may be limited. Self-reported data may be affected by reporting biases, however, this data has been used in other cohort studies and found to be valid. The setting is in a no-cost universal medical care system, which may limit generalizability. As an observational study, confounding can be present, even after using multivariable adjustment for key predictors of survival.	High-intensity prescription opioid use predicted mortality in men, indicating a need to address factors shaping harms from prescription opioid use in this population.	25/42 = 59.5%	24/42=57.1%	58.30%		
1) Demonstrated feasibility of operating an outpatient, community-based, nurse-led PEP program and offered full STI testing rather than solely focusing on HIV; 2) positivity rate for HIV testing in project was highest ever noted in a prevention or testing initiative in Ottawa, Canada (pickup rate exceeds that of most targeted testing programs and suggests easy access to PEP in community may facilitate HIV testing/diagnosis/linkage to care); 3) Four confirmed HIV diagnoses that occurred one year after PEP completion emphasized need to do long-term follow-up with patients who use PEP and highlights need to consider PrEP for patients who qualify for PEP; 4) Demonstrated overall health systems savings with this program	None really stated; Discrepancy mentioned: The project showed lack of outcomes for STI testing, but they would still advocate for this based on findings from previous studies.	Removing barriers to PEP, such as cost and improved availability, should be considered important components of HIV prevention and reductions in overall community infection rates.	18/42 = 42.9%	17/42 = 40.5%	18/42 = 42.9%		

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	2017	Panagiotoglou, D.; Emanuel, K.; Jeong, M.E.; Olding, M.; Ahamad, K.; Ti, L.; Montaner, J.S.G.; Nosyk, B.	Int J Drug Policy	Initiating HCV Treatment with Direct Acting Agents in Opioid Agonist Treatment: When to start for people co-infected with HIV?	Empirical	Cohort - retrospective	BC	Not specified	HCV, HIV (co-infection)
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2017	Socias, M. E.; Ti, L.; Dong, H.; Shoveller, J.; Kerr, T.; Montaner, J.; Milloy, M-J	HIV Medicine	High prevalence of willingness to use direct-acting antiviral-based regimens for hepatitis C virus (HCV) infection among HIV/HCV coinfecting people who use drugs	Empirical	Cohort - retrospective	BC - Vancouver	Community	HCV, HIV (co-infection)

DAA	Opioid agonist treatment (studying adherence to inform initiation of DAA)	HIV/HCV co-infected PWID in British Columbia, Canada; individuals who sought OAT at any point following HIV diagnosis, determined by dispensation records of OAT (either methadone or medications containing buprenorphine) in the PharmaNet database, from 1 January, 1996 to 31 March, 2014	1427	All	Restricted analysis to individuals who sought OAT at any point following HIV diagnosis, determined by dispensation records of OAT (either methadone or medications containing buprenorphine) in PharmaNet database from Jan 1 1996-Mar 31 2014. Cohort included HIV/HCV co-infected PWID in BC, Canada. This study was based on a provincial-level linkage of seven health administrative databases and disease registries: (1) antiretroviral dispensation, (2) virology and (3) HIV-testing registries (antiretroviral dispensations, plasma viral load (pVL), CD4 <sup>+</sup> cell count tests, nominal HIV diagnoses); and the province's (4) Medical Services Plan (MSP, physician billing records), (5) discharge abstract (hospitalizations), (6) PharmaNet (all non- antiretroviral drug dispensations including OAT), and (7) vital statistics (deaths) databases.	To identify when OAT adherence sufficiently improved to inform DAA initiation in OAT settings, assuming continuous OAT retention for at least 12 weeks is necessary to complete the DAA treatment course.
DAA	Direct-acting antiviral (DAA) therapies (not used as an intervention in this study)	HIV/HCV co-infected PWUD in Vancouver	418	HIV/HCV co-infected	Participants were recruited from ACCESS cohort. Prospective cohort of HIV-positive PWUD. Inclusion: HIV positive, age 18+, live in greater Vancouver, used illicit drugs other than cannabis in past month. For present study, participants were included if: HCV seropositive, completed at least 1 study visit between June 2014 and May 2015. Most recent observation was used if there were multiple for the same person.	To explore willingness to use DAA-based regimens among HIV/HCV co-infection PWUD in Vancouver

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<p>Time-dependent, monthly-updated binary measure of 100% OAT adherence (i.e. no days of OAT missed) for 12 weeks from the most recent month completed within a given episode of OAT per patient. An episode of OAT was defined as a continuous period of dispensed OAT medication with no more than a month gap between treatments. A new episode of treatment indicated re-initiation of OAT following a month or longer interruption of dispensed OAT medication. Each episode was followed for up to 18 months, loss to follow-up, death, or censoring.</p>	<p>The primary independent predictor was the consecutively-numbered month on continuous OAT. Other covariates included patient socio-demographics, OAT factors, HIV progression, and treatment status, and reent pharmaceutical treatment for mental health and pain management.</p> <p>Socio-demographics: Age, sex, MSM status, chronic disease score (medication dispensation records)                  Course of OAT: Per treatment episode and updated monthly; assessed previous OAT experience, hospital initiation of OAT, OAT compliance/ taper or titration/ change of provider.                  HIV progression and treatment status: time since HIV diagnosis, ART adherence for at least 3 months prior to OAT initiation, and ART therapy type. Most recent CD4 count and viral load within 6 months.                  Mental Health: DINs prescribed within a year prior to OAT episode</p>	<p>Within the first episode of OAT, the proportion of individuals retained an additional twelve weeks increased from 20% to 31% between the first and seventh month; while the proportion retained an additional eight weeks increased from 27% to 40% over the same period.</p> <p>Our analyses found that after controlling for patient demographics and health characteristics, individuals retained in OAT for three or more months had higher odds of completing another twelve weeks of OAT; individuals retained in OAT for two or more months had improved odds of completing another eight weeks of OAT; and for PWID on ART the odds of completing another twelve weeks of OAT did not change by month. In this context, concurrent retention in ART and OAT appeared to demonstrate ongoing adherence to medical care that could generalize to other forms of continuous care.</p>	<p>Together with results of other studies, this study suggests HCV treatment can be integrated with OAT, and OAT adherence long enough to support the standard twelve week DAA regimen has improved significantly by the third month on OAT. Further, they help assuage concerns of suboptimal adherence to HCV treatment, treatment failure, and the development of treatment resistance, which have been used in the past to limit access to DAA for PWID.</p>	<p>Further implementation science research for DAA treatment initiation time among PWID on OAT without incurring the costs of treatment or drop out, as given the cost of DAA, there are concerns regarding treatment adherence and subsequent antiviral resistance. As well, further research into when treatment can begin, and research showing OAT environments (useful points of care for initiating multiple therapies).</p>
<p>Willingness to use DAA-based regimens, responding as "yes" to a question on the survey</p>	<p>Willingness to use treatment under the following efficacy scenarios: &lt; 40%, 40-59%, 60-79%, &gt;80%</p>	<p>71% of participants reported willingness to use DAA-based regimens. Increased willingness as hypothetical efficacy scenarios increased (12% in &lt;40% efficacy scenario vs. 45% for &gt;80% efficacy scenario). Engagement in methadone maintenance therapy, recent assessment by HCV specialist and self-perception that HCV was affecting health were independently and positively associated with willingness to use DAA-based regimen.</p>	<p>Urgent need for interventions to ensure equitable access to HCV care for PWUD. This includes HCV education, reduced treatment cost, simplifying care delivery and integration with HIV and addiction services, as well as removal of punitive criminal laws and policies against PWUD. Results support calls to expand and sustain access to opioid agonist treatment as part of broader efforts to address HIV, HCV and substance use disorders.</p>	<p>Need to identify and develop effective pharmacotherapies for stimulant use disorders to improve addiction treatment outcomes which may support HCV care for PWUD.</p>

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<p>OAT retention is a strong predictor of long-term ART adherence among PWID (Roux et al., 2009), is associated with HCV treatment initiation (Midgard, Bramness, Skurtveit, Haukeland, &amp; Dalgard, 2016), and has been found to improve adherence in studies conducted during the pegylatedinterferon era (Dimova, Zeremski, Jacobson, Hagan, &amp; Des Jarlais, 2013).</p>	<p>1) Worked exclusively with data on PWID co-infected with HIV/HSC with at least one spide of OAT treatment in BC. Limited potential generalizability of results to individuals with HIV in OAT. 2) Used OAT adherence with assumption that it was necessary for DAA adherence. Some studies suggest that ongoing injectig drug use is not associated with reduced response, prolonged delay in DAA initiation within OAT settings should be avoided, and although DAA retention and SVR are achievable outside OAT settings, OAT remains an important setting for engaging PWID in HSV care and treatment.</p>	<p>DAAAs are increasingly being added to insurance drug formularies internationally, but remain out of reach for most PWID. Similar observational findings of HCV treatment compliance in OAT settings are currently lacking (Taylor, Swan, &amp; Matthews, 2013) and OAT remains highly restricted in many settings.</p>	<p>31/42 = 73.8%</p>	<p>28/42 = 66.7 %</p>	<p>29/42 = 69.0%</p>		
<p>To our knowledge, this is the first study to assess willingness to use DAA-based regimens among HIV/HCV co-infected PWUD, a key population within the HCV epidemic.</p>	<p>Sample not randomly selected, so results may not be generalizable to other populations of HIV/HCV co-infecetd PWUD. Sub-populations of PWUD may be underrepresented. Cross-sectional nature of study: could not determine temporal and causal relationships between explanatory variables and outcome. Self-reported data (may be subject to social desirability bias and recall bias). Finally, due to the lack of systematic access to HCV RNA and tests for liver fibrosis staging (e.g., transient elastography), we were not able to evaluate the number of participants with chronic HCV or who would be eligible for publicly-funded HCV treatment under current Canadian guidelines</p>	<p>None stated</p>	<p>26/42 = 61.90%</p>	<p>27/42=64.3%</p>	<p>63%</p>		

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2017	Tran, M.; Wood, E.; Kerr, T.; Patterson, S.; Bangsberg, D.; Dong, H.; Guillemi, S.; Montaner, J.S.G.; Milloy, M.-J.	Antivir. Ther.	Increases in CD4 cell count at antiretroviral therapy initiation among HIV-positive illicit drug users during a Treatment-as-Prevention initiative in Canada	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2016	Lazarus, L.; Patel, S.; Shaw, A.; Leblanc, S.; Lalonde, C.; Hladik, M.; Mandryk, K.; Horvath, C.; Petrich, W.; Kendall, C.; Tyndall, M.W.	PLOS One	Uptake of Community-Based Peer Administered HIV Point-of-Care Testing: Findings from the PROUD Study	Empirical	Cohort - prospective	ON - Ottawa	Community	HIV

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TasP	Increases in CD4 cell count at antiretroviral therapy initiation among HIV-positive illicit drug users during a Treatment-as-Prevention initiative in Canada	HIV positive PWUD who initiated ART between January 1, 2005 and June 1, 2013	355	All	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an ongoing prospective cohort of people living with HIV/AIDS who use illicit drugs in Vancouver, Canada. The study aims to measure and analyse the behavioural, social, structural and environmental factors that facilitate or impede access and adherence to HIV treatment and thus effect disease progression and viral transmission among people who use drugs. It has been described in detail previously. Briefly, individuals were eligible for the study if they were HIV-positive, aged ≥ 18 years and had used illicit drugs other than cannabis at least once in the 30 days prior to the baseline interview. Participants were recruited from community settings by word-of-mouth, postering and snowball sampling focused on the Downtown Eastside (DTES) area of Vancouver, Canada. The site of an explosive outbreak of HIV infection among injection drug users and their sexual partners beginning in the mid-1990s (21), the area has high levels of illicit drug use and poverty as well as an active open drug market. The ACCESS study has been reviewed and approved by the University of British Columbia/Providence Healthcare Research Ethics Board. All participants provided written informed consent and were compensated \$30 for each study visit	To characterize CD4 cell count at ART initiation over time and evaluate patterns of subsequent virologic response during a community-wide TasP-based initiative
POCT	community-based peer-administered point of care testing (POCT) program	age 16 years or older, having injected or smoked drugs other than marijuana in the past 12 months, and having lived in Ottawa for at least three months and who did not previously test positive for HIV	593 recruited	PWID not previously tested positive for HIV	Participatory Research in Ottawa: Understanding Drugs (PROUD) Study is a prospective cohort study examining HIV risk among people who use drugs in Ottawa, Ontario The Participatory Research in Ottawa: Understanding Drugs (PROUD) Study is a prospective cohort study examining HIV risk among people who use drugs in Ottawa, Ontario.	To elicit the factors associated with the uptake of community-based HIV POCT and to inform models of peer-administered testing among this population

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<p>Observed increasing CD4 cell counts at ART initiation over time. Each year later of ART initiation was associated with an increase in 30 CD4 cells/mL. Higher CD4 cell count at initiation was associated with improved virologic response to treatment.</p>	<p>Age at ART initiation, gender, Caucasian ancestry, Downtown East side of Vancouver dispensation, years since initiation of illicit drug use, and HIV MD experience.</p>	<p>Among the 355 participants, 130 (37%) were non-male and the median age at ART initiation was 41 years. Two hundred people (56%) self-reported Caucasian ancestry. Approximately one-third of the participants received their first ART dispensation at a location in the DTES (106, 30%). The median cell count at CD4 initiation for the entire study period was 220 cells/mL. Of note, between 2005 and 2013, median CD4 cell count increased from 130 (IQR: 60 – 205) to 330 (IQR: 205 – 430) cells/mL (test for trend: <math>p &lt; 0.001</math>). There was a statistically significant upward trend in CD4 cell count at ART initiation from 130 cells/mL in 2005 to 330 cells/mL in 2013, peaking in 2011 with a cell count of 380 cells/mL. increasing year of ART initiation was significantly and positively associated with higher CD4 cell count at baseline (<math>\beta = 31.2</math>, 95% CI: 23.0 – 39.3, <math>p &lt; 0.001</math>). This association was maintained in a multivariable model also adjusted for gender and HIV physician experience. In the adjusted analysis, each later year of ART initiation was associated with a baseline CD4 cell count increase of 29.5 cells/mL (95% CI: 21.0 – 37.9). Initiating ART at CD4 &gt; 350 cells/mL was associated with the swiftest time to a non-detectable VL compared to initiation at lower CD4 strata (i.e., &lt; 200 cells/mL or <math>\geq 200</math> cells/mL and <math>\leq 350</math> cells/mL). Median time to non-detectable VL among all participants was 341 days; among individuals in the highest CD4 strata, median time was 185 days vs. 265 days among individuals in the middle strata. The difference in survival times was statistically significant in a log-rank test (<math>p &lt; 0.001</math>). In the first 12 months following ART initiation, the probability of reaching a non-detectable VL was &gt; 60% in the group with the highest CD4 levels compared to a probability &lt; 30% in the CD4 &lt; 200 cells/mL group. A new multivariable model was fit adding an interaction term between time and VL at ART initiation. In this final model, increased CD4 cell count at ART initiation was associated with shorter time to VL.</p>	<p>Earlier ART uptake among PWUD can be achieved in the setting of a community-wide TasP initiative and results in improved virologic response to treatment. Results support earlier initiation of ART as a part of efforts to improve HIV/AIDS treatment and care within marginalized, drug-using communities.</p>	<p>Additional study is required to understand the possible contribution of different factors to the observed increase, such as improvements in the convenience, tolerability and potency of antiretroviral regimens over time, or the components of the local community-wide TasP campaign, such as changes to clinical HIV/AIDS treatment guidelines and addiction services.</p>
<p>HIV status and agreement to undergo HIV POCT</p>	<p>individual-level variables, including socio-demographic information and drug use patterns; interpersonal variables, including sexual history and connections to community; and structural variables, including access and use of harm reduction services, information on housing and homelessness, experiences with the law, and health status and access to health care, including hepatitis C virus (HCV) and HIV testing and treatment</p>	<p>550 (92.7%) of the 593 participants were offered a POCT, of which 458 (83.3%) consented to testing. Of those participants, 74 (16.2%) had never been tested for HIV.</p>	<p>Our findings support the expansion of novel community-based methods for providing testing, including peer-administered approaches; Low agreement for testing among female participants and those involved in sex work suggest the need for more targeted approaches to reach populations who may face multiple sources of stigma and experience increased barriers to accessing HIV testing and treatment services. More specialized approaches, including female only services, should be explored to better reach these groups; Future community and peer-based approaches should be implemented towards specific at-risk communities, including women and those involved in sex work, who may face challenges in accessing conventional clinic-based HIV-testing and treatment services.</p>	<p>There is a need to develop novel models of community-based testing that draw on the strengths of peer involvement to reach individuals who may not seek testing and treatment in conventional health care settings</p>

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<p>It is the first study to characterize trends in CD4 cell counts at ART initiation among HIV-positive PWUD during a community-wide TasP initiative. The study offers compelling evidence to suggest that earlier ART uptake among PWUD can be achieved in the setting of a community-wide TasP initiative.</p>	<p>First, as the local setting offers HIV/AIDS treatment and care free-of-charge, including all antiretroviral medications, the researchers were unable to consider the possible role played by financial ability on treatment outcomes, an important consideration in studies of HIV treatment outcomes among members of marginalized and vulnerable communities (. In addition, while efforts were made to recruit participants from community settings and include individuals at all stages of clinical care, they cannot claim that it is fully representative of HIV-positive PWUD in our setting or others.</p>	<p>Researchers were unable to include some time-updated behavioural data, such as drug-using practices, presence of psychologic co-morbidities and incarceration that have been shown to influence ART initiation and subsequent virologic response</p>	<p>35/42=83.3%</p>	<p>29/42 = 69.05%</p>	<p>33/42 = 78.57 %</p>		
<p>We successfully reached participants who had not previously been tested for HIV, thus providing new opportunities for HIV prevention education and counseling. To the best of our knowledge, and with the exception of the integration of peer educators and testers in a pilot project in Vancouver's Downtown Eastside [19], there are no other examples of engaging PWUD as testers in community-based HIV testing</p>	<p>Findings may not be applicable to all populations of PWUD due to purposive sampling; characteristics are based on self-report to highly sensitive questions, which may have contributed to social desirability bias and an underreporting of high-risk practices; those who declined testing did so not because of the absence or presence of characteristics found to be associated with uptake of testing, but because they were aware of their positive status or had very recent testing, which was not fully elicited by our study. It is also possible that characteristics of testers other than peer or student status influenced uptake. For example, peers tended to be older and male, whereas medical students were younger and female; It is possible that our recruited population was already served by other testing and care services, or that HIV rates may be higher among those who did not agree to testing</p>	<p>None stated</p>	<p>33/42 = 78.6%</p>	<p>32/42=76.19%</p>	<p>77.40%</p>		

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1 2 3 4 5 6 7 8 9 10 11 12	2016	Rozada, I.; Coombs, D.; Lima, V.D.	J Theor Biol	Conditions for eradicating hepatitis C in people who inject drugs: A fibrosis aware model of hepatitis C virus transmission	Empirical	Mathematical modelling	BC - Vancouver	Not specified	HCV
13 14 15 16 17 18 19 20 21 22 23	2016	Small, W.; Milloy, M.J.; McNeil, R.; Maher, L.; Kerr, T.	AIDS Research and Therapy	Plasma HIV-1 RNA viral load rebound among people who inject drugs receiving antiretroviral therapy (ART) in a Canadian setting: an ethno-epidemiological study	Empirical	Qualitative - ethno-epidemiological study	BC - Vancouver	Community	HIV
24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2015	Bach, P.; Wood, E.; Dong, H.; Guillemi, S.; Kerr, T.; Montaner, J.; Milloy, M.J.	BMC Infectious Diseases	Association of patterns of methadone use with antiretroviral therapy discontinuation: a prospective cohort study	Empirical	Cohort - prospective	BC - Vancouver (Downtown Eastside)	Multiple - clinic and community	HIV

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DAA	DAA	PWID in BC	N/A	All	Model was calibrated with data from PWID cohorts in British Columbia, Canada, where HCV prevalence is around 65%.	To present a mathematical model where transmission of HCV is studied in a simulated population of PWID where fibrosis progression is explicitly tracked. Analyzed the stability properties of the solutions to the model with the goal of understanding the conditions necessary to eradicate the HCV epidemic.
ART	Responses from participant questionnaires receiving ART	PWID who had recently experienced viral rebound	27 (16 male, 11 female)	PWID who had recently experienced viral rebound.	AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS). Participants identified in April 2011. Ongoing community-recruited cohort. Age 18+, history of illicit drug use (other than marijuana). Inclusion: exposed to ART since enrolling in ACCESS, at least 2 consecutive measurements indicating PVL suppression (<50) since 2007, at least 1 subsequent measurement w/ elevated PVL (>1000).	To investigate circumstances surrounding the emergence of plasma viral load (PVL) rebound among PWID in Vancouver, BC.
ART, MMT	MMT and effect on ART discontinuation	HIV-positive PWID	794 HIV-positive PWID	HIV+ PWID	ACCESS - AIDS Care cohort; 18 yrs or older, HIV seropositive, history of illicit drug use. Participants answered interview-questionnaire at baseline and 6 months and provided blood samples for virologic and serologic analyses. Data was also added from local province-wide drug treatment program (DTP) at the British Columbia Centre for Excellence in HIV/AIDS (BC-CfE), a centralized ART dispensary and HIV laboratory for the province of BC. Data include CD4 counts, plasma HIV-1 RNA viral loads and history of exposure to specific antiretroviral agents. The study period is from May 1996 to May 2013. Inclusion exposed to antiretroviral therapy (ART) during follow up with a baseline CD4 count with a viral load measured within 6 months before or after baseline data	To examine the impact of continuous MMT use, non-use and discontinuation on the time to antiretroviral therapy discontinuation (defined as 90 days of continuous non-use following previous enrolment)

<p>1 2 3 4 5 6 7 8 9 10 11 12</p> <p>1) The stability thresholds that determine whether HCV will remain endemic or become eradicated; 2) Conditions on testing and treatment rates for eradication to occur within the context of the new high efficacy therapies.</p>	<p>None</p>	<p>In this paper we presented a deterministic mathematical model of HCV transmission, with fibrosis progression taken into consideration. The model simulates realistic features of the HCV epidemic among PWID, including reinfection, time to diagnosis, and risk reduction after successfully clearing the disease. We described the existence of both disease-free solution and endemic solutions, independent of initial conditions.</p> <p>The results show that HCV eradication in the PWID population of the Vancouver, BC test scenario is achievable, but testing and especially treatment rates will need to increase significantly from current rates.</p>	<p>From a policy perspective, this shows that efforts to reduce the contact rate, e.g. via harm reduction efforts, will have a big effect in pushing the disease into the eradication window. We assumed that infected individuals are most infective during the acute phase, therefore detecting and treating individuals in the acute phase will have a large effect on the epidemic.</p>	<p>None stated</p>
<p>13 14 15 16 17 18 19 20 21 22 23</p> <p>PVL rebound</p>	<p>None</p>	<p>Rebound episodes were shaped by interplay of several factors (individual, social, structural, environmental) within the HIV treatment risk environment. Associated w/ disruption of stable living arrangements and routines (ex. housing transition, managing comorbid conditions (inadequate care and support for mental health and physical conditions), changes in drug use (binge drug use following monthly distribution of social assistance benefits) and drug scene involvement). Intentional treatment discontinuation related to poor relationships with HCPs and misunderstandings about ART.</p>	<p>Interventions to increase housing stability and quality may reduce potential for non-adherence. Efforts to improve continuity of HIV care should focus on ensuring specialist care and appropriate dispensing arrangements after housing transitions. Supportive housing models and housing use harm reduction supports help facilitate adherence. Improving economic opportunities may help reduce drug scene involvement. Need for integrated health services to help manage comorbid conditions and maintain adherence. Potential benefit for peer counselling/support programs. Education about addiction medicine and training to improve patient-provider interactions.</p>	<p>Further research is needed regarding circumstances surrounding rebound</p>
<p>24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>discontinuation of ART, defined as 90 days of continuous ART non-use following previous enrolment in ART</p>	<p>primary explanatory variable was methadone status, and participants at each study visit were categorized either MMT non-users, continuous MMT users taking methadone for at least 6 months or as prior MMT users who had discontinued therapy over the past 6 months. Potential confounders considered were gender, age, ethnicity, homelessness within past 6 months, sex work involvement, at least daily heroin injection, at least daily cocaine injection, at least daily crack cocaine smoking, at least daily alcohol use, a protease inhibitor in initial ART regimen, baseline CD4 count, baseline viral load (VL), and the number of individuals the participant's ART-prescribing physician had experience treating at the time the participant initiated ART</p>	<p>Multivariate analysis showed that both being continuously off MMT (adjusted hazard ratio (AHR) = 1.44, 95% CI: 1.19-1.73) and discontinuing MMT (adjusted hazard ratio (AHR) = 1.82, 95% CI: 1.27-2.60) were each independently associated with an increased risk of discontinuing ART.</p>	<p>Policy not supporting MMT could have significant negative impacts on HIV/AIDS treatment programs</p>	<p>Future qualitative study needed to explore the reasons for discontinuation of ART</p>

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None stated	Continuous deterministic models such as this one present a number of caveats: homogeneous mixing across compartments does not account for high and low risk behavior among PWID; residence times across compartments are distributed exponentially, and the continuous nature of the model makes it unsuitable for modeling small populations; added heterogeneity to model by separating major compartments according to fibrosis level; does not account for patients developing resistance to treatments/becoming immune after spontaneously clearing disease/developing super-infections; does not account for other known vectors of HCV transmission such as unsafe therapeutic injections and contaminated blood transfusions.	None stated	36/42 = 85.7%	34/42 = 81 %	35/42 = 83.3%		
Allowed for direct examination of experiences of PWID who recently experienced rebound. first study to use qualitative and ethno-epidemiological methods to examine VLR among PWID. Looked at individual, environmental and societal factors that play a role.	Findings are specific to the experience of the participants, not necessarily other PWID with rebound. Some participants were unable to describe circumstances surrounding rebound; this analysis focused on cases where complete account was available.	None stated	25/42 = 59.52%	26/42=61.9%	60%		
our data provide support to the positive effects of MMT on optimizing HIV/AIDS treatment outcomes, and provide evidence suggesting that MMT discontinuation is independently associated with ART discontinuation	generalizability to other studies not certain; self-reporting and possibility of response bias; reasons for ART discontinuation not available; exclusion of diagnostic screening for opioid dependence may lead to misclassification bias; observational cohort study; representative to local population; data on reasons for discontinuation not available; does not include diagnostic screening for opioid dependence; relationship between MMT and ART discontinuation is not a causal one	None stated	26/42=61.9%	27/42=64.2%	61.9+64.2/2=63%		



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2015	Joseph, B.; Kerr, T.; Puskas, C.M.; Montaner, J.; Wood, E.; Milloy, M.-J.	HHS Public Access	Factors linked to transitions in adherence to antiretroviral therapy among HIV-infected illicit drug users in a Canadian setting	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2015	Lima, V.D.; Rozada, I.; Grebely, J.; Louranco, L.; Nosyk, B.; Kraiden, M.; Yoshida, E.; Wood, E.; Montaner, J.S.G.	PLOS One	Are Interferon-Free Direct-Acting Antivirals for the Treatment of HCV Enough to Control the Epidemic among People Who Inject Drugs?	Empirical	Mathematical modelling	BC - Vancouver	None stated	HCV

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ART	Adherence to prescribed ART among PWUD	HIV infected PWUD	703	HIV+	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), an ongoing prospective observational cohort of illicit drug users living with HIV/AIDS in Vancouver, British Columbia (BC), Canada. Described in detail elsewhere (Milloy et al., 2011; Strathdee et al., 1998), recruitment for the cohort began in May, 1996, and focused on the city's Downtown Eastside neighbourhood, a post-industrial area with an open drug market and high levels of illicit drug use, poverty, and HIV infection (Strathdee et al., 1997; Tyndall et al., 2003). Eligibility criteria for participation in ACCESS are HIV-serostatus, aged ≥ 18 years, use of illicit drugs other than cannabis in the previous month, and written informed consent. At the baseline interview, and each biannual interview thereafter, participants respond to an interviewer-administered questionnaire, are examined by a study nurse, and provide blood for serologic analyses. At recruitment, participants provide their personal health number (PHN), a unique and persistent identifier issued for billing and tracking purposes to all residents of BC by the government-run universal and no-cost medical system.	To identify the behavioural, social, and structural factors associated with losing or attaining ≥95% adherence to prescribed ART among PWUD
DAA	IFN free DAA, HCV testing, engagement in harm reduction	N/A	N/A	All	N/A	To evaluate the impact of increasing HCV testing, treatment and engagement in harm reduction activities for PWID on the HCV epidemic in BC, to provide theoretical support for the implementation of these strategies

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<p>Transitions in adherence to ART. Transitions were dichotomized as either out of optimal adherence or into optimal adherence.</p>	<p>age (per year older), gender (female vs. male), self-reported Caucasian ethnicity (yes vs. no), level of education attained (<math>\geq</math> high school diploma vs. &lt; high school diploma), homelessness (yes vs. no), employment (formal employment including regular, temporary, or self-employment vs. none or non-formal employment), injection drug use (yes vs. no), non-injection drug use (yes vs. no), self-reported binge drug use (runs or binges in which participant reported using more drugs than usual; yes vs. no), involvement in sex work (yes vs. no), incarceration (yes vs. no), and engagement in methadone maintenance therapy (MMT; yes vs. no). Clinical variables considered were CD4+ cell count (per 100 cells/mL) and physician HIV-related experience (&lt; 6 vs. <math>\geq</math> 6 patients previously enrolled in the province-wide HIV registry).</p>	<p>In this longitudinal study of factors associated with transitioning into or out of optimal adherence to ART among PLWH who use illicit drugs, we observed a high level of non-adherence, with over 70% of individuals exhibiting non-adherence at baseline. sex work was a barrier to becoming optimally adherent while homelessness and incarceration were both risk factors for becoming non-adherent. Engagement in MMT was predictive of optimal adherence at baseline and was the sole protective factor against becoming non-adherent as well as the sole facilitating factor for becoming optimally adherent in multivariate models. [becoming non-adherent was associated with periods of homelessness (Adjusted Odds Ratio [AOR] = 2.52, 95% Confidence Interval [95% CI]: 1.56 - 4.07), active injection drug use (AOR = 1.25, 95% CI: 1.01 - 1.56) and incarceration (AOR = 1.54, 95% CI: 1.10 - 2.17). Periods of sex work (AOR = 0.51, 95% CI: 0.34 - 0.75) and injection drug use (AOR = 0.62, 95% CI: 0.50 - 0.77) were barriers to becoming optimally adherent. Methadone maintenance therapy (MMT) was associated with becoming optimally adherent (AOR = 1.87, 95% CI: 1.50 - 2.33) and was protective against becoming non-adherent (AOR = 0.52, 95% CI: 0.41 - 0.65)]</p>	<p>Our findings emphasize the importance of considering social and structural determinants of ART adherence dynamics and highlight the role of MMT in the protection and maintenance of optimal adherence to ART among opioid-dependent PWUD. Our analyses show that homeless individuals are at risk of becoming non-adherent, emphasizing an already established need for housing interventions.</p>	<p>Given the high levels of non-adherence among PWUD, more research is urgently needed to better understand ART adherence dynamics, to investigate possible protective factors among non-opiate using PWUD, and to develop effective strategies against threats to optimal ART adherence.</p>
<p>(1) HCV incidence rates—obtained by dividing the estimated number of new HCV cases by the estimated size of the susceptible PWID population in a given calendar year; (2) all-cause mortality rates—obtained by dividing the estimated number of deaths by estimates of the size of the infected PWID population in a given calendar year; and (3) HCV prevalence—obtained by dividing the estimated number of individuals living with HCV by the estimated size of the PWID population in a given calendar year. Control Reproduction Number (Rc)</p>	<p>Calculated the effect of the four HCV antiviral regimen scenarios on the Control Reproduction Number for a wide range of treatment and testing rates</p>	<p>Of all HCV antiviral regimens, only IFN-free DAAs offered a high chance of disease elimination (i.e. <math>R_c &lt; 1</math>), but it would be necessary to substantially increase the current low testing and treatment rates. Assuming a treatment rate of 80 per 1000 infected PWID per year, coupled with a high testing rate, the incidence rate, at the end of 2030, could decrease from 92.9 per 1000 susceptible PWID per year (Status Quo) to 65.5 (by treating any fibrosis level, If PWID also had access to increased harm-reduction activities, the incidence rate further decreased to 53.1 per 1000 susceptible PWID per year.</p>	<p>Should increase access to HCV treatment (IFN free DAAs) and harm reduction; need an optimized implementation strategy, which particularly emphasizes the need to reach, support, treat and protect these individuals; identify and test individuals unaware that they are HCV-positive using aggressive "seek" campaigns; testing should use HCV RNA rather than HCV antibody; should use cheaper, safer, less-invasive tech for determination of liver fibrosis; should implement directly observed HCV therapy (consistent with approach to treat opioid dependence)</p>	<p>Extend the present model to specifically investigate the impact of the proposed interventions on the HIV/HCV co-infected PWID population; assess feasibility of interventions using cohort studies on PWID in Vancouver; plan to fine-tune this model, specifically focusing on the effect of treatment on the distribution of fibrosis states in a population</p>

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<p>Within the context of BC's free healthcare and universal access to ART, confounding due to financial barriers to healthcare access has been reduced. The use of repeated measures every six months has allowed them to isolate periods characterized by loss or gain of <math>\geq 95\%</math> adherence.</p>	<p>First, their analytic sample cannot be seen as representative of all PLWH who use illicit drugs due to non-random participant recruitment and the free availability of ART in their setting. Secondly, the possibility of confounding variable influence cannot be excluded. Third, several explanatory variables such as injection drug use, sex work involvement, and incarceration were derived from participant self-report, which might be susceptible to bias. Lastly, the MMT explanatory variable refers to a maintenance therapy undertaken to treat opioid dependence specifically, and may therefore be biased towards opioid users within the study group. Participants were not screened for opioid or stimulant dependence.</p>	<p>None stated</p>	<p>35/42=83.33%</p>	<p>30/42 =73.8%</p>	<p>35+30/2=77.4%</p>		
<p>included movement across different fibrosis states in this population to inform treatment eligibility and success;this model provides an independent validation of the results in Martin et al. supporting the notion that HCV treatment can be used to reduce the HCV incidence, prevalence and mortality among PWID</p>	<p>assumed a homogenous mixing in the PWID population, thus simplifying the complexities that exist in the sharing networks of these individuals; no definite evidence on what the associated transmission probabilities for HCV infections phases are; did not model the impact of the proposed interventions comparing the HCV mono-infected population and the individuals co-infected with HCV and HIV; the mortality rates associated with liver disease, among PWID infected with HCV in BC, were high</p>	<p>None stated</p>	<p>28/42 = 66.7%</p>	<p>31/42 = 73.8%</p>	<p>29/42 = 69.0%</p>		

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2015	Nosyk, B.; Min, J.E.; Evans, E.; Li, L.; Liu, L.; Lima, V.D.; Wood, E.; Montaner, J.S.G.	HIV/AIDS	The effects of opioid substitution treatment and highly active antiretroviral therapy on the cause-specific risk of mortality among HIV-positive people who inject drugs	Empirical	Cohort - retrospective (linked population-level database)	BC - Vancouver	Not specified	HIV
2014	Reddon, H.; Milloy, M.J.; Simo, A.; Montaner, J.; Wood, E.; Kerr, T.	AIDS Behav	Methadone Maintenance Therapy Decreases the Rate of Antiretroviral Therapy Discontinuation Among HIV-Positive Illicit Drug Users	Empirical	Cohort - prospective	BC - Vancouver	Community - Participants can fill their prescription at any pharmacy in the province	HIV

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HAART, OST	Opioid substitution treatment (OST) and highly active antiretroviral therapy (HAART)	HIV+ individuals with history of either OST at initial HAART receipt (indicated by methadone or buprenorphine dispensation records) or having indication of IVDU before HIV infection (indicated by HIV testing database)	1727	HIV+ PWID	7 health administrative databases and disease registries in BC linkage; data included ART dispensation, virology and HIV testing registries, physician billing records, hospitalizations, and non-ART drug dispensations in BC PharmaNet database and BC Vital statistics database; BC PharmaNet database from Jan 1 1996 to March 31 2010; 1727 HIV-positive PWID identified; Excludes HIV-positive PWID who accessed OST but did not access HAART throughout follow-up, as well as excludes pre-HAART periods when individuals may have accessed OST	To determine the independent and joint effects of OST and HAART on mortality, by cause, within a population of HIV-positive PWID following HAART initiation.
ART, MMT	Antiretroviral therapy, Methadone maintenance therapy	ACCESS Cohort; aged >= 18 years, are HIV seropositive, have a history of illicit drug use and provide written consent	408	PWID who are HIV+ and ART-exposed at baseline or initiated treatment during follow-up, also had to be on MMT at baseline or opioid-using at baseline or during follow-up	ACCESS cohort; open-prospective cohort of HIV-seropositive illicit drug users in Vancouver, Canada; populated through snowball sampling and extensive street outreach methods in city's Downtown Eastside; eligibility criteria: aged >= 18 years, are HIV seropositive, have a history of illicit drug use and provide written consent; between May 1996 and April 2008	To evaluate the impact of MMT use on ART discontinuation among a cohort of HIV-positive drug users in a setting of universal access to HIV care and treatment

<p>Dependent variable was mortality, stratified by cause as follows: drug-related, HIV-related, and other cause of death; key-time variable exposures included OST receipt and HAART receipt</p>	<p>Other baseline covariates: age, gender, aboriginal ethnicity, health authority of residence, CD4+ cell count, calendar year of HAART initiation, time from HIV diagnosis and AIDS status; other considerations: Charlson comorbidity index score and OST history at time of HAART initiation, time-varying measures of CD4+ cell count, HA, AIDS status and CCI score</p>	<p>Both forms of treatment were strongly negatively associated with all-cause mortality and HIV-related mortality. However, HART had a stronger independent association with drug-related death, while OST better protected against causes of death other than HIV and drugs. An alternate set of analyses found that the risk of death was lowest when individuals were engaged in both forms of treatment, but had slightly lower hazard of death when only receiving OST compared with only HAART. A novel finding to emerge from our analyses is the relatively stronger association of OST on HIV-related death compared with drug-related death and the generally stronger independent effect compared with HAART. There are both biological and methodological factors that require careful consideration in interpreting these findings.</p>	<p>These findings call for renewed efforts to engage HIV-positive PWID into life-saving OST. Health systems should strive toward integrating the delivery of these medications where possible in order to optimize the individual and public health benefits of these treatments.</p>	<p>OST dosing dynamics may have influenced findings. While dosing information was available, it could not be adequately incorporated into the episode or monthly counting processes within the PH and marginal structural modeling frameworks the study implemented to clearly define its effect; this remains a topic for future study.</p>
<p>Discontinuation of ART defined as a &gt;=90 day period without receiving any antiretrovirals, primary independent variable of interest was MMT in the past 6 months (based on self-reporting)</p>	<p>Secondary explanatory variables that may be related to methadone engagement or antiretroviral treatment patterns: age (per year older); gender (female vs. male); Aboriginal ancestry (yes vs. no); engagement in MMT (yes vs. no); homelessness (yes vs. no); binge drug use (yes vs. no); sex work involvement (yes vs. no); at least daily heroin injection (yes vs. less) and at least daily cocaine injection (yes vs. less)</p> <p>We also considered the following clinical variables: baseline CD4 cell count (cells/<math>\mu</math>L, per 100-cell increase), baseline plasma HIV-1 RNA (log<sub>10</sub>/<math>\mu</math>L, per log<sub>10</sub> increase), date of initiating MMT (per years later) and physician experience</p>	<p>1. By 24 months after ART initiation, the cumulative incidence rate of ART discontinuation was 42.62 per 100 person-years (95 % CI 33.10–52.14) among those engaged in MMT and 71.42 per 100 person-years (95 % CI 59.42–83.43) for those not engaged in MMT</p> <p>2. Additionally, the proportion of participants on MMT to never discontinue their ART was 53 % compared to 67 % among those not on MMT</p> <p>3. Homelessness, sex work involvement, daily cocaine injection, and a higher viral load were associated with shorter time to ART discontinuation</p> <p>4. Participation in MMT, date of therapy initiation, and age were negatively associated with ART discontinuation</p> <p>We observed a high rate of ART discontinuation among HIV-positive drug users. However, participants engaged in MMT had significantly lower rates of ART discontinuation compared to those not engaged in MMT. MMT enrollment remained independently and negatively associated with treatment discontinuation in multivariate analyses that adjusted for a range of potential confounders. These findings translated into higher rates of plasma HIV RNA undetectability among those patients prescribed MMT</p> <p>First, being enrolled in MMT allows more regular contact with the health care system and related programs including the co-administration of ARVs with daily dispensed MMT [33]. Second, the stabilizing effect of MMT may facilitate supportive counseling and other interventions to address barriers to adherence, such as co-occurring mental illness and other psychosocial concerns [34]. Third, enrollment in MMT may provide opportunities for</p>	<p>Given that MMT may provide a means of enhancing uptake and adherence to ART while reducing rates of discontinuation, concurrent delivery of MMT and antiretrovirals should be an essential component of prospective treatment interventions to optimize health outcomes among drug users who are eligible for this therapy. Given the relationship between MMT and higher rates of plasma HIV RNA undetectability, these findings have implications for the recently identified role of ART as a HIV prevention strategy</p> <p>Given the success of MMT as a treatment for opioid dependence, and its role in improving adherence to ART, the search for effective addiction treatments for stimulant users is an urgent priority, as is removing other barriers to optimal HIV treatment outcomes</p>	<p>None stated</p>

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<p>Results were robust to multiple modeling techniques and model formulations, thus providing strong evidence supporting the key findings.</p>	<p>Selectivity of study population and time frame should be taken into account when interpreting results and determining to what extent they apply to other settings; potential for unmeasured confoundings factors, as in any study; some individuals included in study on basis of injection drug use history may have been exclusive non-opioid injectors, though unlikely based on epidemiological studies on PWID in BC; analyses on cause-specific mortality may have been subject to degree of outcome misclassification. While dosing information was available, it could not be adequately incorporated into the episode or monthly counting processes within the PH and marginal structural modeling frameworks the study implemented to clearly define its effect.</p>	<p>This setting has universally covered HIV-related medical care and widely available office-based OST. Must consider applicability to other settings based on cohort included in this study and availabilities of this setting.</p>	<p>31/42 = 73.8%</p>	<p>26/42 = 61.9%</p>	<p>29/42 = 69.0%</p>		
<p>Prior investigations have indicated the relationship to be causal as well. Although MMT has previously been shown to enhance access and adherence to ART, to our knowledge this is the first study to report a positive effect of MMT in preventing ART discontinuation and subsequent plasma HIV RNA responses.</p>	<ol style="list-style-type: none"> <li>1. ACCESS is not a random sample - may not generalize well to larger population of HIV-positive drug users in Vancouver</li> <li>2. Relied on self-reported measures - response biases (e.g. socially desirable reporting)</li> <li>3. ART was co-administered with MMT in some cases while other patients received each medication from separate facilities; it is possible that the co-administration of these treatments could impact ART discontinuation and confound the results</li> <li>4. Data regarding length of enrolment in MMT was not available but this did not prevent us from assessing the impact of current MMT enrolment on ART discontinuation, which was the primary objective of the analysis</li> <li>5. Observational study - results must be interpreted with caution; e.g. negative association between MMT and ART discontinuation may have resulted from unmeasured differences between those who used MMT and those who did not</li> </ol>	<p>None stated</p>	<p>30/42 = 71.4%</p>	<p>30/42 = 71.4 %</p>	<p>30/42 = 71.4%</p>		



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2013	Webb, D.; Milloy, M.-J.; Kerr, T.; Zhang, R.; Montaner, J.; Wood, E.	AIDS Behav.	Injection Drug Use and HIV Antiretroviral Therapy Discontinuation in a Canadian Setting	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2011	Cox, J.; Graves, L.; Marks, E.; Tremblay, C.; Stephenson, R.; Lambert-Lanning, A.; Steben, M.	Journal of Viral Hepatitis	Knowledge, attitudes and behaviours associated with the provision of hepatitis C care by Canadian family physicians	Empirical	Survey	QC - Montreal	Not specified	HCV
2011	Kuyper, L.; Milloy, M.-J.; Marshall, B.D.L.; Zhang, R.; Kerr, T.; Montaner, J.S.G.; Wood, E.	Addict Behav.	Does Initiation of HIV Antiretroviral Therapy Influence Patterns of Syringe Lending Among Injection Drug Users?	Empirical	Cohort - retrospective	BC - Vancouver	Community- ART dispensation program; BC has a province-wide centralized ART dispensation program and laboratory for HIV/AIDS clinical monitoring	HIV
2011	Myles, A.; Mugford, G.J.; Zhao, J.; Krahn, M.; Wang, P.P.	Can. J. Gastroenterol.	Physicians' attitudes and practice toward treating injection drug users infected with hepatitis C virus: Results from a national specialist survey in Canada	Empirical	Survey	Canada	Not specified- Survey sent to ID specialists, gastroenterologists, and hepatologists,	HCV

ART	Antiretroviral therapy (ART) discontinuation among a cohort of injection drug users (IDU) in a Canadian setting.	HIV positive PWID who reported being on ART at the time of recruitment or if they subsequently enrolled and used ART during the study period.	408	All	The AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS) is an ongoing prospective cohort of HIV-positive drug users based in Vancouver, Canada, which has been described in detail previously [16]. Beginning in May 1996, the study began enrolling drug users who resided in the Greater Vancouver region in order to investigate drug-related health outcomes including HIV disease progression as well as barriers to health care access among this population, which resides in a Canadian province that provides ART free of charge to all clinically eligible individuals [17, 18]. ACCESS participants were recruited through street outreach and self-referral, and all participants provided written informed consent. At baseline and at scheduled semi-annual follow-up visits (i.e., every 6 months), study participants completed an interviewer-administered questionnaire and provided blood samples for disease monitoring.	To investigate the impact of ongoing injection drug use on rates of ART discontinuation among a cohort of HIV-positive IDU in Vancouver, Canada.
HCV treatment	Sept 2004 and Jan 2005 Self administered survey to Canadian Family Physicians (with a bias to french speaking physicians) on behaviour change related to practice guideline adoption to systematically examine the HCV-related care behaviours	Canadian Family physicians	n=2366 with 786 completed questionnaires and 749 indicating the types of HCV care they provide	All	N/A	Sept 2004 and Jan 2005 Self administered survey to Canadian Family Physicians (with a bias to french speaking physicians) on behaviour change related to practice guideline adoption to systematically examine the HCV-related care behaviours
ART	ART	ART-naïve at baseline and had measurements of HIV-1 RNA levels and CD4+ cell counts within 12 months of the baseline interview.	380 participants included in analysis	HIV+; ART-naïve	AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS)-18 years of age or older, HIV-positive, had injected drugs during the previous month, and provided written informed consent	Identify whether ART initiation was associated with increased syringe lending among HIV-positive IDU
HCV treatment	HCV treatment	Medical specialists who were most likely to provide care to patients with HCV infection (specialists of ID, gastroenterology and hepatology)	222 completed the survey, of the 528 eligible physicians	HCV+	N/A	To examine the characteristics of Canadian specialist physicians and their likelihood to provide treatment to HCV patients who are IDUs. To describe the clinical practice patterns in treating HCV-infected IDUs and to examine the factors that influence a specialist's likelihood to provide treatment to HCV-infected IDUs

<p>Outcome of interest was ART discontinuation. Defined based on pharmacy dispensation records indicating that a participant did not pick up any ART for 90 days or longer after the end of the prescription refill date.</p>	<p>Potential sociodemographic and drug-related predictors of ART discontinuation that we included in this model were: age, gender, Aboriginal ancestry (yes vs. other), area of residence (defined as residing in Vancouver's downtown eastside, the local epicenter of the drug-related HIV outbreak vs. other areas), enrolment in addiction treatment, public drug use, and binge drug use.</p>	<p>Pharmacy records indicate that almost 2/3 of a cohort of HIV-positive illicit drug users had at least 1 ART discontinuation episode. Rates of ART discontinuation were not significantly elevated among those who reported ongoing injection of heroin, cocaine or other illicit drugs in comparison to those who reported not injecting drugs. However, public drug use was significantly predictive of ART discontinuation. Observed an independent association between public drug use and ART discontinuation.</p>	<p>Clinicians should not make decisions on whether to initiate eligible HIV-positive individuals in ART based solely on abstinence from drug injecting. Decisions to enroll eligible individuals on ART should be done on a case by case basis. In all cases, however, care should be taken to ensure high levels of ART regimen adherence among individuals that may be at particularly high risk of non-compliance. Injecting in public was the only significant drug-related predictor of ART discontinuation in this multivariate analysis. Likely reflects risky nature of public drug use and reaffirms need for structural interventions to address the health needs of this vulnerable population. Findings from this study may contribute to a reconsideration of the role of active drug use in clinical decision-making surrounding ART initiation.</p>	<p>Their results need to be confirmed through further research</p>
<p>The provision of HCV care by family physicians</p>	<p>Sociodemographic and descriptive variables (physician training and practice settings); Outcome and explanatory variables (provision of HCV care, barriers and facilitators); Physician Knowledge related to HCV care; Physician attitude related to HCV care</p>	<p>Only 44% family physicians provided basic/advance HCV care with 63% felt HCV care was not part of family practice; majority of physicians providing care were in rural areas that provided follow-up care; felt limited access to HCV evaluation and treatment supports; women physicians are less likely to provide care; one or more IDU in their practice more likely to provide HCV care and was not associated with attitudes regarding IDUs.</p>	<p>Various care related knowledge attitudes and barriers can serve as strategic opportunities for increasing provision of HCV care by family physicians</p>	<p>Training and CME directed on promoting primary care role in HCV can increase management and access to treatments</p>
<p>lending a used syringe to someone else during the previous six months (i.e. association between ART initiation and syringe lending)</p>	<p>Explanatory variables included: age; gender; ethnicity (Aboriginal vs. non-Aboriginal); homelessness (yes vs. no); frequent heroin injection (≥ daily vs. &lt; daily); frequent cocaine injection (≥ daily vs. &lt; daily); methadone maintenance therapy (yes vs. no); CD4+ count (per 100 cells/mL increase); and HIV-1 RNA plasma viral load (per log<sub>10</sub> increase)</p>	<p>No evidence of increased syringe lending behavior following ART initiation among HIV-positive IDU. In comparison to those who did not initiate ART, those who initiated treatment were more likely to have lower baseline CD4+ cell counts and higher baseline HIV-1 RNA viral loads.</p>	<p>Scale up of ART delivery to IDU to meet the needs of this marginalized and underserved population</p>	<p>None stated</p>
<p>Attitudes towards HCV treatment of IDUs</p>	<p>Physicians' practice region (Atlantic, central, prairies or western Canada), physician type (hepatologist, GI or ID), age, sex, years in practice, size of community where they practice and practice type (eg, solo practice, multiple specialty group, academic and other)</p>	<p>Only 19 (19.79%) comprehensive service providers were likely to provide treatment to a current IDU who uses a needle exchange on a regular basis. The majority of comprehensive service providers (n=86 [89.58%]) were likely to provide treatment to a former IDU who was stable on substitution therapy. On bivariate analysis, factors associated with the likelihood to provide treatment to current IDUs included physicians' type, ie, infectious disease specialists compared with noninfectious specialists and the size of the community where they practice. However, specialists preferred that patients were stable on substitution therapy for at least 6 months prior to provided treatment. IDs reported greater likelihood to provide treatment to current IDUs.</p>	<p>Need to focus on complicated environment-, patient-, disease- and physician-related factors if we intend to improve access of health care to IDUs infected with HCV; Assess each HCV-infected substance abuser individually because they differ considerably from one another; necessary to track change of physicians' attitudes and practice over time; adjust provision of care to take into account the sub-culture of IDUs to more effectively deliver treatment to HCV-infected IDUs</p>	<p>Need for future research and delivery of services that address the complexity of care and treatment for people in marginalized social circumstances.; future studies need to evaluate the entire comprehensive care system that provides treatment to people living with HCV; examine the effectiveness of an integrated multidisciplinary HCV clinic and how it affects treatment uptake in the HCV-infected IDU population.</p>

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Findings are consistent with a previous meta-analysis that found no significant differences in the development of ART-resistant HIV among individuals with and without a history of injection drug use	First, cohort participants were not randomly recruited and therefore the results presented may not be representative of the broader population of HIV-positive IDU in Vancouver. Second, while participant reports of discontinuation of ART and clinical status were confirmed through a data linkage with a local HIV treatment registry, researchers relied on self-report for the behavioral and drug-related variables included in their analyses. Given that drug use and related behaviors are highly stigmatized, these activities may have been underreported by participants. Despite this potential for bias, they know of no reason why cohort participants who did and did not discontinue ART would differentially report on their drug use. Finally, there may be unmeasured variables that are important for determining ART discontinuation, including measures of mental illness, which were not routinely evaluated as part of this study.	None stated	20/42=47.6%	23/42 = 54.76%	22/42=52.4%		
16 17 18 19 20 21	None stated	Cross-sectional nature prevents the ability to ascribe directionality to identify associations; no significant difference from nonrespondents except for language, likely due to intentional french oversampling, cannot rule out selection bias; missing data was substituted with low/minimal level responses decreasing estimates of physician knowledge. Bias towards french speaking physicians potentially skewed results.	None stated	29/42=69%	33/42=78.5%	69.0+71.4/2=70.2%		
22 23 24 25 26 27 28 29 30	evaluated ART receipt in multivariate analyses; examined behaviors related specifically to the period following ART initiation using prospective analyses; used a centralized database to confirm the exact date of ART initiation, a relatively long follow-up duration, and an analytic technique allowing for within-individual changes in behavior prior to and following ART initiation	Syringe lending was self-reported, possibility of under reporting (social desirability); cannot be certain that the cohort represents IDU in the community in general; did not account for the possibility of cessation of injection drug use as a potential contributor to decreased syringe lending; findings may have been confounded by the possibility that IDU initiating ART are less likely to engage in risk behavior because of sterile syringes provided by primary care physicians	Few studies have reported on HIV-related risk behaviors among IDU receiving ART	26/42 = 61.9%	26/42 = 61.9%	26/42 = 61.9%		
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	None stated	Participation was voluntary and there may be bias associated with this approach; lower response rate than desired (difficulties with recruitment); there was no reason to suspect that physicians treating HCV patients were less likely than those who were not to respond to this survey, not sufficient info to estimate biases assoc with nonparticipation; only selected practitioners who were representative of the English-speaking specialists rather than all HCV-related health care providers; only 96 specialists stated that they had a role in providing treatment; therefore, the sample size was relatively small; the data obtained from the surveys were self-reported and comprises the respondents' estimates of the HCV-management conditions in their practice and their own behaviours, which were possibly inaccurate; study results cannot be interpreted as a measure of physicians' adherence to the current guideline.	Lack of comprehensive strategies to treat HCV in IDUs	27/42 = 64.3%	27/42 = 64.3%	27/42 = 64.3%		

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2011	Palepu, A.; Milloy, M.-J.; Kerr, T.; Zhang, R.; Wood, E.	Journal of Urban Health	Homelessness and adherence to antiretroviral therapy among a cohort of HIV-infected injection drug users	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2010	Kazatchkine, C.	HIV/AIDS Policy and Law Review	British Columbia project seeks to improve access to HIV treatment and care among hard-to-reach populations	Non-empirical	Report	BC - Prince George and Vancouver (Downtown Eastside)	Community	HIV

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	ART	ART	Aged 18 years or older, HIV-infected, having used illicit drugs other than cannabinoids in the previous month. HIV-infected injection drug users in Vancouver	545 HIV-infected illicit drug users	HIV+ IDUs	AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS), an ongoing prospective observational cohort of HIV-infected illicit drug users in Vancouver, Canada. In brief, beginning in May 1996, participants were recruited through snowball sampling and extensive street outreach in the city's Downtown Eastside neighborhood, the local epicenter of drug-related HIV transmission. ACCESS eligibility criteria include: aged 18 years or older, HIV-infected, having used illicit drugs other than cannabinoids in the previous month, and having provided written informed consent. At baseline and every 6-month follow-up interview, participants answer a standardized interviewer-administered questionnaire, are examined by a study nurse and provide blood samples for serologic analysis. The information on sociodemographic, drug uses and other behavioral characteristics gathered at each interview is augmented with data on HIV care and treatment outcomes from the British Columbia Centre for Excellence in HIV/AIDS Drug Treatment Programme. This province-wide, centralized antiretroviral therapy dispensary and HIV/AIDS monitoring lab provides a complete prospective profile of CD4 cell counts, plasma HIV-1 RNA viral load, and dispensation of specific antiretroviral agents for each	to determine the longitudinal impact of homelessness on adherence to ART using data derived from longstanding community-based cohort of HIV-infected IDU with detailed data on housing status and drug use behaviours
22 23 24 25 26 27 28	Seek and Treat	"Seek and Treat," the first program of its kind in Canada and thought to be the first internationally, will provide Highly Active Antiretroviral Therapy (HAART). Under the pilot program, health workers will be deployed on the streets of marginalized communities in order to diagnose, support and provide treatment to those who are medically eligible.	HIV-positive residents, especially those who are hard to reach, including PWID	N/A	HIV+	N/A	To provide update on recent legislation and policy

<p>adherence to antiretroviral therapy (defined as adherence &gt;= 95% adherence to ART during 6-month period)</p>	<p>variables measured: age, gender, Aboriginal ancestry, education, employment, injection use of cocaine, heroin, methamphetamine, use of methadone maintenance therapy, CD4+ cell count, HIV-1 RNA plasma viral load</p> <p>Legal employment referred to having salaried or temporary work at any time in the previous 6 months.</p>	<p>The multivariate model showed that homelessness (adjusted odds ratio [AOR] 0.66; 95% CI: 0.53–0.84) and frequent heroin use (AOR 0.40; 95% CI: 0.30–0.53) were significantly and negatively associated with ART adherence adjusting for baseline CD4 count and baseline plasma viral load. Methadone maintenance therapy was positively associated with ART adherence (AOR 2.33; 95% CI: 1.86–2.92). There were no significant interactions.</p> <p>The multivariate model revealed that homelessness (adjusted odds ratio [AOR] 0.66; 95% CI: 0.53–0.84) and frequent heroin use (AOR 0.40; 95% CI: 0.30–0.53) were significantly and negatively associated with ART adherence, whereas methadone maintenance was positively associated (AOR 2.33; 95% CI: 1.86–2.92). Sub-optimal ART adherence was associated with homelessness and daily injection heroin use among HIV-infected IDU.</p>	<p>Given the survival benefit of ART, it is critical to develop and evaluate innovative strategies such as supportive housing and methadone maintenance to address these risk factors to improve adherence. A focus on individual-level behaviors alone may not be effective in improving ART adherence, especially in the context of homelessness or unstable housing. Strategies that address broader determinants of health, such as housing, for this vulnerable group are more likely to be effective in creating the social and physical environments that reduce the ongoing risks for non-adherence and other HIV-risk behavior.</p>	<p>Future studies should evaluate innovative interventions that strengthen the links between supportive housing and addiction treatment for HIV-infected IDU</p>
<p>N/A</p>	<p>N/A</p>	<p>The Seek and Treat program will provide Highly Active Antiretroviral Therapy (HAART) to HIV-positive people in Vancouver and Prince George, BC</p>	<p>The pilot program was launched after a recently published study found evidence suggesting that HAART is becoming increasingly effective at the population level in British Columbia.</p>	<p>None stated</p>

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None stated	<p>1. The cohort was not a random sample of HIV-infected participants and this is not feasible as no registry of all HIV-infected individuals, particularly illicit drug users, exists. This may limit generalizability</p> <p>2. Limitation of generalizability of results to other settings</p> <p>3. Our pharmacy refill measure may be an overestimation of adherence in our sample as we do not know if the study participants ingested their medication</p>	None stated	28/42=66.6%	27/42 = 64.29%	27.5/42 = 65.48%		
None stated	None stated	None stated	N/A	N/A	N/A		

For peer review only



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	2010	Krüsi, A.; Wood, E.; Montaner, J.; Kerr, T.	International Journal of Drug Policy	Social and structural determinants of HAART access and adherence among injection drug users	Non-empirical	Literature review	Multi-country	Not specified	HIV
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	2010	Uhlmann, S.; Milloy, M.-J.; Kerr, T.; Zhang, R.; Guillemi, S.; Marsh, D.; Hogg, R.S.; Montaner, J.S.G.; Wood, E.	Addiction	Methadone maintenance therapy promotes initiation of antiretroviral therapy among injection drug users	Empirical	Cohort - prospective	BC - Vancouver (Downtown Eastside)	Community	HIV
37 38 39 40 41 42 43 44 45 46 47	2009	Doucette, K. E.; Robson, V.; Shafran, S.; Kunimoto, D.	Canadian Journal of Gastroenterology	Improving access to care by allowing self- referral to a hepatitis C clinic	Empirical	Cohort - retrospective	AB - Edmonton	Clinic	HCV

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	HAART	HAART	IV drug users	N/A	N/A	N/A	To encourage a conceptual shift away from understanding suboptimal HAART adherence as determined predominantly by individual factors modifiable through individually focused interventions, towards a greater acknowledgement of the influence of social and structural factors such as stigmatization and social exclusion, unstable housing environments, the organization of health care systems and the continued prohibitionist approach to illicit drug policy
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	ART, MMT	A cohort of antiretroviral-naive HIV infected IDU to investigate whether exposure to methadone maintenance therapy increased initiation and subsequent adherence to ART	All IDU with HIV who participated in the AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS) study.	709 HIV-infected participants were recruited for this study, among whom 457 (64.5%) had never been on ART at baseline. Of these 457, 231 (50.5%) participants reported heroin injection and had had at least one CD4+ count within 12 months of recruitment, and were therefore eligible for the present study.	All	AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS) was created to study issues related to access to HIV/AIDS care among HIV-infected IDU. Beginning in May 1996, participants were recruited through self-referral and street outreach from Vancouver's Downtown Eastside. At baseline and semi-annually, all participants complete an interviewer-administered questionnaire. The questionnaire elicits demographic data as well as information about participants' drug use, including information about type of drug, frequency of drug use, involvement in drug treatment and periods of abstinence	The present study using a cohort of antiretroviral-naive HIV-infected IDU to investigate whether exposure to methadone maintenance therapy increased initiation and subsequent adherence to ART.
37 38 39 40 41 42 43 44 45 46 47	HCV treatment	Comparing characteristics and outcome of HCV patients who self-referred for HCV treatments with those who were HCP-physician referred	Hepatitis C infected individuals	1563 patients enrolled with 336 self referral and 1227 referred by physician; IDU were 49.7% and 52.6% respectively	All	All patients in the Hepatitis Support Program database from December 17 2002 to Decemeber 31 2007 were included with follow up completed to June 30 2008. All patients were included with no exclusion. Outcomes measured were characteristics between referred and self referred patients; Sex, age, HCV genotype distributions, and liver biopsy fibrosis scores with similar treatment rates and outcomes. Self referral patients had higher rates of IDU (49.7% vs 52.6%) and immigrants (4.8% vs 4.2%)	Self referral vs Physician referral

<p>N/A</p>	<p>N/A</p>	<p>1. Proposal of risk environment framework: Conceptualizes drug-related harms as a product of the social situations and environments in which individuals who use drugs operate; shifts focus of analysis and intervention from individual level to include social and structural contexts which shape IDU's access and adherence to HAART. Also allows room for thinking about how social and structural contexts intersect with the economic, social, gender and ethnic position of individuals and how these factors may lead to higher levels of vulnerability among individuals belonging to these groups                  2. Emphasis on individual adds to stigma and social exclusion; drug addiction received among highest ratings of social disapproval cross-culturally, and this is exacerbated amongst women and ethnic minority groups. This likely contributes to women and members of ethnic minority groups facing elevated risk for HIV and hepatitis C.                  3. Impact of homelessness and unstable housing conditions on HIV treatment among IDU has received limited attention in developing/transitional settings and developed settings. Several factors related to substandard living conditions likely related to HIV-positive IDU's ability to follow through with HIV treatment: crowded living environments, lack of security and privacy, food insecurity, absence of cooking and food storage facilities, inadequate sanitary facilities                  4. Highly compartmentalized health care systems do not easily allow for comprehensive care for HIV-positive IDU whose service needs are complex and span multiple areas including HIV specialty and primary care, addiction treatment, psychiatric care and hepatology                  5. Lack of exploration of how drug policy approaches which prioritize law enforcement over social and health focused interventions, interfere with access and</p>	<p>Given the shortcomings of the predominant individually focused approach to access and adherence to HAART among IDU, it is clear that a broader approach to HAART provision needs to be prioritized urgently. A conceptual shift is required to move away from understanding suboptimal HAART adherence as determined primarily by individual factors modifiable through individually focused interventions towards a better understanding of the social situations and structures that facilitate and interfere with the delivery of HAART to this population. This will require a range of novel research, programmatic, and policy initiatives internationally.                   1. Development of multidisciplinary HIV treatment approaches that address HIV-positive IDU's health care more comprehensively                  2. Promote continued investigation of stimulant substitution therapies that can be effectively coupled with HAART                  3. Policy changes which facilitate program delivery that supports HIV treatment such as MMT and opioid prescription</p>	<p>Research that fosters an improved understanding of the mechanisms through which stigma and social exclusion create barriers to accessing HIV treatment and care among IDU. Furthermore, ongoing monitoring of the effect of policing and incarceration on HIV treatment access and adherence should be prioritized. Interventional studies documenting novel approaches to supportive housing for HIV-positive IDU will contribute to a better understanding of the housing needs of HIV-positive</p>
<p>The primary end-point of interest in the present analysis was time to first antiretroviral therapy (ART) use among participants who were HIV-positive opioid users.</p>	<p>Explanatory variables considered included: age (24 years versus &gt;24 years); gender (female versus male); ethnicity (Aboriginal versus non-Aboriginal); involvement in the sex trade in the past 6 months (yes versus no); daily cocaine use (yes versus no); daily heroin use (yes versus no); any injection drug use in the past 6 months (yes versus no); plasma HIV-1 viral load (&lt;100 000 copies/ml versus 100 000 copies/ml); and CD4+ cell count (&lt;200 cells/mm<sup>3</sup> versus 200 cells/mm<sup>3</sup>). Methadone treatment was associated with antiretroviral adherence levels after ART initiation</p>	<p>The present study demonstrates that, among a community-recruited sample of antiretroviral-naïve opioid-using HIV-infected IDU, those who used MMT initiated ART at an elevated rate compared to those not receiving MMT. Additionally, those individuals on MMT had increased subsequent adherence to antiretroviral therapy.</p>	<p>Importance of providing MMT to opioid-dependent HIV-infected IDU as a strategy to address the ongoing HIV epidemic among this population. MMT should be an essential component of any campaign to curb HIV infection in this population, and policies and regulations restricting access to MMT should be repealed in favour of more evidence-based strategies.</p>	<p>Future research should be to examine how the quality of MMT programmes affects access and adherence to ART</p>
<p>Outcomes of patients treated for hepatitis C virus with pegylated interferon and ribavirin</p>	<p>Source of referral (self or physician/other HCP), demographics (age, sex), risk factors for HCV infection ( injection drug use, transfusion, tattoo, immigrant/therapeutic injection), qualitative serum HCV RNA, HCV genotype, whether HCV treatment was started, Liver fibrosis stages</p>	<p>Primary reason self referral was lack of PCP</p>	<p>Change physician specialist remuneration to allow for self referral and the need for additional HCV treatment education for PCP; allows access to risk reduction education, screening for HIV coinfection and vaccination against Hepatitis A and B</p>	<p>None stated</p>

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None stated	None stated	None stated	N/A	N/A	N/A		
The first study of antiretroviral-naive HIV-infected IDU to examine the possible role of MMT on time to initiation of ART and subsequent antiretroviral adherence	Because this is an observational study, the association of MMT and more rapid initiation of ART must be interpreted with caution; The effect of methadone on uptake of ART may be as a result of inherent differences between those who used methadone and those who did not rather than the effect of methadone. However, there are several reasons why we believe this relationship to be causal. First, in Vancouver, Canada, where the study was conducted, methadone is often dispensed daily with antiretroviral drugs as a strategy to achieve high rates of adherence. Secondly, dispensing methadone affords more regular contact with the health care system. Thirdly, ready access to methadone decreases the time consuming routine of obtaining opioids, and the money to pay for them, which allows more time for individuals to focus upon personal health.	None stated	29/42=69%	27/42=64.2%	66.60%		
None stated	Self referral may include more "inappropriate" referrals such as those HCV RNA negative or have absolute contraindications for therapy	None stated	32/42=76%	20/42=47.6%	61.9+54.7/2=58.3%		

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1	2008	Wood, E.; Hogg, R.S.; Lima, V.D.; Kerr, T.; Yip, B.; Marshall, B.D.L.; Montaner, J.S.G.	JAMA	Highly Active Antiretroviral Therapy and Survival in HIV- Infected Injection Drug Users	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2	<b>Supervised Injection Site / Safe Consumption Site / Safe Injection Facility / Supervised Injection Facility n=19</b>								
3	2019	Correctional Service Canada	n/a - Correctional Service Canada website?	Overdose Prevention Service	Non-empirical	Report	AB - Drumheller	Other- Prison (Drumheller Institution)	HIV, HCV, skin infections
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HAART	This study was conducted to compare patterns of mortality between patients with and without a history of injection drug use among a cohort of antiretroviral-naive patients initiating HAART in a setting with free HIV/ AIDS care.	all antiretroviral-naive patients aged 18 years or older initiating HAART in British Columbia, Canada, and has been described in detail elsewhere.	3116 individuals, 915 were IDUs (29.4%), 579 were female (18.6%), and the median age was 39.4 years (interquartile range, 33.3-46.4 years).	All	HAART Observational Medical Evaluation and Research (HOMER), study period (between August 1, 1996, and June 30, 2006), 3372 patients initiated HAART, among whom 256 individuals (7.6%) were excluded from the HOMER cohort for 3116; Vancouver; Inclusion criteria: analyses were restricted to antiretroviral-naive HIVinfected men and women who were first prescribed triple drug antiretroviral therapy between August 1996 and June 2006, and who were followed up to June 30, 2007. Primary outcome was time to death	This study was conducted to compare patterns of mortality between patients with and without a history of injection drug use among a cohort of antiretroviral-naive patients initiating HAART in a setting with free HIV/ AIDS care.
Overdose Prevention Service	The OPS includes consumption rooms within the institutional health care centre, where health care staff are available to provide health teaching, counselling, and emergency response in the event of a medical crisis. Participants will use self-supplied substances and safely dispose of any used equipment and left over substances. Participants will remain in the OPS for 30 minutes or longer as needed after using illicit substances for the purpose of monitoring for signs of an overdose. The OPS will be available between 7:00 a.m. to 7:00 p.m., seven days a week.	OPS intended to serve prisoners at the institute who choose to participate in the program (harm reduction)	N/A	Prisoners	N/A	Purpose of the document is likely just to provide information regarding the purpose of the program: On June 24, the Correctional Service of Canada (CSC) began an overdose prevention service (OPS) at Drumheller Institution to continue ongoing efforts to help prevent fatal and non fatal overdoses, reduce the sharing of needles, reduce the transmission of infectious diseases, including HIV and HCV, reduce the occurrence of skin infections, and facilitate referrals to other health care services and programs.

All-cause mortality	included age, sex, a prior diagnosis of AIDS (yes vs no), protease inhibitor use in the initial regimen (yes vs no), date of therapy initiation (before or after July 1, 1997), physician experience (per 100 patients enrolled), baseline CD4 cell count (50, 50-199, or 200 cells/ $\mu$ L), baseline HIV RNA levels (log <sub>10</sub> transformed), and 95% antiretroviral adherence (yes vs no).	The present study demonstrated mortality rates that were not significantly different between HIV-infected IDUs and non-IDUs initiating HAART in a population-based setting.	HAART regimens may have effectiveness at a population level that is not significantly different regarding the survival of individuals with and without a history of injection drug use.	None stated
N/A	N/A	<p>Since it isn't a study, there are no "findings". The purpose of the program is to provide another option for harm reduction. The CSC's harm reduction measures currently include: 1) screening and testing at reception and ongoing throughout incarceration; 2) education on admission and throughout incarceration regarding IDUs and how to prevent their acquisition and/or transmission; 3) access to trained peer support workers for advice, information and support; 4) access to harm reduction material and information (e.g. condoms); 5) access to substance abuse programs in CSC and community-based Narcotics Anonymous; 6) opiate agonist treatment (methadone/suboxone); 7) health promotion/prevention initiatives on risks of tattooing; 8) mental health referral/counselling; 9) post-exposure and pre-exposure prophylaxis; 10) HIV and HCV treatment; 11) prevention, diagnosis and treatment of TB (parallel screening for HIV &amp; TB); 12) access to bleach; 13) Prison Needle Exchange Program.</p> <p>This will be another program that will be externally evaluated in the future.</p>	N/A	An integral part of the OPS implementation is an external evaluation of the program, where lessons learned from Drumheller Institution will inform future planning in the area of harm reduction.

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<p>the present study is well suited for comparing real-world outcomes from HAART among IDUs and non-IDUs in a populational setting. Furthermore, the local context provides an excellent opportunity to compare survival patterns in a setting in which the potentially confounding effects of financial barriers to medical care are removed.</p>	<p>Observation study therefore no conclusions about causality can be made.; Only baseline data on injection drug use and we were not able to assess the impact of ongoing drug use.; we only considered patients who were prescribed HAART</p>	<p>None stated</p>	<p>30/42=71.4%</p>	<p>26/42=61.9%</p>	<p>28+27/2= 65.4%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		

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2017	Kerr, T.; Mitra, S.; Kennedy, M.C.; McNeil, R.	Harm Reduction Journal	Supervised injection facilities in Canada: past, present, and future	Non-empirical	Literature review	Canada	Community, clinics and hospital	HCV
2015	Enns, E.A.; Zaric, G.S.; Strike, C.J.; Jairam, J.A.; Kolla, G.; Bayoumi, A.M.	Addiction (Society for the Study of Addiction)	Potential cost-effectiveness of supervised injection facilities in Toronto and Ottawa, Canada	Empirical	Cost-benefit and cost-effectiveness analysis	ON - Toronto and Ottawa	Community	HCV, HIV

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SIS	SIS - discussion of the evolution of policies around Canada for the establishment of safe injection sites over time	PWID	N/A	All	N/A	A historical and political look at the establishment of SIF in Canada
SIS	Using a dynamic compartmental simulation model of HIV and HCV transmission, using published literature, self-reported surveys and 2006 I-track survey and the impact of establishing cost effective supervised injection sites in Toronto and Ottawa.	Simulated populations from Toronto and Ottawa	Simulated	Used published estimates for Toronto and Ottawa focusing on PWID, PWID with MMT, HIV, HCV, Coinfected prevalence;etc	Modeling outcome measures: Primary quantified health effects in terms of number of HIV and HCV infections averted and the number of quality-adjusted life years (QALY) for the optimal cost effective number of supervised injection sites	Determine optimal, cost effective number of safe injection sites for Toronto and Ottawa

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<p>N/A</p>	<p>N/A</p>	<p>Our review demonstrates that although considerable progress has been made towards integrating this form of intervention into the continuum of programs offered to PWID, continued activism, research advocacy, and litigation has been necessary in order to advance this evidence-based approach in Canada. There remains a pressing need to amend federal legislation to better enable the scale-up of these services. The ongoing overdose crisis indicates clearly that more must be done. Further, models that are more responsive to the needs of PWUD (e.g., assisted injection services, peer-run models) should be implemented and evaluated, and SIF programming should be extended into new settings (e.g., hospital). The federal government will maintain responsibility for the approval of new facilities and there remains a need to demonstrate a lack of impact on crime, thus continuing to subject the expansion of these critical health services to political processes. Reforms are urgently needed to facilitate the integration of assisted injection and safer smoking interventions into SIFs and reduce challenges in access to these facilities stemming from gender, disability, and polysubstance use. To facilitate the creation and continued functioning of peer-run SIFs, amendments to federal laws should be made to allow PWID to work in SIFs. Further, local health authorities should seek to promote the operation of peer-run SIFs and provide necessary financial support given existing evidence indicating that peer-run SIFs extend the reach and coverage of these programs.</p>	<p>While much progress has been made in that regard, there is a pressing need to create a more enabling environment for SIFs through amendment of federal legislation. Further innovation in SIF programming should also be encouraged through the creation of SIFs that accommodate assisted injecting, the inhalation of drugs. As well, peer-run, mobile, and hospital-based SIFs also constitute next steps needed to optimize the impact of this form of harm reduction intervention.</p>	<p>None stated</p>
<p>Quantified health effects in terms of the number of HIV and HCV infections averted and the number of quality-adjusted life-years (QALYs) gained, an outcome that integrates quality of life with survival</p>	<p>(See table 1) Drug use populations size; MSM; Migration rates per 100 person years; Aging rates per 100 person-years; Drug use heterosexuals, men having sex with men; MMT; HIV prevalence; HCV prevalence; Annual Probability of HIV transmission per sexual partner; annual number of sexual partners; proportion of sexual partners with whom a condom is used; HIV and HCV transmission probability per shared injection; Annual number of injections, proportion of shared needles; HIV and HCV Transmission probability per episode of sharing crack cocaine paraphernalia; Crack cocaine smoking; HIV and HCV progression, diagnosis and treatment parameters; Annual mortality rates (see list); Annual health-care costs (2012 CAD\$) (See list); Annual supervised injection facility costs (fixed facility costs; variable per-user costs); Quality of life weights (persons who smoke cocaine; inject drugs; MMT; HIV infected persons; HIV infected persons with antiretroviral therapy; persons with advanced stage chronic HCV infection)</p>	<p>a cost-effectiveness threshold of \$50 000, the optimal number of facilities from an economic evaluation perspective was three in Toronto and two in Ottawa; projected that a single supervised injection facility in Toronto would be visited by 10.8% of people who inject drugs; visit a facility is projected as 29.6% for three facilities and 39.8% for five facilities; In Ottawa a single facility would be visited by 36.2% of people who use drugs; Over 20 years projected that one supervised injection facility in Toronto would avert 164 HIV infections and 459 HCV infections; in Ottawa, one facility would avert 358 HIV infections and 323 HCV infections; Toronto, a single facility resulted in a gain of 385 discounted QALYs and incurred \$4.1 million in net discounted costs for an ICER of \$10 763 per QALY gained; In Ottawa, a single facility resulted in a gain of 743 discounted QALYs and incurred \$4.6 million in net discounted costs for an ICER of \$6127 per QALY</p>	<p>While our analysis contributes to the demonstration of local conditions indicating a need for a facility in Toronto and Ottawa, a factor identified by Canada's Supreme Court for granting exemptions for facilities, recent legislative changes restrict exemptions to exceptional circumstances' and impose additional requirements [97,98]. Although economic analyses are necessary inputs to such debates, the final decision will also reflect the decision-makers' social and political agendas.</p>	<p>Analyses should be repeated once better data on new HCV treatment patterns are available</p>

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None stated	None stated	Current gaps in coverage of supervised injection facilities point to the need to extend this evidence-based intervention into new settings and consider new approaches.	N/A	N/A	N/A		
Toronto and Ottawa specific data was used. The model was calibrated closely to observed epidemiological trends, although not validated to external data. Results were generally robust across treatment uptake and cost assumptions	Did not include health impacts of hepatitis B infections, overdoses, referrals to addiction treatment services and infectious complications of injection drug use, thus underestimating overall health benefits. Also did not model social consequences, such as changes in injection-related litter and crime. Did not evaluate supervised smoking facilities, for which strong evidence of effectiveness is unavailable. Did not have data on the variability of HIV and HCV prevalence and risk behaviors across neighborhoods, which would further enhance our analysis. I-Track respondents were recruited through harm reduction programs and may over-represent people who use drugs more frequently and people who use multiple substances. Did not model the use of buprenorphine as a treatment for opioid dependence, it has comparable net costs and overall effectiveness to MMT and our results were insensitive to variation in the cost and effectiveness of the opioid substitution program used by people who inject drugs. Did not include male-to-male sexual transmission of HCV, but this occurs at low rates and probably would not alter our conclusions. Did not include indirect health costs. As a simulated model a wide variety of assumptions were made	None identified	38/42=90%	33/42=78.5%	83.3+80.9/2=82.1%		

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1 2 3 4 5 6 7 8 9 10 11 12 13 14	2015	Jozaghi, E.; Jackson, A.	Int J Health Policy Manag	Examining the potential role of a supervised injection facility in Saskatoon, Saskatchewan, to avert HIV among people who inject drugs	Empirical	Cost-benefit and cost-effectiveness analysis	SK - Saskatoon	Community	HIV
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2015	Shaw, A.; Lazarus, L.; Pantalone, T.; LeBlanc, S.; Lin, D.; Stanley, D.; Chepesiuk, C.; Patel, S.; Tyndall, M.; PROUD Community Advisory Committee	Harm Reduction Journal	Risk environments facing potential users of a supervised injection site in Ottawa, Canada	Empirical	Cohort - prospective	ON - Ottawa	Community	HCV, HIV

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SIF	SIF - Proposed	PWID	N/A - modeling study	All	N/A	To determine cost-benefit and cost-effectiveness employing HIV data and sharing needle cases in Saskatoon to determine prospect of a safe injection site in Saskatoon.
SIS	Self-reported risk environments (social, economic, political, etc.) faced by PWID in Ottawa and willingness to use supervised injection sites	Subset of PROUD cohort: 270 participants recruited in Byward Market who reported injecting drugs in last 12 months previous to interview	858	All	PROUD cohort: 858 people aged 16 or older who reported using injection drugs or smoking crack cocaine in past 12 months, had been living in Ottawa for at least 3 months at time of interview (March to December 2013). 593 were recruited in ByWard Market area. This study focuses on 270 participants (see population column)	To understand risk behaviours and risk environments faced by PWID in Ottawa, establish need for a supervised injection site (SIS), and help contribute to SIS design that addresses current risks and reduces harm

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<p>Marginal benefit and cost are the measurement of benefits or cost of producing one more unit, in this case cost of running an SIF and cost of averting HIV care</p>	<p>None</p>	<p>Establishing at least two SIF in Saskatoon is cost-effective. In Saskatoon, HIV reports were more than three times that of the national average. The annual incidence report for Saskatoon was 31.3 per 100,000 persons in comparison to the national average of 9.3 per 100,000 persons. Additionally, the majority of Saskatoon's HIV reports were attributed to PWID (76.9%), while the nation's average of PWID contribution to HIV was 18.9%. At least two SIF in Saskatoon will on average prevent at least 14 new HIV cases. This translates into cost savings of \$764,970 for the first two facilities. Moreover, the establishment of SIF in Saskatchewan's largest city appears to be cost-effective.</p>	<p>We suggest that harm reduction services in Saskatoon should include SIF as part of healthcare delivery to this vulnerable population. Education to health professionals and policymakers is needed about the benefits of harm reduction programs and the roles they play in reducing crime, drug dealing, public injection, and other social maladies. Community support is fundamental for sustaining a SIF.</p>	<p>The models may be considered simple in comparison to other more complex models that consider the dynamics of the social system and a score of parameters, such as secondary sexual transmission, effects of attending methadone therapy and increase in the population of drug users.</p>
<p>Hypothetical uptake of future SIS in Ottawa based on the question "Would you likely use a supervised injection site if one was opened in Ottawa?"</p>	<p>None</p>	<p>84.8% of participants thought there should be an SIS in Ottawa and 75% reported they would use an SIS if one opened. 74.9% of potential SIS users reported ever having been diagnosed w/ mental health illness. 63.5% tested positive for HCV at their last test, 12.8% self-reported that they were HIV positive. 39.5% reported public injection, 39.4% accessed addictions treatment and 43.8% sought care in hospital/ER in past year. Significant association with insecure housing/homelessness. Among potential SIS users, 19.2% had trouble accessing new needles. In univariate analysis, those willing to use an SIS were more often younger, identified as LGBTQ, injected in public, injected with other people, required assistance to inject, had overdosed in the past 12 months.</p>	<p>There is a demand for SIS in Ottawa. PWID who are likely to use SIS face complex risk environments for drug-related harm, which could be addressed by developing SIS that respond to the local context. Based on savings from HIV and HCV prevention alone, an SIS in Ottawa would be an efficient and effective use of resources. However, the model must be suited to its users.</p>	<p>Future research should investigate harm reduction needs of people who inject alone in private residences. Also investigate other context-specific barriers and reasons for not accessing SIS services. Future research should also develop and implement monitoring and evaluation program for SIS once opened.</p>

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None stated	The first limitation pertains to the exclusive focus on HIV cases. Other costing studies, that have considered Insite and its potential role for expansion in other cities, have included HCV in the cost-benefit analysis. However, the current study due to unavailability of key parameters had to rely on HIV cases alone which made the costing study more conservative in reporting the benefits of SIF in Saskatoon. However, the most noteworthy limitation of this study concerns the static mathematical models used in the analysis. Such models omit Quality-Adjusted Life Years (QALYs). Our models may be considered simple in comparison to other more complex models that consider the dynamics of the social system and a score of parameters, such as secondary sexual transmission, effects of attending methadone therapy and increase in the population of drug users.	None stated	22/42=52.4%	24/42 = 57.1%	54.80%		
CBPR combines academic inquiry with meaningful community participation and control. Street-based, peer-driven recruitment can identify highest-risk populations. These methods ensure that priorities of communities with PWID are affected by future SIS.	The CAC elected to recruit during daylight hours due to group safety concerns, which could reduce the representation of sex workers and other community members who are primarily available at night. Recruiters targeted street-involved PWID, which mirrors the target population of an SIS which leads to overrepresentation of homeless and socially marginalized PWID. Outcome measure addresses hypothetical use of a future site. Self-reported data may be influenced by social desirability bias, underestimation of high risk practices, nonresponse (missing data). This analysis cannot predict willingness to use SIS based on specific health risks/user characteristics. Does not capture all contextual factors that interact with or shape risk for harm/access to harm reduction among PWID.	N/A	35/42 = 83.33%	32/42=76.2%	34/42=80.95%		



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2014	Hadland, S.E.; DeBeck, K.; Kerr, T.; Nguyen, P.; Simo, A.; Montaner, J.S.; Wood, E.	J Adolesc Health.	Use of a medically supervised injection facility among street youth	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2014	Jozaghi, E.; Reid, A.A.; Andresen, M.A.; Juneau, A.	Substance Abuse Treatment, Prevention, and Policy	A cost-benefit/cost-effectiveness analysis of proposed supervised injection facilities in Ottawa, Canada	Empirical	Cost-benefit and cost-effectiveness analysis	ON - Ottawa	Community	HCV, HIV
2014	Ti, L.; Kerr, T.	Harm Reduction Journal	The impact of harm reduction on HIV and illicit drug use	Non-empirical	Commentary	BC - Vancouver	Community	HIV

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SIF	Insite - supervised injection facility (SIF) as government-sanctioned space for users to inject pre-obtained drugs under nurse supervision. Open 18 hours, 7 days per week. Nurses can intervene in the event of an overdose.	Actively-injecting street youth in Vancouver. Street-involved was defined as being absolutely or temporarily without stable housing, or having accessed street-based youth services in the past six months. Had to report injection in the preceding 6 months during Sept 2005-May 2012, either at baseline or at any semiannual follow-up visit.	1,019 in ARYS 414 included in this study	Street youth	At-Risk Youth Study (ARYS) - prospective cohort of street youth in Vancouver, Canada. Started 2005. Inclusion criteria 1) age 14-26 years, 2) use of an illicit drug other than or in addition to marijuana in the 30 days prior to enrollment. Have baseline and bi-annual interviews and bloodwork for HIV and Hep C.	To identify factors associated with use of the Vancouver SIF among street youth
SIF	SIF - Proposed	PWID	N/A - modeling study	All	N/A	To conduct cost-benefit and cost-effective analyses for the opening of SIFs in Ottawa, Ontario
SIF	SIF	HIV+ PWID	N/A	HIV+ PWID	N/A	Commentary in support for harm reduction programs as an essential component for responding to the HIV and illicit drug use epidemics

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<p>Primary outcome is self-reported use of the Vancouver SIF at least once in the preceding 6 months. "In the last six months, have you fixed at the Insite safe injection site?"</p>	<p>For those that did use the SIF, descriptive data included how often participants used the SIF, proportion of all injections conducted at the SIF, where participants injected most of the time if not injecting at the SIF, if they received new information about safe injection practices they did not already know at the SIF, and whether they felt the SIF was youth-friendly. Blood samples to determine HIV and HCV serostatus. Covariates included age, biologic gender at birth, Aboriginal ancestry, high school education, recently having lived or spent time in the Downtown Eastside, recent homelessness, recent incarceration, recent sex work, recent daily heroin / cocaine, / crystal methamphetamine injections, recent drug overdose, recently having dealt drugs, any recent drug injection in a public place, recently having help injecting from someone else, recently having visited a crack house or shooting gallery, having borrowed a syringe, 'jacked up' by police (i.e., stopped, searched or tained for presumed drug possession without arrest) and recently having received drug treatment.</p>	<p>These findings show that street youth that use the SIF appear to be those who inject frequently and may be at greatest risk of overdose death and of HIV or HCV infection. 414 individuals were actively injecting drugs, 33.8% female, 22.9% Aboriginal, 3.4% 14-17 yrs, 20.8% 18-20 yrs, 75.8% at or over 21 yrs; Mean age of first injection drug use was 22.8 yrs; At baseline, 2.4% were HIV seropositive and 35% were HCV-seropositive; 305 returned for follow-up after reporting injection drug use; 42.3% used the SIF at least once and SIF use was reported 37.5% of all study visits; Of 175 using SIF, 51.4% used the facility at least weekly and 44.6% used it for at least one-quarter of all injections, 22.3% reported receiving new information about safe injection practices; 2.9% of SIF users felt the facility was not youth-friendly. In final multivariate model, variables significantly and independently associated with SIF use included having lived or spent time in the Downtown Eastside neighborhood surround the SIF, daily heroin injection, daily cocaine injection, daily crystal methamphetamine injection, and having injected in public.</p>	<p>The SIF provides a critical point of contact with the city's highest risk homeless adolescents and young adults who might otherwise be 'hidden' from other public health efforts. Other arguments for establishing SIF may be associated with public health benefits, including enhanced public order, from injection not done in public, and decreased injection-related litter. As governments consider novel approaches to prevent and mitigate the harms of injection drug use, these data support the implementation of SIFs as a way of promoting public health and community safety.</p>	<p>In adjusted analysis, recent overdose was not independently associated with SIF use and SIF use was not associated with reduced syringe sharing or recent entry into drug treatment, but these may be due to the higher frequency of drug use. Further research may find benefits of SIF use that are not captured statistically in this study, such as syringe sharing, overdose, and drug treatment are not less common, even though this is a higher-risk population. Future studies could attempt to delineate how far street youth may be willing to travel for safe injection to help determine ideal locations for similar facilities in other settings.</p>
<p>The costs of operating numerous SIFs in Ottawa was compared to the savings incurred; this was done after accounting for the prevention of new HIV and Hepatitis C (HCV) infections</p>	<p>None</p>	<p>The sensitivity analyses conducted with the models reveals the potential for SIFs in Ottawa to be a fiscally responsible harm reduction strategy for the prevention of HCV cases – when considered independently. With a baseline sharing rate of 19%, the cumulative annual cost model supported the establishment of two SIFs and the marginal annual cost model supported the establishment of a single SIF. More often, the prevention of HIV or HCV alone were not sufficient to justify the establishment cost-effectiveness; rather, only when both HIV and HCV are considered does sufficient economic support became apparent.</p>	<p>Funded supervised injection facilities in Ottawa appear to be an efficient and effective use of financial resources in the public health domain. Though this is not scientific evidence, these models serve as excellent tools to identify what kind of changes we can expect when public health policy is implemented.</p>	<p>These results demonstrate the need to routinely collect accurate, up-to-date, and geographically specific data so that studies such as this may help to inform public policy with greater accuracy and confidence. More-over, these results also show the importance of considering more than one potential benefit in cost-benefit analyses for public health. In moving forward, research should also consider how to facilitate the implementation of new SIFs.</p>
<p>N/A</p>	<p>None</p>	<p>None stated</p>	<p>Harm reduction programs do not exacerbate individual and community drug use patterns. It is clear that programs like Insite save lives and support rather than undermine treatment efforts by connecting individuals to various forms of addiction treatment.</p>	<p>None stated</p>

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<p>Characteristics of ARYS sample are similar to those from other studies of high-risk youth.</p>	<p>Study recruitment used snowball sampling to recruit street youth, who are frequently homeless and although the ARYS sample is not random, characteristics of the cohort are similar to those from other studies of high-risk youth. Interviews relied on self-report - social desirability bias could underestimate true prevalence of risk behaviours and overestimated true prevalence of SIF use. Sociodemographic and drug use-related covariates were determined within the same six-month window period as a participants' SIF use, so cannot determine temporality.</p>	<p>Relationship of street youth SIF use and outcomes such as decreased overdose and HIV and HCV infections.</p>	<p>31/42 = 73.8%</p>	<p>28/42=66.7%</p>	<p>70.30%</p>		
<p>None stated - however, the use of multiple mathematical formulas and ranges of prevalence rates for outcomes gathered from evidence are strengths</p>	<p>It is important to note that the calculated cost-savings of Insite are an under-estimate of the actual cost savings. In our analyses, we do not consider any growth of the PWID population, new secondary HIV and HCV infections, or any reductions in other harms such as cellulitis, subcutaneous abscesses, endocarditis, and other soft-tissue infections. Perhaps, more significant is the fact that we do not consider the value of a prevented death</p>	<p>None stated</p>	<p>21/42=50%</p>	<p>24/42 = 57.1%</p>	<p>53.60%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		

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1	2013	Jozaghi, E.; Andresen, M.A.	Harm Reduction Journal	Should North America's first and only supervised injection facility (InSite) be expanded in British Columbia, Canada?	Empirical	Qualitative - semi-structured interviews	BC - Vancouver, Surrey and Victoria	Community	HCV, HIV
2	2013	Jozaghi, E.; Reid, A.A.; Andresen, M.A.	Substance Abuse Treatment, Prevention, and Policy	A cost-benefit/cost- effectiveness analysis of proposed supervised injection facilities in Montreal, Canada	Empirical	Cost-benefit and cost-effectiveness analysis	QC - Montreal	Community	HCV, HIV
3	2012	Small, W.; Moore, D.; Shoveller, J.; Wood, E.; Kerr, T.	Health, Risk and Society	Perceptions of risk and safety within injection settings: Injection drug users' reasons for attending a supervised injecting facility in Vancouver, Canada	Empirical	Qualitative - ethnographic methods and in- depth interviews	BC - Vancouver	Community	HIV

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SIF	InSite in Vancouver, needle exchange programs in Surrey and one which closed down in Victoria	People who had injected illicit drugs in the previous month, 19 years or older and provided informed oral consent	31	All	N/A	To explore the potential of expanding InSite to more locations throughout British Columbia including from injection drug users who reside in cities that have no access to supervised injection facilities
SIF	SIF - Proposed	PWID	N/A - modeling study	All	N/A	To present cost-effectiveness and cost-benefit analyses for various SIF operation scenarios in Montreal in an effort to inform public policy on this complex issue
SIF	Questionnaires used to understand injectors' reasons for using supervised injection facility (Insite)	PWID - Insite clients recruited from Scientific Evaluation of Supervised Injecting Cohort (Vancouver), interviewed between November 2005-February 2006	50 (28 male, 21 female, 13 First Nations, 37 non-First Nations)	Insite clients	Scientific Evaluation of Supervised Injecting Cohort. Cohort composed of >1000 randomly selected Insite users in Vancouver. Representative of population of IDUs who use Insite	To examine injection drug users' motivations for using Insite and explore how the SIF setting is perceived to shape experiences of risk and safety when injecting drugs

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<p>Themes on benefits of InSite and need for expansion</p>	<p>None</p>	<p>Safe injection sites lead to decreases in overdose deaths, sharing of needles and spread of infectious diseases, increased safety by decreasing theft, assault and arrest, connection to addiction and counselling services, personal connections and therapeutic alliances, decreased emergency care use, and increased personal and community empowerment.</p>	<p>There is a need to open similar supervised injection facilities in cities with significant IDU populations and IDUs in Surrey and Victoria would attend a supervised injection facility if one were available.</p>	<p>None stated</p>
<p>Specifically, the analyses estimate the number of new HIV and HCV infections prevented as a result of operating SIFs using mathematical modelling with conservative parameter estimates. The dollar costs of illnesses avoided are compared to the operational cost of a SIF. The analyses are then extended to consider the impact of opening additional SIFs. As long as the marginal benefits outweigh the marginal costs of additional SIFs hours and locations, the expansion of SIF should be recommended</p>	<p>None</p>	<p>It is predicted that the addition of each supervised injection facility (up-to a maximum of three) in Montreal will on average prevent 11 cases of HIV and 65 cases of HCV each year. As a result, there is a net cost saving of CDN\$0.686 million (HIV) and CDN\$0.8 million (HCV) for each additional supervised injection site each year. This translates into a net average benefit-cost ratio of 1.21: 1 for both HIV and HCV. Increasing the scope of SIFs through site expansion would result in a decrease of HIV infection cases.</p>	<p>Establishing SIFs in Montreal will benefit the publically funded health care system.</p>	<p>None stated</p>
<p>None</p>	<p>None</p>	<p>Participants injected at Insite because it is a safer alternative to public/private sites. It is perceived as the "proper" venue for injecting to reduce health risks and relocate injection behaviour from public settings. Regulated environment perceived as beneficial, but some felt that it restricted their behaviour. Provide an alternative to injecting within private residences belonging to other individuals as obligation to share drugs is eliminated, these resources reduced the potential for blood-borne virus transmission and helped to reduce injection-related health risks, some participants reported a preference for social interactions during injecting and viewed the individual booths as a negative aspect of the injection setting at Insite, participants frequently reported that medical supervision was a reason why they injected at Insite, it protects clients from charges of drug possession, while they are on-site, it is a regulated injection environment is that it is perceived to reduce the potential for violence or robbery.</p>	<p>There is a need to fully consider risk perceptions and priorities of IDUs when designing harm reduction interventions. Attention to IDUs' risk perceptions will enable development of more appropriate interventions, which may increase their use and decrease risks.</p>	<p>Explore perspectives of IDUs who have never used SIS and why some do not use this intervention. Future research should investigate how social and spatial arrangements within the Downtown Eastside drug scene impact the operation and management of the supervised injection facility, as this information would be helpful in optimising the design and operation of the facility. Another dimension that remains unclear is how the alterations in social relationships within Insite might 'spill over' into the street, as only a fraction of a drug user's day is spent within the facility.</p>

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None stated	None stated	None stated	20/42=47.6%	19/42 = 45.2%	46.40%		
None stated	Potential for cost-savings with respect to cellulitis, subcutaneous abscesses, endocarditis, and incidence of soft-tissue infections averted were not considered in the calculations	None stated	21/42=50%	24/42 = 57.1%	53.60%	Background?? 26. Holtgrave DR, Pinkerton SD: Updates of cost of illness and quality of life estimates for use in economic evaluations of HIV prevention programs J Acquir Immune Defic Syndr Hum Retrovirol 1997, 16:55-61	
N/A	Exclusively conducted study with Insite clients (may have affected responses). Interview participants were recruited through evaluation study. Did not include perspectives from people who have never used the SIS and does not address reasons for not using the SIS.	None stated	23/42 = 54.76%	25/42=59.6%	24/42 = 57.14%		

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2011	Pinkerton, S.D.	Int J Drug Policy	How many HIV infections are prevented by Vancouver Canada's supervised injection facility?	Empirical	Literature review and mathematical modelling	BC - Vancouver	Community	HIV
2011	Reddon, H.; Wood, E.; Tyndall, M.; Lai, C.; Hogg, R.; Montaner, J.; Kerr, T.	AIDS Educ Prev	Use of North America's first medically supervised safer injecting facility among HIV-positive injection drug users	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV

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SIF	InSite SIF	Uninfected IDU	N/A	All	N/A	To review and critique the mathematical models utilised in the Andresen and Boyd article, then describe an alternative and potentially more accurate method for estimating the impact of the Insite SIF.
SIF	InSite SIF	HIV-positive IDU	395	HIV+ PWID	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS): Open prospective cohort of HIV-positive IDUs in Vancouver, Canada; populated through snowball sampling and extensive street outreach methods; inclusion criteria: 18+, HIV-positive, used injection drugs, provided written informed consent, recruited and completed at least one follow-up interview between Dec 2005-May 2008	To examine supervised injecting facility (SIF) use among a cohort of 395 HIV-positive injection drug users in Vancouver, Canada. We sought to investigate the prevalence and correlates of SIF use among HIV-positive IDUs in Vancouver, Canada.

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<p>Estimates the number of HIV infections prevented by Vancouver Canada's Insite supervised injection facility</p>	<p>None</p>	<p>Article critiqued the Anderson and Boyd article that aimed to create a mathematical model to estimate the number of HIV infections prevented by Vancouver's Insite supervised injection facility. Developed an alternative model.</p> <p>Target article suggested Insite SIF prevents between 19-57 incident HIV infections per year. Analysis of this study indicates that it prevents approx. 5-6 infections per year, with a plausible range of 4-8 prevented infections. These estimates suggest that the Insite SIF reduces HIV incidence among DTES IDU by about 6-11%.</p>	<p>The present analysis supports Andresen and Boyd's (2010) conclusion that the Insite SIF is cost saving as a stand-alone operation, independent of Insite's other programmes.</p>	<p>Previous study found that Vancouver IDU who reported that "some, most, or all" of their injections took place that the Insite SIF were 70% less likely than other IDU to have borrowed or lent a syringe in the past 6 months. However a 70% reduction in the prevalence of borrowing or lending does not imply an equivalent reduction in the borrowing rate (i.e. the proportion of injections that involve borrowed syringes). Additional research could help clarify this issue.</p>
<p>Primary outcome of interest was reporting frequent SIF use, which was operationally defined as using the SIF for more than 25% of injections</p>	<p>Selected a range of individual and contextual variables that were deemed to be potentially associated with the outcome. These variables were age, gender, Aboriginal ancestry (yes vs. no), residence in the Downtown Eastside (yes vs. no), homelessness (yes vs. no), frequent crack use (yes vs. no), daily heroin injection (yes vs. no), daily cocaine injection (yes vs. no), daily methamphetamine use (yes vs. no), participation in the sex trade (yes vs. no), public injecting (yes vs. no), borrowing needles/syringes (yes vs. no), lending needles/syringes (yes vs. no), nonfatal overdose (yes vs. no), and methadone maintenance therapy (yes vs. no). All behavioral variables referred to the 6-month period prior to the interview.</p> <p>From the confidential linkage to the centralized antiretroviral dispensary, we added these variables: current ARV use, HIV-1 RNA level (<math>\geq 500</math> copies/mL vs. <math>&lt; 500</math> copies/mL), and CD4 cell count (<math>\geq 200</math> cells/<math>\mu</math>L vs. <math>&gt; 200</math> cells/<math>\mu</math>L).</p>	<p>Of 395 participants, 104 (26.4%) reported using the SIF for more than 25% of their injections. Factors positively associated with frequent SIF use at baseline included gender, homelessness, daily heroin injection, daily cocaine injection and non-fatal overdose, whereas factors negatively associated with SIF use included age and current receipt of antiretroviral therapy. Reasons for not using SIF included (subanalysis of 341 observations): 21% having another safe place to inject, 31% preference for injecting at home, 10% preference for keeping drug use private, 8% living too far from Insite, 6% dislike of design or operations of facility (e.g. entrance too public, don't want to register), 6% report of requiring help injecting (prohibited at Insite), 4% wanting to avoid Downtown Eastside, 13% various other reasons. Of the 1051 observations from baseline to most recent follow-up, 58% reports included an account of using services other than injecting room. In terms of health-related service use, there were 49% reports of needle exchange use, 17% reports of receiving care from a nurse, 8% reports of alcohol and drug counseling use, and 2% reports of receiving a health care referral.</p> <p>There are also correlations between frequent SIF use and age, gender, homelessness, daily heroin injection, daily cocaine injection, and antiretroviral use.</p>	<p>Given that the SIF in Vancouver is attracting high-risk IDUs with a lower likelihood of receiving HIV treatment, the SIF could provide a venue for enhanced HIV care, including viral load and CD4 count testing, vaccinations and other preventive measures, and distribution of antiretroviral therapies. With the subanalyses revealing reasons why some HIV-positive IDUs refrain from using Insite, efforts to remove structural barriers to prevention and treatment services are critical to ensuring the optimal impact of such services. Efforts aimed at increasing coverage of SIFs locally should therefore focus on both increasing the number of SIFs (and their geographic coverage) and modifying rules that prevent assisted injecting. As well, the SIF is therefore an ideal environment in which to offer HIV-specific services to IDUs, as it makes treatment and care more readily accessible to this population.</p> <p>Overall, modifications to and expansion of the SIF program may result in higher coverage of SIF services among HIV-positive IDUs. Further, the services offered at the SIF could be expanded to include HIV-specific services such as disease monitoring and the provision of antiretroviral therapy.</p>	<p>Further research should seek to evaluate the impact of these types of structural changes to SIF program delivery (structural changes: increasing number of SIFs/geographical coverage and modifying rules to allow for assisted injecting).</p>

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<p>None stated. Robustness of their result was tested with univariate analysis, demonstrated the results were most sensitive to number of injections per IDU and to presumed incidence of HIV infection with Insite SIF in operation. Also conducted Monte Carlo sensitivity analysis.</p>	<p>These estimates are conservative inasmuch as they take into account only the reduction in the number of injections with borrowed "street" syringes amongst uninfected IDU. They do not account for possible behavioural changes on the part of Insite clients that could lead them to decrease the rate at which they inject with borrowed syringes, over and above the reduction due to utilisation of the SIF.</p>	<p>The actual reduction in HIV transmission due to the Insite SIF is difficult to quantify. Incidence surveillance data cannot separate out the impact of the Insite SIF from the multiple other factors that influence HIV incidence in the Vancouver area.</p>	<p>35/42 = 83.3%</p>	<p>33/42 = 78.6%</p>	<p>34/42 = 81.0%</p>		
<p>To our knowledge, this is the first study to examine SIF use, as well as barriers to SIF use, among HIV-positive IDUs.</p>	<p>1) ACCESS is not a random sample; study findings may not generalize well to larger population  2) Variations across settings, including differences in high-risk behaviors in other urban environments, findings may not generalize well to HIV-positive IDUs in other locations  3) We relied on a dichotomous outcome, and several of our independent variables were also dichotomized. Use of continuous variable may have allowed for a more nuanced analysis and less restricted variance across measures, we note that we were able to detect several significant associations between the outcome and independent variables that were considered.  4) Relied on self-reported measures, which may have introduced response biases into results, such as socially desirable responding. Thus, we may have underestimated the sensitive behaviors and experiences, such as injection drug use and sex work involvement, among the participants.</p>	<p>None stated</p>	<p>31/42 = 73.8%</p>	<p>31/42 = 73.8%</p>	<p>31/42 = 73.8%</p>		

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2010	Andresen M.A.; Boyd, N.	International Journal of Drug Policy	A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility	Empirical	Cost-benefit and cost-effectiveness analysis	BC - Vancouver	Community	HIV
2010	Pinkerton, S.D.	Addiction	Is Vancouver Canada's supervised injection facility cost-saving?	Empirical	Cost-benefit and cost-effectiveness analysis	BC - Vancouver	Community (InSite-supervised injection facility)	HIV

SIF	InSite (supervised injection facility): exemption from Canada's Controlled Drugs and Substances Act (Vancouver Coastal Health, 2007), allowing users to consume at a specific location without arrest	PWID who use InSite	N/A	All	N/A	To estimate the number of new HIV infections and deaths prevented among PWID each year and use this with estimated lifetime public health care costs of a new HIV infection and the value of a life to calculate the societal benefits of Insite (supervised injection facility) using mathematical modelling. The annual costs of operating the SIF are used to measure the social costs of Insite. In using this information, we calculate cost-effectiveness and benefit-cost ratios for the SIF.
SIF	InSite: provides safe, supervised location to inject drugs using sterile, facility supplied syringes. Health personnel are available to monitor the injection process and intervene if necessary. They treat infections, provide counseling and referral to drug treatment programs.	IDU	13,500 (modeling parameter since approx 13,500 IDU reside in greater Vancouver.	All	N/A	<p>1. to calculate number of HIV infections prevented</p> <p>2. to determine if the savings in averted HIV-related medical care costs are more than sufficient to offset Insite's operating costs</p> <p>We conducted a mathematical model-based analysis to shed further light on the economic efficiency of Insite. The objectives of this analysis were: (i) to quantify the epidemiological impact of the Insite supervised injection facility (number of HIV infections prevented), including the facility's syringe exchange program; and (ii) to determine whether or not the associated savings in averted HIV-related medical care costs are sufficient to offset Insite's operating costs—that is, to determine whether or not Insite is 'cost-saving'.</p>

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<p>Annual cost-effectiveness and cost-benefit of prevented HIV infections and overdose deaths</p>	<p>Variables used: number of needles used per client-year, number and rate of shared injections per year, HIV prevalence rate, cumulative probability of HIV infection, number of IDUs in population, participation rate at Insite, reduction of risk from participation, number of needles in circulation, percentage of needles not cleaned, probability of HIV infection from a single injection, number of sharing partners, percentage of HIV infected needles</p>	<p>Through the use of conservative estimates, Vancouver's Insite (supervised injection facility), on average, prevents 35 new cases of HIV and about 3 deaths each year. This provides a societal benefit of more than \$6 million per year after considering the program costs indicating an average benefit-cost ratio of 5.1:1. Insite generates benefits from 2 sources: provision of clean injecting equipment and facilitating change in injecting behaviors in PWID.</p>	<p>Expansions of Insite should be considered in order to accommodate a greater proportion of the injections taking place in Vancouver's Downtown Eastside - in order to further reduce the harm from injecting drug use.</p>	<p>First, assessment of both the expansion of Insite to other locations and the costs of 24 hours operation of the facility should be carried out to determine whether the benefits from increased operating hours and increased facilities are greater than the increased operating costs. Second, public health benefits should be expanded to include diagnostics, immunization, referral to detoxification facilities and a correspondingly diminished use of various medical resources.</p>
<p>mathematical modeling to find out if the savings in averted HIV-related medical care costs are more than sufficient to offset Insite's operating costs.</p> <p># of incident HIV infections among Vancouver IDU and associated costs if Insite were closed</p>	<p>Modeling parameters used:</p> <ul style="list-style-type: none"> <li>- IDU population parameters (IDU living in Vancouver, prevalence of HIV infection (%), annual incidence of HIV infection (%))</li> <li>- Injection-related parameters (injections per IDU per year, injections with borrowed syringes (%))</li> <li>- Syringes distributed in Vancouver per year (syringes distributed by Insite SEP, syringes distributed by non-Insite sources)</li> <li>- Insite facility parameters (supervised facility injections per year, annual operating cost (CAD))</li> </ul>	<p>1. In the absence of Insite, the annual incident HIV cases would be 83.5 additional infections per year.</p> <p>2. The life-time HIV-related medical care costs prevented are about \$17.6 million compared to \$3.0 million annual operating costs of Insite - highly cost-saving.</p> <p>Most infections prevented by Insite were due to the syringe exchange program.</p>	<p>Insite's safe injection facility and syringe exchange program reduce substantially the incidence of HIV infection within Vancouver's IDU community. The associated savings in averted HIV-related medical care costs are more than sufficient to offset Insite's operating costs.</p>	<p>None stated</p>

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<p>Used conservative values as often as possible within each of the models</p>	<p>Only 2 health outcomes (HIV infection and overdose death) studied and used to measure benefit. Other health care outcomes not studied due to lack of data. Immunization, diagnostics, and referrals could all create further health benefits for this population. Mathematical modelling limitations: all benefits assumed to be linear, restricting the ways expansions of Insite can be assessed. Greater detail in fixed versus variable costs would allow for better assessment of how and expansion of Insite would impact public health costs.</p>	<p>None stated</p>	<p>27/42=64.2%</p>	<p>31/42=74%</p>	<p>64.2+69/2=66.6%</p>		
<p>None stated</p>	<p>1. scarcity of detailed information about the injection practices of Vancouver IDU  2. analyses did not account for sexual and other types of transmission  3. did not consider prevention of hepatitis C transmission and associated medical care savings  4. analyses were restricted to one-year time frame (do not reflect secondary (downstream) infections that were prevented as a consequence of infections prevented in this 1 yr time frame)  5. did not account for additional services provided by the supervised injection facility and the economic impact of these services.</p>	<p>This research cannot address socio-political concerns</p>	<p>25/42=59.5%</p>	<p>27/42= 64.29%</p>	<p>26/42=61.90%</p>		

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20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	2008	Bayoumi, A.M.; Zaric, G.S.	Canadian Medical Association Journal	The cost-effectiveness of Vancouver's supervised injection facility	Empirical	Cost-benefit and cost-effectiveness analysis	BC - Vancouver	Community - Participants can fill their prescription at any pharmacy in the province; SIF in Vancouver	HCV, HIV

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SIS	Interview of residents, users with HIV and staff of the DPC SIS centre in downtown Vancouver.	The interviewees included 15 male and seven female HIV-positive IDU. Six of the interviewees were residents at the DPC, and the remaining 16 individuals were day-program participants. The mean age among the sample was 43.8 (range 28-54), and the average number of years living with HIV was 12.	22 in-depth interviews	HIV+ PWID that are DPC participants and have used the Harm Reduction Room (HRR) at least once	N/A	Participant interviews were facilitated using a semi-structured topic guide encouraging discussion of experiences and impact of the HRR, care experiences at the DPC, and perceived barriers. Staff interviews were facilitated by a different topic guide consisting of questions concerning the operation and integration of the HRR into existing services. <b>To examine the perspectives of HIV-positive IDU and healthcare staff regarding an integrated SIF within an HIVcare facility, with the aim of evaluating the program's influence on access to prevention and care services for HIV-positive IDU.</b>
SIS	Supervised injection site	<p>The population included injection drug users, non-users, persons with HIV and hepatitis C virus infection, and those with combinations of these states.</p> <p>Whenever possible, we used Vancouver-specific data for our model, including published and unpublished data for cohorts from 2 studies — the Vancouver Injection Drug Users Study and the Scientific Evaluation of Supervised Injecting. We compared and supplemented these data with estimates from the medical literature. When several estimates were available, we gave the most emphasis to those from North American studies.</p>	N/A - used model cohort. no info listed about # of people in cohort	HIV/HCV+ PWID	<p>VIDUS and SEOSI cohorts - The cohort for the model included individuals aged 15–64 years. We estimated the rate at which individuals leave the cohort over time because of death, aging beyond 64 years or migration out of the Vancouver area. We also estimated the rate at which individuals enter the cohort over time by attaining an age of 15 years or by migrating into the Vancouver area. Vancouver has an estimated population of 578 040, of whom 74% were within the age distribution of our cohort.<sup>11</sup> The supervised injection facility is located in the Downtown Eastside neighbourhood, where about 5000 injection drug users live.<sup>12–14</sup> We included another 2000 users estimated to live in other areas of the city.<sup>12</sup> We excluded other users in the Greater Vancouver Area to facilitate homogeneity in each model compartment and to allow for effective calibration of our model against epidemiologic data. Because the epidemiology of drug use is imprecise, we varied the estimate of the number of users from 3000 to 20 000 in sensitivity analyses.</p>	We used computer simulation to estimate the projected impact of Vancouver's supervised injection site on survival, rates of HIV and hepatitis C virus infection, referral to methadone maintenance treatment and associated costs. Our goal was to assess the cost-effectiveness of the facility and thus provide important insights into this policy debate.

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<p>Access to care; Acceptability; Safer injection education; Relationships; Delivery of care; Overdose prevention; Legitimate space; Type of substance; Shame</p>	<p>None</p>	<p>highlight the potential benefits of integrating harm reduction interventions within HIV care settings, and suggest that a SIFs can positively influence access to care for HIV-positive IDU.</p>	<p>present study highlight the value of integrating a SIF within a comprehensive care facility for HIV-positive IDU</p>	<p>None stated</p>
<p>Our main outcome of interest was the incremental costeffectiveness ratio of the supervised injection facility. Our comparator was a situation in which there was no such facility but other interventions for injection drug users were in place, including needle-exchange programs and methadone maintenance treatment. Although there is no single threshold at which an intervention is considered "cost-effective," we evaluated under which scenarios the incremental cost effectiveness of the facility would exceed \$50 000 per lifeyear gained, a commonly used benchmark</p>	<p>Outcomes included life-years gained, costs, and incremental cost-effectiveness ratios discounted at 5% per year</p>	<p>Focusing on the base assumption of decreased needle sharing as the only effect of the supervised injection facility, we found that the facility was associated with an incremental net savings of almost \$14 million and 920 life-years gained over 10 years. When we also considered the health effect of increased use of safe injection practices, the incremental net savings increased to more than \$20 million and the number of life-years gained to 1070. Further increases were estimated when we considered all 3 health benefits: the incremental net savings was more than \$18 million and the number of life-years gained 1175. Results were sensitive to assumptions related to injection frequency, the risk of HIV transmission through needle sharing, the frequency of safe injection practices among users of the facility, the costs of HIV-related care and of operating the facility, and the proportion of users who inject in the facility.</p> <p>Our analysis indicates that the supervised injection facility in Vancouver is associated with improved health outcomes. These health benefits and cost savings are due in large part to averted cases of HIV infection, even with conservative estimates of efficacy.</p> <p>The model also estimated that, with the introduction of the supervised injection facility, the size of the population of injection drug users would increase owing to fewer HIV and hepatitis C virus infections and reduced associated mortality.</p>	<p>Our analysis indicates that the supervised injection facility in Vancouver is associated with improved health outcomes. These health benefits and cost savings are due in large part to averted cases of HIV infection, even with conservative estimates of efficacy.</p>	<p>More generally, our observations indicate the challenge of evaluating an intervention without a contemporary control group and underscore the importance of considering intermediate outcomes, such as temporal trends in injecting practices, alongside epidemiologic data.</p>

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None stated	<p>The present study has a number of limitations. The views represented in our sample may not be entirely representative of all DPC participants who have made use of the HRR, as some participants with deviating views may have chosen not to participate. This study focused exclusively on the views of IDU who have used the HRR at least once; therefore, the views of IDU who attend the DPC but do not use the service are not represented. Likewise, the perspectives of non-IDU DPC participants regarding the HRR were not explored here. Added insights, concerning the acceptability of the HRR could have been gained by interviewing opiate and stimulant users separately. However, this proved difficult in this setting as most IDU are polysubstance users. In addition, we did not collect data on the impact of the HRR on participants' safer sex practices, and therefore we were unable to make inferences concerning the impact of the HRR on participants' sexual practices. Lastly, although we investigated the impact of the HRR on access to care, we did not obtain data specific to the impact of the HRR on access and adherence to HAART. Future studies should seek to investigate this further. An integrated SIF may provide unique opportunities for enhancing uptake of directly observed HAART.</p>	None stated	26/42=62%	25/42=59.5%	26+25/84=60.7%		
None stated	<p>First, we modelled the efficacy of the facility by focusing on the injecting behaviours of regular users of the facility. We may have overestimated efficacy if injection practices of users injecting outside the facility did not change; however, available analyses to date suggest a general change in injecting practices.<sup>3</sup> We may also have underestimated efficacy by ignoring the decreased risk associated with injections within the facility by casual users.</p> <p>Second, we excluded from our analysis potentially important health benefits such as decreased overdose, reduced transmission of hepatitis B, and reduced incidence of softtissue infections, endocarditis and other harms associated with unhygienic injection. We also did not account for benefits such as increased access to, and delivery of, other health services, social services and crisis management as well as societal benefits such as decreased cost of crime and improved social order, which may be particularly important in economic terms.<sup>59</sup></p> <p>Third, we considered methadone maintenance treatment as the only form of drug addiction treatment and not more expensive treatments such as residential care. Finally, we did not consider quality of life or a full probabilistic analysis. Our estimates are specific to the characteristics of the Vancouver supervised injection facility and may not be generalizable to other settings, since the size and geographic location of the population of</p>	<p>Did not include in analysis other health benefits like decreased overdose, reduced hepatitis B transmission, reduced incidence of soft-tissue infection, endocarditis and other harms associated with unhygienic injection. Did not account for benefits like increased access to and delivery of other health servies, social services and crisis management, as well as societal benefits such as decreased cost of crime and improved social order. Did not consider quality of life or full probabilistic analysis</p>	29/42 = 69.05%	27/42 = 64.3%	28/42 = 66.67%		

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	2008	Expert Advisory Committee on Supervised Injection Site Research (Ogborne, A.; Larke, B.; Plecas, D.; Waller, I.; Rehm, J.)	Prepared for the Hon. Tony Clement Minister of Health Government of Canada	Vancouver's INSITE Service and Other Supervised Injection Sites: What Has Been Learned from Research? - Final Report of the Expert Advisory Committee on Supervised Injection Site Research [Health Canada, 2008]	Non-empirical	Report	BC - Vancouver	Community	HIV, HCV, other injection related infections such as skin abscesses
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41	2008	Small, W.; Wood, E.; Lloyd-Smith, E.; Tyndall, M.; Kerr, T.	Drug and Alcohol Dependence	Accessing care for injection-related infections through a medically supervised injecting facility: A qualitative study	Empirical	Qualitative - interviews	BC - Vancouver	Community - Scientific Evaluation of Supervised Injecting (SEOSI)	HIV
42	Opioid Agonist Therapy (MMT / OST / OAT / HAT / MAT) n=12								

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SIF	InSite - supervised injection facility (SIF) as government-sanctioned space for users to inject pre-obtained drugs	N/A	N/A	All	N/A	<p>The purpose was to evaluate the services of Insite- focusing on the following:</p> <ul style="list-style-type: none"> <li>i) access to health and addiction care increased or not</li> <li>ii) overdose fatalities reduced or not</li> <li>iii) transmission of blood-borne viral infections and other injection related infections reduced or not</li> <li>iv) public order improved or not</li> </ul> <p>I'm not sure if this means the same thing but: The research reviewed relates to the formally stated objectives of INSITE, namely to: i) increase access to health and addiction care; ii) reduce overdose fatalities; iii) reduce transmission of blood-borne viral infections and other injection related infections; and iv) improve public order.</p>
SIF	supervised injection facilities	All	50	All, including indigenous and transgender participants	<p>Interview participants were recruited from the Scientific Evaluation of Supervised Injecting (SEOSI) cohort, which is composed of over 1000 randomly selected SIF users (Wood et al., 2004). Interviewees were selected from persons attending the research office for cohort interviews and recruiting efforts created a sample consistent with the socio-demographic profile of SEOSI</p> <p>no detailed info on the cohort in this paper</p>	<p>Given the significance of injection-related infections locally and the lack of evidence concerning the impact of SIFs on access to medical care, this study sought to investigate IDU perspectives regarding the impact of SIF utilization upon access to care for injection-related infections.</p>

<p>N/A</p>	<p>N/A</p>	<p>1) INSITE Utilization and User Characteristics Over 8,000 people have visited INSITE to inject drugs. 18% or 1506 of these 8,000 people account for 86% of the overall visits to INSITE. Less than 10% used INSITE for all injections. The median number of visits is approximately 8. Average of &gt;600 visits/day - operating near capacity. ~80% of visits are for injecting, 20% for other support services like counseling. 2) Services Provided: INSITE provides clean, supervised environments for injection drug use, clean syringes, needles and swabs, and ensures safe disposal of used needles. It also provides nursing services, including for skin abscesses, to large numbers of users. Users rate services as highly satisfactory. Letters of support and surveys show that health professionals, local police, local community and general public have positive/neutral views of INSITE services and the majority wish to see the service continue. Some local police are neutral, but not antagonistic. Opposition to the service tends to decrease over time. 3) Increasing Access to Health and Addiction Care: INSITE encourages users to seek counseling, detoxification and treatment. Existence of INSITE facilitated immunization of IDUs in DTE during an outbreak of pneumococcal pneumonia in 2006. 4) Impact on Overdose Fatalities: Mathematical modelling (see caution about validity below) suggests that INSITE saves about one life a year as a result of intervening in overdose events. 5) Reducing the Transmission of Blood-Borne Viral Infections &amp; Other Injection Related Infections: Results indicated needle sharing decreases with increased use of SISs but the Expert Advisory Committee were not convinced that these assumptions were entirely valid. This was based on mathematical modeling, based on assumptions about baseline rates of needle sharing – which require estimates for # of HIV cases that might have</p>	<p>None stated</p>	<p>future research could inform policy decisions, including research on the social determinants of injection drug users.</p>
<p>Looked at themes that emerged in interviews about IDUs' perspectives (ex. related to barriers to care, increased access to care and connecting to other medical care facilities); influence of SIF upon healthcare access and potential impact of SIF use on the management of injection-related infections</p>	<p>None</p>	<p>The perspectives of IDU participating in this study indicate that contact with nurses within the SIF serves to facilitate access to care for injection-related infections. The presence of nurses on-site was viewed as mediating common difficulties experienced in accessing medical attention, which may cause IDU to delay seeking care (described nursing staff were non-judgmental and "experienced" in working with IDU). SIF nurses provided care and treatment for infections on-site, and helped to connect IDU with off-site medical attention as required. The findings of the present study suggest that the SIF addresses important social and structural factors which constrain the ability of IDU to access care for injection-related infections. Also, helped by operating on a schedule that better accommodates the hours kept by many IDU.</p>	<p>In summary, our findings indicate that SIFs may help facilitate access to assessment, care, and treatment of injection-related infections among active IDU. By providing non-judgemental care within a setting where drug use can be accommodated, SIFs appear to have potential to overcome many of the well documented social and structural barriers to care commonly experienced by IDU.  Our findings highlight the value of SIF as an adapted primary care service, which has potential to increase uptake of health services among IDU  Enhancing access to primary care among IDU has the potential to reduce emergency room use and hospitalization among this population (Laine et al., 2005; Friedmann et al., 2006). This suggests that further benefits may be gained by increasing the volume of nursing care provided through the SIF, as well as expanding the capacity of SIF locally. Additionally, increasing IDU access to nursing care through needle exchange programs and outreach services may be effective in expanding the reach of care in urban settings without SIFs</p>	<p>None stated</p>

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None stated	Limitations to validity - mathematical models based on assumptions of baseline rates of needle sharing, risks of HIV transmission and other variables, generated very wide ranging estimates for the # of HIV cases that might have been prevented. The EAC were not convinced that these assumptions were entirely valid.	None stated	N/A	N/A	N/A		
None stated	Although interviewees were told that the study was being conducted independently of the SIF, it is possible that social desirability bias affected the responses of some participants. Our findings are based upon interviews with a sample of local IDU who use the SIF, and should be further evaluated through quantitative investigation.	None stated	18/42 = 42.86 %	19/42 = 45.2%	18/42 = 42.86 %		

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2019	Grebely, J.; Drolet, M.; Nwankwo, C.; Torrens, M.; Kastelic, A.; Walcher, S.; Somaini, L.; Mulvihill, E.; Ertl, J.; Liebert, R.; Litwin, A.H.	International Journal of Drug Policy	Perceptions and self-reported competency related to testing, management and treatment of hepatitis C virus infection among physicians prescribing opioid agonist treatment: The C-SCOPE study	Empirical	Survey	Multi-country: Australia, Canada, Europe, USA	Clinics	HCV
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2018	Butt, Z.A.; Shrestha, N.; Gesink, D.; Murti, M.; Buxton, J.A.; Gilbert, M.; Balshaw, R.F.; Wong, S.; Kuo, M.; Wong, J.; Yu, A.; Alvarez, M.; Samji, H.; Roth, D.; Consolacion, T.; Hull, M.W.; Ogilvie, G.; Tyndall, M.W.; Krajdien, M.; Janjua, N.Z.	Clinical Epidemiology	Effect of opioid-substitution therapy and mental health counseling on HIV risk among hepatitis C-infected individuals	Empirical	Cohort - prospective	BC	Not specified	HIV, HCV

OAT	Mix of OAT settings - 53% in publicly funded clinics, 47% in privately funded clinics (30% in private for-profit and 17% in private not-for profit). 38% substance use clinics/centres, 20% in hospital department providing treatment to people receiving OAT, 15% in OAT clinic/centre, 27% other institutions/offices providing treatment for people receiving OAT.	Physicians providing care for patients in a clinic providing OAT, treating PWID with OAT.	203 physicians	PWID receiving OAT treatment at OAT certified centres	N/A	To test perceptions and competency related to HCV testing, management and treatment among physicians practicing in clinics offering opioid agonist treatment (OAT)
OST, mental health counselling	OST, mental health counselling	people with HCV (subgroup: IDUs, MSM)	36, 077 participants with HCV	HCV+	The British Columbia Hepatitis Testers Cohort (BC-HTC) includes all individuals (~1.5 million; approximately a third of all BC residents) tested for HCV or HIV at the BC Centre for Disease Control Public Health Laboratory (BCCDCPHL) or diagnosed with HCV, HBV, HIV/AIDS, or active tuberculosis (TB). People diagnosed with HCV during 1990–2013 but negative for HIV were eligible for inclusion	To estimate the risk of HIV and factors preventing and promoting this risk among people living with HCV in British Columbia

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<p>1-5 scale for perceptions and 1-7 scale for perceived competency</p>	<p>Multiple covariates including region, primary specialty of physician, number of years in practice, practice source of funding, type of OAT institution, OAT clinic setting, number of patients managed on OAT who are PWID in past 12 months, number of patients personally managed on OAT who are PWID with HCV in past 12 months, number of patients treated for HCV in past 6 months, awareness of any document/tools for screening, diagnosis, or treatment of HCV, training on these in the past year, looked at information on these in past year, read or consulted any specified guidelines for HCV, and availability of a protocol for testing/diagnosing HCV.</p>	<p>73% of physicians were aware of documents for screening, diagnosis or treatment of HCV, 65% obtained same information in past year, 37% attended training on HCV in past year, 37% read specific guidelines. Over 80% recognized it was extremely or very important to perform HCV antibody testing among PWID, perform HCV RNA testing in those who are HCV antibody positive, and for people with detectable HCV RNA test to be linked to professional treating HCV, receive a liver disease assessment, for PWID diagnosed with HCV to initiate HCV treatment and achieve a virological response. However, 69% felt that it was extremely or very important for them to be able to prescribe and treat HCV in PWID.</p>	<p>Need to develop and implement programs to enhance HCV education and improve clinical practice among physicians prescribing OAT, including improving knowledge of assessment of liver disease and DAA therapies. National guidelines could provide important foundation for clinical practice and standardization of care, and increase number of patients accessing HCV treatment. Ensure appropriate referrals amongst multidisciplinary health care</p>	<p>None stated</p>
<p>Time to HIV infection at least 6 weeks after HCV diagnosis</p>	<p>sexual orientation (MSM), IDU, OST, mental health counseling, age at HCV diagnosis, year of HCV diagnosis, hepatitis B, social deprivation quintile at time of test; major mental illness; depression; psychosis; problematic alcohol use; active TB; sex; HIV tests per year</p>	<p>In Cox regression model, injection-drug use (aHR 1.47, 95% CI 1.33–1.63) and being a man who has sex with men (aHR 2.78, 95% CI 2.14–3.61) were associated with higher risk of HIV infection. Opioid substitution therapy (OST) (aHR 0.59, 95% CI 0.52–0.67) and mental health counseling (aHR 0.48, 95% CI 0.43–0.53) were associated with lower risk of HIV infection</p>	<p>Improving access to OST could prevent transmission of HIV and other bloodborne infections, especially in settings where access is limited.</p>	<p>As causal inferences based on intervention effects in observational studies are prone to biases, future research using experimental designs is needed to validate the results of this study</p>

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<p>The panels for selection in other countries matched the AMA demographic characteristics.</p>	<p>Possible selection bias due to voluntary opt-in panels as methods for recruitment. There is heterogeneity in the availability of healthcare services, education and training, and policies for HCV testing and treatment between countries which may have influenced responses. As a cross-sectional survey, cannot establish causality. Recall bias from self-reported survey.</p>	<p>Perception and knowledge gaps exist amongst physicians providing OAT care for the screening and treatment of Hep C for PWID</p>	<p>35/42 = 83.3%</p>	<p>29/42 = 69%</p>	<p>31/42 = 73.8 %</p>		
<p>large population based cohort study</p>	<p>1. misclassification of variables 2. observational study: causal inferences based on intervention effects are prone to biases 3. some interactions could not be evaluated because of smaller samples (MSM, IDU)</p>	<p>None stated</p>	<p>33/42=78.5%</p>	<p>33/42=78.5%</p>	<p>78.5+78.5/2=78.5%</p>		

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2018	Klimas, J.; Dong, H.; Fairbairn, N.; Socias, E.; Barrios, R.; Wood, E.; Kerr, T.; Montaner, J.; Milloy, M.-J.	Addiction Science & Clinical Practice	Eligibility for heroin-assisted treatment (HAT) among people who inject opioids and are living with HIV in a Canadian setting	Empirical	Cohort - retrospective	BC - Vancouver	Not specified	HIV
2018	Ti, L.; Socias, M.E.; Wood, E.; Milloy, M.-J.; Nosova, E.; DeBeck, K.; Kerr, T.; Hayashi, K.	PLOS ONE	The impact of methadone maintenance therapy on access to regular physician care regarding hepatitis C among people who inject drugs	Empirical	Cohort - prospective	BC - Vancouver	Not specified	HCV

HAT	Heroin-Assisted treatment (HAT); injectable diacetylmorphine (i.e. prescribed heroin) for treatment-refractory opioid use disorder	Had completed at least one study visit between December 1, 2005 and May 31, 2014, over 18 years old, reported ever injecting drugs at least once at the baseline interview; people who use illicit drugs and live with HIV in Vancouver, Canada (ACCESS - cohort of HIV-seropositive adults who have used at least one illicit drug, other than or in addition to cannabis, in the month prior to recruitment	478 participants included in analysis	HIV+	AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS)-HIV-seropositive adults who have used at least one illicit drug in the month prior to recruitment; baseline and biannual interviewer administered questionnaires assessing sociodemography, drug use and related behaviours, characteristics and exposures, nursing exam and phlebotomy for HIV monitoring, HIV-1 RNA viral loads, CD4 counts, ART records accessed from linked retrospective and prospective HIV monitoring profile	Estimate the prevalence and characteristics of HIV-positive individuals eligible for HAT in Vancouver, Canada
MMT	Methadone Maintenance Therapy	The study was conducted between September 2005 and May 2015 and the sample was restricted to participants who: 1) were HCV seropositive at baseline or became positive during follow-up via serologic test; 2) completed at least one follow-up visit after the HCV-positive test result; 3) reported a history of injection drug use at a visit when their blood sample tested positive for HCV; 4) did not die during the study period (or up until the most recent date of death confirmed through a confidential linkage to the provincial Vital Statistics database); 5) has chronic HCV, defined via self-report as those who reported not having naturally cleared HCV, which was derived through a series of questions related to HCV	1627	All	1)The Vancouver Injection Drug Users Study (VIDUS)--> May 1996 (inception)--> consists of HIV-negative adult (18 years of age) PWID. All participants must have injected an illicit drug in the previous month to be eligible for inclusion, 2) AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS)--> May 1996 (inception)-->cohort of HIV-positive adults people who use illicit drugs (PWUD) who must have recently used an illicit drug other than or in addition to cannabis in the month prior to enrollment. 3) the At-Risk Youth Study (ARYS)--> October 2005 (inception) --> street-involved youth between the ages of 14 and 26 who have used illicit drugs other than or in addition to cannabis in the month prior to enrollment. All individuals must have resided in the greater Vancouver region and provided written informed consent to be eligible for the study. All 3 studies are open cohort studies. At baseline and semi-annually, participants completed a harmonized interviewer-administered questionnaire that elicited information on socio-demographic characteristics, drug use patterns, involvement in addiction treatment, and other relevant exposures and outcomes (i.e., participants in the VIDUS, ACCESS, and ARYS studies completed an identical questionnaire to allow for pooled analyses and comparisons across cohorts). Additionally, at each study visit, participants provided blood samples for HIV and HCV serologic tests and HIV disease monitoring as appropriate.	To examine the relationship between MMT and having access to regular physician care regarding HCV among HCV-positive PWID

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21</p> <p>Eligibility for HAT: Defined HAT eligibility as (a) currently residing in the study area (i.e., the city of Vancouver); (b) current regular injection of illicit opioids (i.e., ≥ one time in the previous 6 months); (c) at least two self-reported prior SUD treatment attempts, including one episode of OAT (i.e., methadone or buprenorphine/naloxone); (d) at least 5 years of illicit opioid use; and (e) poor health, or psychosocial functioning, defined as a self-reported mental health diagnosis</p>	<p>Explanatory variables: age; gender; Caucasian ethnicity/ancestry; hepatitis C virus antibody status; number of years of using injection heroin at baseline; homelessness; relationship status; highest level of education completed; formal employment (yes vs. no, i.e., regular job, temporary job, or self-employed); money spent on drugs per day (≥ \$50 per day vs. &lt; \$50 per day); drug dealing; ≥ daily non-injection cocaine use (yes vs. no); ≥ daily non-injection heroin use (yes vs. no); ≥ daily crack use (yes vs. no); ≥ daily methamphetamine use (yes vs. no); non-fatal overdose (yes vs. no); lent used syringe (yes vs. no); recent incarceration (yes vs. no); engagement in any form of unprotected sex (yes vs. no); exchange of sex for gifts, food, shelter, clothes, etc. (yes vs. no); being a victim of violence, defined as having been attacked or assaulted (yes vs. no)</p> <p>Included HIV clinical monitoring data: HIV-1 RNA plasma viral load (VL), using the median of all observations in the previous 6 months or, if none, the most recent observation; ART engagement, using the number of</p>	<p>94 (19.7%) were deemed to be eligible for HAT at least once through study period: 32 reported eligible for once, 19 twice, 11 thrice, and 32 more than thrice; Periods of HAT eligibility associated with markers of severe SUD, such as high-intensity illicit drug use, homelessness and drug dealing; Males in HIV-positive sample were less likely to be deemed HAT eligible</p>	<p>Identifies benefits of expanding access to HAT in population, particularly for those who do not respond to typical treatment of opioid use disorder; expanding HAT to this population might influence the factors linked with sub-optimal HIV treatment and improve HIV treatment outcomes, thus contributing to TasP goals. Moreover, they provide further support for the potential role of HAT in decreasing opioid-associated morbidity and mortality.</p>	<p>More evidence needed for improving access to HAT and its contribution to TasP; need to establish benefit of concomitant HAT/ART treatment for people with treatment refractory opioid use disorder; research into a potential role of HAT in facilitating HAT adherence among women is needed</p>
<p>22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Main explanatory variable: having been enrolled in MMT in the last 6 months. Found an independent association between being on MMT and having access to regular physician care regarding HCV, even after adjusting for a range of confounders.</p>	<p>sex (male vs. female); age (per year increase); HIV serostatus (positive vs. negative); homelessness (yes vs. no); daily opioid injection, including heroin or prescription opioid injection (daily vs. &lt; daily); daily stimulant injection, including cocaine, crack cocaine, or crystal methamphetamine injection (daily vs. &lt; daily); stable employment, defined as having a regular job, temporary work, or selfemployed (yes vs. no); hospital use (yes vs. no); and incarceration (yes vs. no). All variables except for sex were time-updated and referred to the six-month period prior to the follow-up interview unless otherwise indicated.</p>	<p>A substantial proportion of a community-recruited sample of HCV-positive PWID reported having access to regular physician care regarding HCV. Furthermore, researchers found an independent association between being on MMT and having access to regular physician care regarding HCV, even after adjusting for a range of confounders. The findings from this study are consistent with previous research focused on HIV care that highlighted the positive role that MMT plays in ART retention, adherence, and viral load suppression among HIV-positive PWID [17,25,26]. Specifically, a randomized controlled trial found that PWID enrolled in a MMT program reported significantly faster entry into HIV care compared to those without a history of MMT. There are a number of possible pathways that underline the relationship between engagement in MMT and accessing HCV care. First, it is likely that access to addiction treatment gives physicians an opportunity to discuss HCV testing, treatment, and care options and can provide an entry point for the delivery of these services to patients. Second, MMT is generally daily dispensed through pharmacies in BC; thus, community pharmacists are uniquely positioned to link PWID to HCV testing and treatment .</p>	<p>Adds to a growing body of evidence that suggests that the integration of infectious disease testing, treatment and care within addiction programs is associated with better health outcomes and increased use of healthcare services among PWID and other marginalized populations. Has been done successfully in several settings with high prevalence of HCV; several international guidelines focusing on HCV recommend integrated, multidisciplinary approaches to scale up testing and treatment services. This study also highlights the need to engage PWID in addiction treatment, when appropriate.</p>	<p>Future research needed to more clearly understand relationship b/w engagement in MMT and accessing HCV care; little is known about other possible pathways</p>

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None stated	sample was not recruited at random and cannot be assumed to represent the larger population of PWID in Vancouver; did not confirm the diagnoses of mental health and opioid use disorder; underestimated the rates of risky behaviours and drug use (e.g. syringe sharing) due to the effects of social desirability; did not assess potential risk factors for opioid overdose (e.g. current co-use of benzodiazepines, alcohol or non-injection heroin)	None stated	27/42 = 64.3%	27/42 = 64.3%	27/42 = 64.3%		
The study adds to the literature by suggesting that the benefits of opioid substitution treatment programs, such as MMT, may also be extended to the HCV context given the associated effectiveness in linking PWID to HCV care.	First, the observational nature of the study design limited our ability to determine a direct causal relationship between being enrolled in MMT and having access to regular physician care regarding HCV. Second, the study included some data derived from self-report and thus, may be subject to reporting biases. Specifically, participants may have responded as having access to regular physician care regarding HCV if their addiction medicine doctor who prescribed their methadone asked them casually about their HCV once during a six-month period. This may have biased their results away from the null. Third, there may be unmeasured confounding given that we were only able to control for known confounders. Fourth, they measured chronic HCV status based on HCV-antibody positive test results and self-reports of having never been told by a physician that they no longer have HCV but were not on HCV treatment. Therefore, it is unknown whether these individuals had active HCV infection during the study period. Lastly, their study was not randomly recruited and therefore may not be representative of local PWID or generalizable to other PWID populations outside of Vancouver.	None stated	26/42=61.9%	25/42 = 59.52%	26/42=61.9%		

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2017	Socias, M. E.; Wood, E.; McNeil, R.; Kerr, T.; Dong, H.; Shoveller, J.; Montaner, J.; Milloy, M.-J.	International Journal of Drug Policy	Unintended impacts of regulatory changes to British Columbia Methadone Maintenance Program on addiction and HIV-related outcomes: An interrupted time series analysis	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
2017	Vashishtha, D.; Mittal, M.; Werb, D.	Harm Reduction Journal	The North American opioid epidemic: current challenges and a call for treatment as prevention	Non-empirical	Commentary	Multi-country: USA, Canada and Mexico	Community	HCV, HIV

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MMT	Switch to 10x more concentrated methadone formulation and restrictions in pharmacy delivery services	HIV-positive opioid users in Vancouver		331 HIV+ (part of ACCESS cohort)	Data drawn from ACCESS cohort. Prospective cohort of HIV-positive PWUD. Inclusion: HIV positive, age 18+, live in greater Vancouver, used illicit drugs other than cannabis in past month. For present study, participants were included if: reported any history of opioid use, with at least one follow-up visit in both the pre- (November 1, 2012 – January 31, 2014) and postpolicy periods (March 1, 2014 – May 31, 2015). Thus, we included data from 15 months prior to the change in the MMT program and up to 15 months after	To evaluate possible unintended effects of changes to regulatory reforms to MMT program in BC on illicit drug use pattern and HIV treatment outcomes among HIV-positive opioid users
MAT	Medication-assisted treatment, treatment as prevention strategy	PWID in the USA, Canada and Mexico	N/A	All	N/A	Review current challenges in responding to opioid misuse, describe barriers to the treatment of opioid use disorder (OUD) through MAT, and explore public health-oriented policy and interventional options to effectively respond to OUD in North America.

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<p>4 yes/no outcomes: 1. current engagement in MMT (self-reported) 2. self-reported illicit heroin injection (within 6 months prior to interview) 3. optimal ART adherence (&gt;=95%) 4. VL suppression</p>	<p>None</p>	<p>although the policy change was associated with a gradual increase in the proportion of HIV-positive opioid users enrolled in MMT, rates of illicit heroin injection increased sharply immediately after the implementation of the policy and remained elevated throughout the study period. Importantly, changes in the MMT program appeared to also have affected engagement in HIV care as demonstrated by a significant drop in ART adherence immediately after the policy change. However, this change was not accompanied by a corresponding decrease in viral suppression rates. In summary, our study provides empirical evidence detailing possible unintended consequences of the regulatory changes introduced to the BC MMT program in February 2014, changes that were made with the goals of improving the quality of OAT. Importantly, adverse effects were documented not only in drug use behavior (increase in illicit heroin injection), but also in HIV-related treatment outcomes (decrease in ART adherence).</p>	<p>Need for interventions that support MMT clients upon introduction of new medication formulations or other changes that affect medication dispensation. First and foremost, the affected community should be consulted and involved in the planning, development and implementation phases of proposed new approaches. Persons on methadone's input on key aspects of implementation strategies and their capacity to provide insights into potential unexpected outcomes (positive and negative) is of paramount importance. findings from this study may help inform the development and implementation of policies targeted to individuals with opioid use disorders (and related comorbidities). Particularly, results from the present analysis underscore the need to consider potential unintended effects of altering health policies targeting vulnerable populations, the need to develop appropriate mitigation strategies, as well as to involve all relevant stakeholders, including the affected community in the planning and implementation of these new policies</p>	<p>please see previous column</p>
<p>N/A</p>	<p>N/A</p>	<p>Part of the treatment gap in the USA is likely attributable to the lack of a national healthcare system, which has allowed for the scale up of buprenorphine prescribing in France and Canada. Further, the USA is lacking in low-threshold programs which increase treatment accessibility for the greatest number of individuals in need. Such low-threshold models are becoming the standard of care in countries such as Canada and elsewhere. In Vancouver, Canada, for example, methadone is dispensed at pharmacies and integrated mental health treatment, and social support services for pregnant opioid users have been implemented. In the USA, the Substance Abuse and Mental Health Services Administration (SAMHSA) will expand MAT availability by allowing previously trained nurse practitioners and physician assistants to prescribe MAT in the form of buprenorphine in early 2017. Only 2.2% of US physicians are waived to provide buprenorphine. Physicians have also been characterized as having "low confidence in addressing addiction, limited access to addiction experts, lack of institutional or office support, lack of behavioral health services, and reimbursement concerns". This is related to the fact that physicians receive little addiction training and have ongoing stigma against treating PWID. Mexico faces an even more serious challenge, as primary care physicians are unable to directly prescribe MAT to patients. This is because methadone treatment is the only MAT option available in Mexico, and it is only dispensed in a few private clinics, while only three government-sponsored clinics are in operation across the entire country</p>	<p>First, federal and state-level funding for MAT treatment centers must be increased to address the 92% of opioid-dependent individuals eligible for MAT treatment. Second, barriers that hamper the capacity of clinicians to prescribe MAT must be removed. Third, geographic "hot spots" of opioid misuse among marginalized populations should be prioritized for the provision of low-threshold and experimental approaches to MAT delivery. Fourth, policies of drug decriminalization should be considered to reduce the risk that PWID populations will remain "hidden," less likely to engage in care, and at higher risk of HIV transmission. Fifth, there must be an overall shift towards more harm reduction-oriented policing practices. Finally, pharmaceutical companies and academic research institutions should be further engaged in developing novel pharmacotherapies for OUD accessible to a range of populations. Clinicians must support and advocate for the development of an evidence-based addiction treatment system that is accessible to marginalized populations and effective in managing the unacceptably high burden of OUD across the USA, Mexico, and Canada.</p>	<p>None stated</p>

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<p>The major strength of this study is the use of a strong longitudinal, quasi-experimental design to evaluate the impacts of regulatory changes in BC MMT program on both addiction and HIV-related treatment outcomes among HIV-positive opioid users in Vancouver, BC. Importantly, this study design allows to control from pre-existing levels and trends of each of the outcomes evaluated. Another strength of the present analysis is the utilization of a closed cohort (i.e., inclusion of participants with observations in both the pre- and post-policy periods), which reduces the possibility of selection-attrition biases.</p>	<p>First, our study sample was not randomly selected, and thus, might not be representative of the larger population of HIV-positive opioid users in Vancouver. Likewise, results from this study may not be completely generalizable to HIV-negative opioid users or to settings with different health policies and clinical practices (e.g., low threshold MMT services, universal and comprehensive coverage for HIV care). Second, we relied on self-reported data for some of the outcomes evaluated, which may be subject to social-desirability bias. Third, the use of aggregated individual-level data does not allow making inferences about individual-level outcomes. Fourth, the relatively small number of observations per data point and related variability within the data, as reflected by the presence of some outliers, may have resulted in reduced power to detect small changes in the outcomes. Finally, given that we only measured heroin injection the impact of the policy change on other forms of opioid misuse could not be assessed.</p>	<p>None stated</p>	<p>27/42 = 64.29%</p>	<p>29/42=69%</p>	<p>28/42 = 66.67%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>		

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	2016	Socias, M.E.; Wood, E.; Small, W.; Dong, H.; Shoveller, J.; Kerr, T.; Montaner, J.; Milloy, M.-J.	Drug and Alcohol Dependence	Methadone maintenance therapy and viral suppression among HIV-infected opioid users: The impacts of crack and injection cocaine use	Empirical	Cohort - retrospective	BC - Vancouver	Community	HIV
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2016	Islam, N.; Kraiden, M.; Shoveller, J.; Gustafson, P.; Gilbert, M.; Buxton, J.; Wong, J.; Tyndall, T.; Janjua, N.Z.; BC-HTC Team	Conference report for The National AIDS Treatment Advocacy Project (NATAP) in the American Association for the Study of Liver Diseases (AASLD), Boston, MA, November 2016	Impact of drug use and opioid substitution therapy on Hepatitis C reinfection: The BC Hepatitis Testers Cohort	Empirical	Cohort - prospective	BC	Not specified	HCV

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	MMT	Methadone maintenance therapy (MMT) in HIV-infected opioid users	HIV-infected PWUD in Vancouver enrolled in MMT	397	HIV+ (part of ACCESS cohort)	Data drawn from ACCESS cohort. Prospective cohort of HIV-positive PWUD. Inclusion: HIV positive, age 18+, live in greater Vancouver, used illicit drugs other than cannabis in past month. Analysis included HIV-positive opioid users who completed at least 1 study interview between 2005 and 2014. For this analysis, we included participants who reported any history of opioid use, and who were ART exposed at enrollment. ART-naïve participants who subsequently initiated ART were included from the next follow-up interview forward. We further restricted our analytical sample to participants who had at least one VL measure and one CD4 measure within $\pm$ 180 days of the earliest interview.	To evaluate whether the effect of MMT on viral suppression differs among opioid users with distinct patterns of cocaine use. Including impacts of high intensity cocaine use (ie. at least daily) and potential differences between routes of administration (ie. crack smoking, cocaine injection)
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	OST, mental health counseling	Opioid substitution therapy (OST) and mental health counselling	Individuals testing positive for HCV and then clearing infection	5,945 used in analysis; 46,940 positive HCV RNA test, then 19,346 at least one negative RNA test; 5,960 spontaneous clearance (3,690 had at least 1 PCR after clearance) and 3,652 cleared after SVR treatment (2,255 had at least 1 PCR after clearance)	HCV+	The BC Hepatitis Testers Cohort (BC-HTC) includes at least 1.5 million people who have been tested for HBV, HCV, HIV, or active TB; no further information provided in document	To estimate incidence rate of re-infection of HCV and to identify factors associated with reinfection risk, and examine the role of opioid substitution therapy (OST) on HCV reinfection among PWID

<p>Time-updated measure of viral load (VL). Viral suppression was defined as having a HIV plasma viral load &lt; 50 copies/mL (yes versus no) in the previous six months.</p>	<p>The primary explanatory variable was a time-varying measure of enrollment in a methadone maintenance program (MMT) for the treatment of opioid use disorders in the six-month period preceding the study interview (yes vs. no). Time-fixed variables of interest at baseline included: age (per 10 years older); gender (male versus female); ethnicity (Caucasian versus non-Caucasian); highest educational attainment (high school or postsecondary education vs. less than high school completion); and depressive symptomatology Time-varying variables included frequent heroin injection (<math>\geq</math> daily versus &lt; daily); heavy alcohol use (<math>\geq 4</math> drinks/day versus &lt;4 drinks/day); unstable housing (yes versus no); incarceration (yes versus no); involvement in sex work (yes versus no); and employment (yes versus no)</p>	<p>Enrollment in MMT program was associated with increased odds of VL suppression among less than daily cocaine injectors. There was no beneficial effect of MMT for more frequent cocaine injectors. There was a positive impact on VL for frequent cocaine injectors who were retained on MMT for longer consecutive periods. Crack cocaine use did not undermine positive impact of MMT on viral suppression. Unexpectedly, there was a greater positive effect of MMT on viral suppression among daily crack cocaine smokers (vs. less frequent crack cocaine smokers).</p>	<p>There is a need for multi-level approaches that include harm reduction opportunities (ex. safe smoking facilities and distribution of safer smoking kits) and other social support interventions in order to improve health and wellbeing of people who smoke crack-cocaine.</p> <p>Our findings underscore the urgent need to identify novel and effective pharmacotherapies for the treatment of cocaine use disorders, as well as social-structural interventions to support engagement in addiction and HIV care for this population</p>	<p>Future research is needed to better understand what enables some cocaine users to be retained in MMT. There is a need for research that identifies effective pharmacotherapies to treat cocaine use disorders, as well as individual and structural interventions that promote ART adherence and the reduction of drug-related harm. Further research is needed to understand combination of interventions that are best suited to address health and social harms associated with crack-cocaine use disorders.</p>
<p>HCV reinfection as positive RNA test after two consecutive negative PCR tests <math>\geq 28</math> days apart</p>	<p>age, gender, HIV coinfection, mental health counseling visit, injection drug use, problematic alcohol use, material deprivation, viral genotype</p>	<p>Incidence of reinfection higher among those who spontaneously cleared [(1.6 or 2.9/100person year vs. treated with sustained virologic response (SVR)], HIV coinfection (2.56 or 4.17/100PY) and PWID (1.77 or 3.34/100PY). OST, mental health counselling and female gender reduced risk of reinfection.</p>	<p>More PWIDs are being treated with DAAs, therefore reinfection rates are important to note as insurance companies may be reticent to cover HCV treatment and reinfection rates are expected to increase; OST and mental health counseling reduce risk of reinfection.</p>	<p>Further investigation needed to assess impact of OST and other harm reduction strategies</p>

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None stated	<p>1. Sample not randomly selected, so might not be representative of larger population of HIV-positive opioid-dependent individuals in Vancouver or other settings.</p> <p>2. Many measures relied on self-reported data (possible social desirability bias and underreporting).</p> <p>3. This was an observational study - despite the utilization of multivariable statistical approaches, we cannot exclude the possibility of residual unmeasured confounding.</p> <p>4. The current analytic approach does not allow us to tease out relative contributions of behavioral and biological pathways and lower rates of viral suppression among frequent cocaine injectors.</p> <p>5. the absence of a positive association between MMT and VL suppression during periods of at least daily cocaine injection may have been the result of low statistical power</p> <p>5. the study design does not allow us to determine the exact temporal relationship between enrollment in MMT and VL suppression within any six-month period.</p>	None stated	25/42 = 59.52%	31/42=73.8%	27/42 = 64.29%		
None stated	None stated	Reinfection with HCV presents a barrier to treating HCV and for insurers to cover HCV treatments, which must be addressed in order to eliminate HCV. Need to assess OST and other harm reduction strategies such as mental health counselling in reinfection.	20/42 = 47.6%	21/42=50%	48.80%		



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	2015	Ahamad, K.; Hayashi, K.; Nguyen, P.; Dobrer, S.; Kerr, T.; Schütz, C.G.; Montaner, J.S.; Wood, E.	Lancet HIV	Low Threshold Methadone Protects against HIV Incidence in a Canadian Setting: An Observational Cohort Study	Empirical	Cohort - prospective	BC - Vancouver	Multiple - clinic and community	HIV
19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35	2014	McNeil, R.; Small, W.; Wood, E.; Kerr, T.	Soc Sci Med.	Hospitals as a 'risk environment: An ethno-epidemiological study of voluntary and involuntary discharge from hospital against medical advice among people who inject drugs	Empirical	Qualitative - ethno-epidemiological	BC - Vancouver	Hospital	HCV, HIV

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MMT	Low threshold availability of methadone maintenance therapy (prescribed in primary care and dispensed in community pharmacy)	PWID who were HIV negative at study recruitment and completed at least one follow-up interview between May 1996-May 2013	1639 PWID participants receiving MMT who were initially HIV negative and returned for at least one follow up visit for assess for HIV infection	All	Vancouver Injection Drug Users Study (VIDUS); started in 1996; individuals were eligible to enroll in VIDUS if they had injected illicit drugs at least once in the previous month and resided in the Greater Vancouver region at enrollment; interviewer administered questionnaire and blood samples at enrollment and semi-annual follow-up visits;	To determine the effect of methadone maintenance therapy on HIV incidence in a Canadian setting with low threshold availability of methadone
MMT	MMT, opioid use in hospital	Cohort participants who reported that they had recently been discharged from hospital against medical advice during follow-up surveys that are part of their participation in cohort studies.	30	All PWID leaving AMA from hospital, ensured inclusion of women and people of Aboriginal ancestry to make more representative of population	Vancouver Injection Drug Users Study (VIDUS), AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS); These cohort studies include more than 2000 current and former drug users, and their methods have been described in detail elsewhere (Strathdee et al., 1997; Wood et al., 2003).	To explore how the social-structural dynamics within hospitals function to produce discharges against medical advice among PWID. Particularly concerned with the role of abstinence-based drug policies in hospital settings in framing the social and structural-environmental contexts of hospital care, pain management practices, and in-hospital drug use. Finally, we aimed to identify ways in which the hospital 'risk environment' could be modified to minimize the potential for adverse outcomes, including discharges AMA

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<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</p> <p>Time to HIV seroconversion, defined as the time interval between recruitment into the cohort and estimated date of HIV seroconversion/infection. Date of HIV infection was estimated as the midpoint between the last HIV negative test and the first HIV positive test.</p>	<p>Primary explanatory variable was use of methadone maintenance therapy (MMT) in previous six months; gender (male vs. female); age (in years); ethnicity (Caucasian vs. other); incarceration defined as being in detention, prison or jail for overnight or longer (yes vs. no); sex work involvement defined as exchanging sex for money, food, drugs, shelter or other commodities (yes vs. no); at least daily injection heroin use (yes vs. no); at least daily injection cocaine use (yes vs. no); syringe borrowing (yes vs. no); required help injecting (yes vs. no); at least daily crack cocaine smoking (yes vs. no); and unprotected vaginal/anal sex (yes vs. no). Unless specified, all behavioural variables refer to activities taking place within the previous six months.</p>	<p>In this setting, where methadone is available through primary care physicians and dispensed by community pharmacies, the use of methadone was independently associated with a reduced rate of HIV infection after adjusting for potential confounders including demographic and drug using characteristics. Of 1639 HIV-negative individuals, 138 cases of HIV seroconversion occurred during a median of 75.5 months of follow-up. Methadone maintenance therapy was independently associated with a reduced hazard of HIV infection (adjusted relative hazard: 0.64[90% confidence interval: 0.41-0.98]).</p>	<p>This study reinforces that decreasing barriers to methadone by providing access through primary care physicians is safe, equally effective and increases access to an essential medical therapy, especially important in settings where HIV related to drug use remains high</p>	<p>Even though a RCT might be better, it could be unethical given the known benefits of methadone maintenance therapy</p>
<p>19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35</p> <p>None</p>	<p>None</p>	<p>Participant accounts underscored the role of social and structural forces in shaping pain management practices and producing suffering that framed experiences in hospital setting; findings underscore how the perception that participants were 'drug-seeking' was critical in shaping the social-environmental context of hospital care, and likely delegitimized the very real pain and suffering that they endured; Most participants expressed that heroin and prescription opioid injection were the only avenues available to them to address pain and withdrawal; Participants characterized hospitals as "jails" or "prisons", and viewed hospital staff as playing the role of "cop" in enforcing abstinence-only drug policies; Whereas all participants indicated that they had been admitted to hospital for complex health problems, and required extensive treatment, approximately one third of our participants reported that they were involuntarily discharged for in-hospital drug use; Approximately half of our participants reported that they left hospital altogether when using drugs. <b>Diverse forms of social control that function to regulate drug use in hospitals (i.e. surveillance and regulation) increases the potential for drug-related harm and discharges against medical advice. Hospitals are a risk environment where social and structural conditions produce discharges AMA and, in turn, more complicated and protracted medical treatment.</b></p>	<p>Reforms may be needed to rethink pain management strategies and re-orient towards alleviating suffering, including changes to legal and professional regulations regarding the prescribing of prescription opioids; education and training programs aimed at improving cultural competency among hospital staff; increase addiction and pain management training among physicians; implement MMT, opioid substitution therapy, appropriate pain management for hospitalized PWID; implement comprehensive harm reduction into hospitals; involving PWID in the development and implementation of hospital-based harm reduction services may serve to increase the acceptability of such services while promoting agency among PWID. "In this regard, our findings highlight the importance of considering how diverse settings constitute risk environments for injection drug-using populations, and how drug criminalization frames the structural vulnerability of PWID in these settings." - highlights potential for larger law/policy change</p>	<p>Further research into the perspectives of hospital staff regarding the care of injection drug-using populations, and the potential integration of harm reduction services into hospitals, is urgently needed.</p>

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<p>Primary endpoint was based on objective laboratory evidence of HIV seroconversion.</p>	<p>Observational design which may not account for all confounding factors, and self-reporting for several measures, including methadone use</p>	<p>Not all jurisdictions allow for low threshold dispensing of methadone, limiting access and use of MMT</p>	<p>31/42 = 73.8%</p>	<p>26/42=62</p>	<p>27/42 = 64.3%</p>	<p>Background? 5. MacArthur GJ, Minozzi S, Martin N, et al. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis. BMJ: British Medical Journal. 2012;345.</p>	
<p>None stated</p>	<p>Because participants had been discharged against medical advice, their experiences in hospital may be negatively biased, and may not be representative of those who completed treatment; findings are specific to hospitals in the Vancouver area and, although they generate insights that may be relevant to other settings where hospital care is shaped by similar contextual forces, they cannot fully account for PWID's experiences in hospitals; participants were covered by universal, publicly-funded health care insurance, PWID in other settings may face additional financial barriers to care that have an additional impact on hospital care; findings represent only the perspectives of PWID not hospital staff</p>	<p>Limited attention has been paid to how untreated and undertreated pain shapes experiences in hospital settings</p>	<p>33/42 = 78.6 %</p>	<p>32/42 = 76.2%</p>	<p>33/42 = 78.6 %</p>		

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1	2014	Nolan, S.; Lima, V.D.; Fairbairn, N.; Kerr, T.; Montaner, J.; Grebely, J.; Wood, E.	Addiction	The impact of methadone maintenance therapy on hepatitis c incidence among illicit drug users	Empirical	Cohort - retrospective	BC - Vancouver	Community (MMT prescribed by community physicians and dispensed through a network of community pharmacies)	HCV	
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16	2010	Buxton, J.A.; Kuo, M. E.; Ramji, S.; Yu, A.; Kraiden, M.	Canadian Journal Public Health Rev Canadienne de Sante Publique	Methadone Use in Relation to Hepatitis C Virus Testing in British Columbia	Empirical	Cohort - retrospective	BC	Community (Community Pharmacy Dispensary recorded by Provincial Public Reference Laboratory)	HCV	
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25	<b>Integrated ID and addictions programs n=10</b>									
26	2018	Beaulieu, T.; Hayashi, K.; Milloy, M.J.; Nosova, E.; DeBeck, K.; Montaner, J.; Kerr, T.; Ti, L.	Journal of Acquired Immune Deficiency Syndrome	<u>HIV Serostatus and Having Access to a Physician for Regular Hepatitis C Virus Care Among People Who Inject Drugs</u>	Empirical	Cohort - prospective	BC - Vancouver	Multiple - clinic and community	HCV, HIV	
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	MMT	Methadone maintenance treatment (MMT); enrolment in based on self-report of methadone prescription	HCV negative PWID (HCV negative at study recruitment and had at least one follow-up visit to assess for HCV incidence between May 1996-Dec 2012)	1004	All	ARYS, VIDUS, and ACCESS cohorts; 1) Cohort of drug using stress-involved youth between 14-26 years of age, recruitment beginning in 2005, 2/3) Individual studies of HIV-negative and HIV-positive drug users respectively, recruitment beginning in 1996; Each cohort populated through snowball sampling and extensive street outreach and participants were eligible for inclusion if they lived in greater Vancouver region at enrolment, reported using illicit drug other than marijuana in past 30 days and provided written informed consent	To determine the relationship between methadone maintenance therapy and hepatitis C seroconversion among illicit drug users
16 17 18 19 20 21 22 23 24	MMT	MMT (Linking data of methadone use and serological testing of HCV infection)	Records of individuals in BC tested for anti-HCV 1992-2004 linked to methadone dispensation records 1995-2006	404,941 in total in the provincial laboratory dataset who had anti-HIV testing and were linked to PharmaNet records: 10,314 individuals underwent anti-HIV testing and received MMT	All	PharmaNet database for methadone dispensation (Sept 1, 1995- Dec 31, 2006) and HCV antibody by Provincial Public Reference Lab (April 1, 1992-July 16, 2004); total of 404,941 both databases; in total 10,314 both tested for HCV and receiving MMT	To determine if methadone use can reduce transmission of HCV/bloodborne pathogens
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	Counselling and care linkage	HIV, HCV posttest counselling and linkage to care	PWID who are enrolled in three different prospective cohort studies Vancouver Injection Drug Users Study (VIDUS), AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS) and At-Risk Youth Study (ARYS) and HCV positive completing at least one follow up after positive HCV test result	1627 HCV-positive PWID	All	3 prospective cohorts - VIDUS (18 yrs or more with injection drug use), ACCESS (18 yrs or more with illicit drug use) and ARYS (14-26 yrs, street involved with illicit drug use). Recruitment through self-referral, street outreach and snowball sampling. Participants answered interview-questionnaire at baseline and 6 months and provided blood samples for HIV and HCV tests at each visit. HIV disease monitored. Inclusion criteria: HCV positive at baseline or seroconversion between September 2005 and May 2015. Minimum of 1 follow-up visit after a positive HCV result. Reporting a history of injection drug use after testing positive for HCV at the same visit. Chronic HCV condition. Did not die during the study period.	to assess the effect of HIV serostatus on accessing HCV physician care among PWID in Vancouver, Canada

<p>Baseline and semi-annual HCV antibody testing and standardized interviewer administered questionnaire soliciting self-reported data relating to drug use patterns, risk behaviors, detailed sociodemographic data and status of active participation in MMT program</p>	<p>Primary variable of interest was enrolment in MMT. Other hypothesized factors associated with HCV incidence determined a priori: age (per year older), gender (male vs female), ethnicity (Caucasian vs other), and education defined as high school completion (yes vs no); other measurements: unstable housing (defined as living in single occupancy room in a hotel, a recovery house or treatment, hostel, shelter, jail, or having no fixed address in last 6 months (yes vs no)), syringe borrowing (injecting with used syringe in last 6 months (yes vs no)), various measure of drug use in last 6 months (daily injecting of cocaine, heroin, or methamphetamine (all yes vs no)).</p>	<p>Demonstrated high incidence of HCV seroconversion among drug users in this setting. Furthermore, enrolment in MMT was found to be independently protective after adjustment for a range of sociodemographic and drug use characteristics. Additionally, despite higher risk drug users being attracted into MMT use, the protective effect was maintained with prolonged duration of MMT exposure in a dose dependent fashion.</p>	<p>This study adds to known benefits of MMT on reducing harms associated with heroin and other drug use. These findings have important implications for healthcare systems and settings which continue to limit the availability of MMT.</p>	<p>Study adds to current knowledge as previous meta-analysis was only able to identify 8 studies examining impact of opioid replacement therapy on HCV incidence with heterogeneity and sample sizes impacting results. RCT might be better, however would raise feasibility issues due to duration of follow-up required to demonstrate effect and ethical issues due to non-provision of MMT give proven benefits in treatment of heroin addiction</p>
<p>Number of Anti-HCV positive in people using MMT</p>	<p>None</p>	<p>64% of individuals on MMT were already positive for HCV; more females than males tested for anti-HCV; males high seropositive; 40% of multiple neg antiHCV who receive MMT are female</p>	<p>Missed prevention opportunities and support prior to MMT and require an intergrative care model</p>	<p>None stated</p>
<p>Access to a physician for regular HCV care, defined by any self-reported access to a doctor or specialist for regular HCV care at least once in the past 6 months</p>	<p>The primary explanatory variable was HIV-seropositivity (defined as a positive HIV antibody test. Confounders included age (per yr increase), sex, homelessness, incarceration, daily or more opioid injection drug use, daily or more stimulant injection drug use, enrollment in methadone maintenance therapy and hospitalization. The potential mediator variable (frequency of engagement in health care) was defined as having had access to a doctor, clinic, specialist, jail doctor, health care outside hospital/clinic/doctor's office, or other in the past 6 months. Once vs once every 2-3 months vs once a month vs every 1-2 weeks vs more than once a week vs no access.</p>	<p>HIV serostatus was significantly and positively associated with access to a physician for regular HCV care in multivariable analysis even after adjusting for potential confounders (Adjusted Odds Ratio = 1.99; 95% CI: 1.77 - 2.24). Mediation analysis resulted in a statistically significant Average Casual Mediation Effect (ACME) (Beta = 0.049; 95% CI: 0.044 - 0.054), Average Direct Effect (ADE) (Beta = 0.141; 95% CI: 0.111 - 0.170), and Total Effect (TE) (Beta = 0.190; 95% CI: 0.161 - 1.216). This indicates that for HIV - seropositive participants, an increased frequency of engagement in health care resulted in a higher likelihood of accessing HCV physician care, as compared to HIV-seronegative participants. About 26% of the effect was attributable to mediation.</p>	<p>Results indicate an essential need for scaling-up equitable access to HCV treatment, with service delivery models tailored to the needs of PWID. A sustained commitment to address these contextual differences will be necessary to mitigate the alarming rates of preventable HCV-related morbidity and mortality among PWID.</p>	<p>Future research should examine the impact of policy change on uptake of HCV treatment and care among PWID. Researchers should also explore the impact of diverse and innovative delivery strategies (OAT clinics and HCV-related services, community-based clinics, peer-based models of treatment and task shifting) to improve uptake of HCV care for HCV-monoinfected PWID.</p>

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<p>Present study was conducted among a large community recruited cohort in a setting where access to MMT is less restricted than in US since it is provided in office practices and dispensed through community pharmacies. While some drug use behaviours and other variables may be collinear, given that both the univariable and multivariable models produced similar odds ratios (with the same direction and strength) for each explanatory variable, we are reassured and feel confident multicollinearity did not influence our final results.</p>	<p>Not a random sample as there are no registries of drug user populations in setting; observational study (cannot infer causation and possibility of unmeasured confounders influencing results); use of needle exchange facility is potential confounder; variables in study often relied on self-report (potential underreporting); in some settings, buprenorphine/naloxone is more widely available than MMT but could not assess impact of this due to infrequent use in this setting.</p>	<p>Although high rates of HCV among drug users have previously been reported, the literature investigating the effect of MMT on HCV incidence in this patient population is scarce.</p>	<p>29/42 = 69.0%</p>	<p>23/42= 54.7%</p>	<p>26/42= 61.9%</p>		
<p>subjects from entire province as cohort</p>	<p>not a prospective linkage of data</p>	<p>None stated</p>	<p>32/42=76%</p>	<p>27/42=64.2%</p>	<p>64.2+66.6/2=65.4%</p>		
<p>Data collection instruments and procedures were harmonized across the 3 cohorts to allow for pooled analyses.</p>	<p>Self-reported data tends to be biased toward social desirability and recall. Results may be affected by residual and unmeasured confounding. Observational study not able to establish causation. The results of this nonrandom sample may not be generalizable beyond the sample.</p>	<p>None stated</p>	<p>25/42=59.5%</p>	<p>28/42=66%</p>	<p>59.5+66/2=62.7%</p>		

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2018	Nouch, S.; Gallagher, L.; Erickson, M.; Elbaharia, R.; Zhang, W.; Wang, L.; Bacani, N.; Kason, D.; Kleban, H.; Knebel, L.; Hall, D.; Barrios, R.; Hull, M.	Int J Drug Policy	Factors associated with lost to follow-up after hepatitis C treatment delivered by primary care teams in an inner-city multi-site program, Vancouver, Canada	Empirical	Cohort - prospective	BC - Vancouver	Community (Three Vancouver Coastal Health hep C treatment sites: Pender, Downtown, and Ravensong Community Health Centres)	HCV
2017	Artenie, A.A.; Zang, G.; Daniel, M.; Fortier, E.; Jutras-Aswad, D.; Puzhko, S.; Bruneau, J.	International Journal of Drug Policy	Short-term injection drug use changes following hepatitis C virus (HCV) assessment and treatment among persons who inject drugs with acute HCV infection	Empirical	Cohort - prospective	QC - Montreal	Multiple - clinic and community	HCV

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Interdisciplinary care	Support groups, education Interdisciplinary HCV treatment program delivered by family physicians within community based on primary care and addictions clinics. Treatment includes OAT and optional drop-in support groups facilitated by a counsellor. Treatment regimens are primarily determined by access to reimbursement for medications as guided by provincial coverage (included DAA therapy, limited access to sofosbuvir/ribavirin). Also included education on adherence and reinfection.	Inclusion criteria included any clients at the three centers who were initiating DAA HCV therapy. Only individuals who received at least one dose of HCV medications and who were due for SVR 12 before Aug 1, 2017 were included in analysis.	138 individuals analysed	All	Participants were enrolled prospectively in a treatment cohort between Oct 2015 and Oct 2017. Exclusion criteria included clients unable to give informed consent and those who had already initiated HCV treatment at another non-VCH site.	To evaluate the effectiveness of an interdisciplinary HCV treatment program delivered by family physicians within community based primary care and addiction clinics, as determined by SVR, with a secondary focus on factors associated with becoming lost to follow-up after HCV treatment.
Addiction medicine clinic for HCV infection - targeted health care services offered to people with mental health co-morbidity and social instability.	Referred to the CHUM addiction medicine clinic for HCV infection follow-up, assessment for treatment suitability, and HCV related care by a team of clinicians, nurses and social workers. Targeted health care services offered to people with mental health co-morbidity and social instability.	PWID with acute HCV infection in Montreal	87 PWID with acute HCV infection	All	IMPACT was a longitudinal prospective cohort study in Montreal to determine the effect of antiviral treatment on behavior change in a community-based sample of current PWID with acute HCV who were systematically referred for HCV clinical assessment and offered targeted health services. Duration was between November 2007 and March 2015. Participants were recruited from 2 main sources: a) the St. Luc Cohort (community-based cohort study assessing the factors of HCV and HIV transmission among current PWID and b) local community and hospital-based collaborating clinics, including the addiction medicine clinic at the Centre Hospitalier de l'Universite de Montreal (CHUM). Eligibility: 18 years of age, history of injected drugs in the past 6 months, infection of acute HCV (lab evidence). Exclusion: pregnancy and HIV seropositivity. Inclusion: completed three study visits Exclusion: chronic HCV infection	Primary objective of the study was to compare eligible IMPACT participants who received treatment to those who chose not to engage in HCV care post-diagnosis with respect to their drug use changes over the course of a year. Secondary objective was to compare a subset of PWID not eligible for treatment either because there was spontaneous clearance of infection or had contra-indications to therapy with those who did not engage in HCV care regarding one-year injection drug use changes.

<p>The primary endpoint was SVR 12, which was defined as a documented negative HCV RNA at least 12 weeks after treatment completion (with a two-week window for early results), regardless of location of the bloodwork.</p>	<p>Study outcomes were treatment completion, treatment response (SVR), and post-treatment follow-up. Other outcomes included re-infection versus viral relapse and loss to follow-up. Participant gender, age, ethnicity, education, and current housing status. Additional variables collected included nature and frequency of illicit substance use, history of ever-injecting and recent injection use (within the last month), alcohol use patterns, harm reduction program use and attendance to medical care, and HCV specific care.</p>	<p>Of 138 individuals included in the analysis, 52% were on opioid agonist therapy (OAT), 75% reported a history of injection drug use (IDU), with 25% reporting IDU in the month prior to treatment initiation. ITT SVR across all sites and genotypes was 86% and mITT was 95%. There was a significant difference in mITT for those reporting recent IDU compared to those who did not (87% vs 99% <math>p = 0.03</math>).</p> <p>HCV treatment programs integrated into community health centers with family-physicians as prescribers can be effective for inner-city patients, including for PWID. Follow-up after treatment is still a challenge. Participants receiving OAT addiction care in the same location as their HCV care were less likely to be lost to follow-up with the HCV program and appropriate post-treatment lab monitoring.</p>	<p>Our results, along with several other real-world studies, suggest that more efforts are needed to explore how to maintain engagement after HCV treatment. Our findings suggest that integrating HCV treatment within similar primary care and addictions clinics who see patients already engaged on OAT, may help to improve follow-up after treatment.</p>	<p>Qualitative studies exploring patients' ideas, beliefs and feelings after HCV treatment and reasons for not returning for care may help understand this important issue. Further studies exploring the integration of HCV treatment into existing primary care and addiction care clinics who see many HCV+ patients may provide further insights into the feasibility to expand treatment uptake within these populations and improve follow-up.</p>
<p>Past-month injection drug use examined dichotomously at the 3rd study visit corresponding to 12-month follow-up. Since participants started treatment at different time points following enrollment, visit three was chosen as the endpoint for this study.</p>	<p>Primary exposure variable was HCV care, consisting of four categories: received treatment, spontaneously cleared the infection, presented with a contra-indication to treatment, and chose not to engage in HCV care. Covariates adjusted for in statistical analyses included age, gender, education, injection drug use in the month before baseline assessment, duration of injection drug use, recent homelessness, receiving opioid agonist therapy (OAS) at baseline interview.</p>	<p>Participants who received treatment were less likely to report injection drug use at 1 year follow-up (adjusted odds ratio (AOR): 0.18, 95% CI: 0.04-0.76) compared to those who chose not to engage in HCV care after diagnosis. The odds of reporting injection drug use at follow-up were considerably lower in participants who showed contra-indication to treatment (AOR: 0.24, 95% CI: 0.05-1.22) and spontaneous resolution of infection (AOR: 0.34, 95% CI: 0.08-1.40) compared to those not engaged in HCV care although p-values were not significant at the 0.05 level.</p>	<p>Receipt of HCV treatment is associated with a lower likelihood of reporting injection drug use; emphasizing the importance of offering access to HCV assessment and treatment</p>	<p>Further research is needed to investigate which aspects of HCV care are likely to help support changes in drug use patterns</p>

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<p>Our results add important real-world outcome data from the community setting with information on substance use and a detailed look at follow-up after treatment.</p>	<p>We enrolled participants from the first group of patients considered for HCV therapy following the funding approval of DAAs – which may represent a more stable population who were engaged in care and waiting for treatment. Enrollment in the study was voluntary so those who enrolled may have also represented a more engaged population than all those receiving treatment within the same programs. The significant rate of no response to recent substance use question on the questionnaires (21%) and the possibility that participants who responded may have underreported substance use at the time of treatment initiation due to social desirability bias, together may have contributed to an underestimation of rates of active substance use in the cohort. In addition, data collected on alcohol use was limited and its effect on follow-up may not have been captured. Furthermore, our information on outcomes beyond provincially available HCV RNA is limited by the lack of information on participants who have not returned for care.</p>	<p>As this is a population with high rates of cirrhosis and medical comorbidities, it is important to explore interventions to improve followup.</p>	<p>29/42 = 64.2%</p>	<p>26/42 = 61.9%</p>	<p>27/42 = 64.3%</p>		
<p>the only study to have been conducted in a sample of active PWID recruited from the community, majority of whom were not involved in HCV care at the start of the study demonstrating real-world responses following access to HCV assessment and treatment among PWID.</p>	<ol style="list-style-type: none"> <li>1. participant self-selection relating to engaging in HCV assessment and treatment.</li> <li>2. loss to follow-up</li> <li>3. Injection drug use (outcome variable) was assessed through self-report which may lead to social desirability bias.</li> <li>4. Modest sample size affected the ability to obtain more precise results.</li> <li>5. It is unclear if the study's results are generalizable to current HCV treatment regimens as treatment regimen has changed from interferon-based to direct-acting antiviral (DAA); individuals included in our study may not be representative of the patient population considered for treatment in the current DAA era; study only focuses on changes in injection drug use measured at two time points using a binary variable</li> </ol>	<p>None stated</p>	<p>27/42=64.2%</p>	<p>28/42=67%</p>	<p>64.2+67/2=65.6%</p>		

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	2017	Ti, L.; Dong, H.; Kerr, T.; Turje, R. B.; Parashar, S.; Min, J. E.; Montaner, J.; Wood, E.; Milloy, M.-J.	HHS Public Access	The effect of engagement in an HIV/AIDS integrated health programme on plasma HIV-1 RNA suppression among HIV-positive people who use illicit drugs: a marginal structural modelling analysis	Empirical	Cohort - prospective	BC - Vancouver	Other- Dr. Peter Centre (DPC), HIV/AIDS care facility	HIV
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2016	Fernando, S.; McNeil, R.; Closson, K.; Samji, H.; Kirkland, S.; Strike, C.; Baltzer Turje, R.; Zhang, W.; Hogg, R.S.; Parashar, S.	Harm Reduction Journal	An integrated approach to care attracts people living with HIV who use illicit drugs in an urban centre with a concentrated HIV epidemic	Empirical	Mixed methods - Linked data from cohort study with administrative data	BC - Vancouver	Not specified	HIV

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Integrated health program	An low threshold HIV/AIDS focused adults integrated health program that supports PLWHA facing barriers like homelessness, poverty, mental health and addiction	HIV-positive PWUD who are exposed to Highly Active Antiretroviral Therapy (HAART)	746	All	AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS) , a community recruited open prospective study of HIV positive people who illicit drugs. Study began in 1996, participants were recruited from Vancouver's Downtown Eastside if they were: 18 years or older, resided in the greater Vancouver region, were HIV-positive upon entry, illicit drugs other than or in addition to cannabis in the mouth prior to enrolment, provided informed written consent. Study included 746 participants who are HIV-positive PWUD and received at least one day of HAART before the end of the study period, and at least one day of observation of CD4 cell count and VL within ± 180 days of the day they entered the study.	To estimate the effect of being a DPC client on viral load suppression among HIV-positive PWUD in Vancouver using a marginal structural model applied to observational data with comprehensive information on VL determinants
Integrated care facility	The Dr. Peter Centre (DPC) is a non-profit integrated care facility with a supervised injection room that serves people living with HIV (PLHIV) experiencing multiple barriers to social and health services in Vancouver. Services include, art, music, and recreation, complementary therapy, support and counseling, nursing and dietetics, amenities, food and nutrition.	PLHIV in Vancouver who inject drugs; Specific inclusion criteria: individuals enrolled in the DPC who were over the age of 19, residents of BC, and able to provide consent.	917 LISA cohort participants who had complete clinical data within the Drug Treatment Program (for access to ART for HIV); 558 were PWID and were included in analysis	PLHIV	The Drug Treatment Program at the BC Centre for Excellence in HIV/AIDS is mandated by the provincial government to distribute ART free of charge to all eligible PLHIV. Individuals are entered into the Drug Treatment Program when they are first prescribed ART, and a prospective profile of ART is maintained. Individuals who are 19 or older, residents of BC, and able to provide informed consent are eligible to participate in the Longitudinal Investigations into Supportive and Acillary health services (LISA) study, which aims to examine experiences of harder-to-reach PLHIV who have accessed ART in BC.	To characterize the engagement of PLHIV who use(d) illicit drugs and access the DPC

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17</p> <p>Being a DPC patient was associated with a dramatically increased likelihood of VL suppression among HAART-exposed PWUD</p>	<p>age, gender, indigeneous ancestry, HCV positive-serostatus, homelessness, diagnosed mental illness, ≥daily heroin injection, ≥daily cocaine injection, ≥daily crack non-injection, enrollment in MMT, ≥95% HAART adherence, CD4 cell count</p>	<p>The results suggest a potentially important contribution of a harm reduction model-based HIV/AIDS integrated health program on producing optimal virologic responses in a setting where there are no financial barriers to HIV treatment and care. This is largely due to the comprehensive set of programs offered by the DPC, resulting in the provision of appropriate housing, treatment, and care for this vulnerable population. Specifically, the DPC incorporates a wide range of harm reduction strategies and services to meet the needs of clients, including the distribution of drug use paraphernalia as well as a supervised injection facility. Other services offered through the DPC, such as nursing care, art therapy, nutrition services, and counselling, may also be contributing to the observed association. The researchers hypothesize that the continuum of care provided by the DPC alleviates the health and social inequities experienced by this vulnerable population, thereby improving HIV-treatment outcomes.</p>	<p>Findings highlight the potential for harm reduction-based HIV/AIDS integrated health programs to complement existing TasP efforts by serving vulnerable individuals with complex comorbidities. Findings support calls for harm reduction programs and services to be incorporated into treatment strategies in order to provide HIV-positive PWUD with the necessary care to ensure VL suppression, limit disease progression and premature death and HIV transmission in this population</p>	<p>The authors hypothesize that the continuum of care provided by the DPC alleviates the health and social inequities experienced by this vulnerable population, thereby improving HIV-treatment outcomes, future in-depth qualitative research should seek to explore this area further</p>
<p>18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Self-reported use of DPC services, asked by 2 questions in the LISA survey - 1) what type of place do you live in right now? (DPC is an option), and 2) what 3 agencies or organization do you use most regularly?</p>	<p>Socio-demographic and psychosocial variables - gender, Indigenous ancestry, housing status, relationship status, employment status, use of supportive services, self-reported physician diagnosed mental health disorder, self perceived health now compared to a year prior, having experienced interpersonal violence, history of incarceration. Clinical variables - ART interruption lasting longer than 1 year between first ART date and time of interview, CD4 cell count at time of interview, and prescription dispensation period.</p>	<p>PLHIV with a history of injection drug use and who report attending the DPC experience more complex health challenges than those who do not attend the DPC. The DPC integrated model of care helps facilitate access to support services for this population. The DPC's referral and selection criteria successfully capture and engage key populations experiencing complex health issues.</p>	<p>Syndemic health issues, such as mental health and illicit drug use, interfere with individuals managing their HIV, and engaging in safer practices, thus acting as barriers to adequate care. Specialized health care services targeting PLHIV with complex health issues are necessary for optimization of health outcomes.</p>	<p>Further research on integrated health care facilities, including harm reduction services, should be conducted to examine whether they improve treatment outcomes and quality of life among key populations living with HIV</p>

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<p>The first study to utilize causal inference techniques for observational data to mimic randomized experiments in an effort to gain a better understanding of the effect of an HIV/AIDS integrated health program on VL suppression</p>	<p>It is difficult to truly assess causality given the observational nature of cohort studies and non-random assignment of participants to the exposure of interest, particularly when standard approaches for adjusting for confounders are usually biased due to time-dependent factors. There may be remaining unmeasured confounding (e.g., undiagnosed mental illness, other chronic comorbidities) given that the researchers were only able to control for known confounders. Another limitation of the study relates to the generalizability of the study findings since they included HIV-positive PWUD who were engaged in some level of care (e.g., on HAART), the study sample may not be representative of all HIV-positive PWUD and therefore the findings may not be widely generalizable. The main explanatory measure, being a DPC client, does not account for the frequency and type of service(s) used; thus, it is unclear whether there is a dose-dependent relationship exists between the main explanatory and outcome variables. The study included some data derived from self-report and thus, may be subject to reporting biases.</p>	<p>Missing time-varying confounder information was imputed using the most recent observation carried forward, as done in previous HIV-related analyses. &lt;2% of observations with missing data, so authors did not think there would be a significant impact on results.</p>	<p>24/42= 57.14%</p>	<p>21/42 = 50%</p>	<p>23/42=54.76%</p>		
<p>None stated</p>	<p>Measurement of lifetime history of injection drug use does not necessarily correspond to current drug use. Potential information bias as socio-demographic and psychosocial indicators were self-reported in the LISA survey.</p>	<p>DPC clients with a history of injection drug use are more than twice as likely to have been diagnosed with a mental health condition compared to non-DPC clients. Untreated mental health disorders can make navigating conventional health care systems arduous, often leaving PLHIV who live with these conditions more likely to experience suboptimal treatment and health outcomes.</p>	<p>26/42 = 61.9%</p>	<p>27/42 = 64.3%</p>	<p>61.9+64.3%/2=63.1%</p>		



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2016	Wang, L.; Panagiotoglou, D.; Eun Min, J.; DeBeck, K.; Milloy, M.J.; Kerr, T.; Hayashi, K.; Nosyk, B.	Drug Alcohol Depend	Inability to access health and social services associated with mental health among people who inject drugs in a canadian setting	Empirical	Cohort - prospective	BC - Vancouver	Community	HCV, HIV
2014	Bruneau, J.; Zang, G.; Abrahamowicz, M.; Jutras-Aswad, D.; Daniel, M.; Roy, E.	Clinical Infectious Diseases	Sustained drug use changes after hepatitis C screening and counseling among recently infected persons who inject drugs: a longitudinal study	Empirical	Cohort - prospective	QC - Montreal	Community	HCV

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Existing health and social services	Access to health and social services by three of the most prevalent comorbid conditions among PWID: HIV, hepatitis C (HCV), and mental health, in an urban setting in Canada	PWID who were representing eight mutually exclusive patient subgroups with the occurrence of: HIV; HCV; mental health conditions; HIV and HCV; HIV and mental health conditions; HCV and mental health conditions; HIV, HCV and mental health conditions; and without any of the three conditions at each follow-up.	2494	All	the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS), the Vancouver Injection Drug Users Study (VIDUS), and the At-Risk Youth Study (ARYS). The three cohorts have followed HIV-seropositive illicit drug users (aged greater than 18), HIV-seronegative PWID (aged greater than 18), and street-involved youth (aged 14–26) who use illicit drugs, respectively, through word of mouth, street outreach, and referrals since 2005	The current study evaluates PWID's self-reported inability to access health and social services and investigates the relationship between comorbid health conditions and self-reported inability to access health and social services in an urban setting of Vancouver, Canada.
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37	Multidisciplinary care	HCV testing and HCV positive individuals receiving multidisciplinary individualized care	HCV-negative PWID of open cohort in Montreal who had undergone 3 or more visits between November 2004 and March 2011	208	All	St Luc Cohort: an open cohort of PWID started in Montreal in 1988 to study factors of HIV transmission. In 2004, the study focus was expanded to include factors of HCV, and the Hepatitis Cohort (HEPCO), an embedded cohort of HCV-negative PWID, was constituted. Eligibility: PWID who had injected drugs in the past 6 months, negative for HCV antibodies and 18 or more years of age. Cohort visits were scheduled at 6-month intervals and consisted of behavioral questionnaires administered by trained interviewers as well as venous blood samples obtained for HIV and HCV antibody testing. Participants were asked to return for their serostatus test results 2 weeks after their visits, when posttest counseling and referrals were provided. 208 participants (60%) who had undergone > 3 visits between November 2004 and March 2011; measures include cocaine, heroin and illicit prescription opioid use, syringe sharing and alcohol	1. To assess substance use and injection behaviors after HCV status notification 2. to compare changes over time between PWID who tested positive and those that remained negative after test

<p>The primary outcome of interest was a binary variable capturing self-reported inability to access health and social services (barriers to access) in the last six months determined from the question "In the last six months, was there a time you were in need of a service but could not obtain it?".</p>	<p>PWID's sociodemographic characteristics, drug use patterns, criminalization, and other social and structural factors included age (in years), male (yes vs no), Caucasian (yes vs other), 2daily heroin use, 2daily stimulants use, 2daily prescription opioid use, non-fatal overdose, binge alcohol use, incarceration, homelessness, employment, sex work, drug dealing and reporting being the victim of violence. Other primary covariates of interest were the 3 most prevalent comorbid health conditions among PWID: HIV, HCV and mental health conditions. Mental health conditions were determined by a binary composite indicator constructed to capture any of the following self-reported markers of mental health conditions in the last 6 months: 1) diagnosis with one of the following mental illnesses: depression, anxiety, obsessive compulsive disorder, schizophrenia, PTSD, personality disorder, bipolar, attention deficit disorder, oppositional defiance disorder, other hyperactive disorder; 2) receipt of mental health treatment; 3) suicide attempt(s); and 4)</p>	<p>Over 65% of participants reported inability to access services at some point during the study period. Mental health conditions were independently associated with increased barriers to access health and social services (despite individual's participation in addiction treatment). HIV not associated with barriers to access services. PWID residing in DTES were less likely to report barriers to access than those residing outside DTES.</p>	<p>Findings reveal the need to improve the connection between HIV treatment settings and other services. It would be ideal to have a comprehensive integrated model with all required services located in the same setting or if not possible, through referral pathways and linkages to local services. Targeted strategies to seek and treatment mental health conditions in settings that serve PWID, and assist PWID with mental health conditions in navigating the healthcare system may improve the efficiency and effectiveness of publicly-funded health and social services.</p>	<p>None stated</p>
<p>Several outcome variables were examined to assess potential changes associated with notification of HCV status. Drug use and injection behavior outcomes were chosen because of their positive association with HCV acquisition. Measures included cocaine, heroin and illicit prescription opioid (mainly hydromorphone, hydrocodone, and fentanyl) injection, as well as syringe sharing. In addition, alcohol use was chosen for its clinical relevance in relation to liver disease. All outcomes were measured by questions pertaining to use within the past 6 months, expressed as dichotomous variables (with yes or no responses).</p>	<p>None</p>	<p>Of the 208 participants (83% male; mean age, 34.7 years, mean follow-up time, 39 months), 69 (33.2%) seroconverted to HCV. A linear decrease in syringe sharing behavior was observed over time after HCV and status notification, whereas a 10% decrease for each additional 3 months of follow-up was observed for injection cocaine and heroin use among HCV seroconverters but not among HCV-seronegative PWID (<math>P &lt; .05</math>). No significant changes were observed in alcohol use</p>	<p>There is a need for regular and individualized HCV screening and counseling for all PWID, with linkage to HCV treatment and opiate substitution therapy when appropriate</p>	<p>Further research is needed to identify what works, that is, whether it is the influence of the result itself (new infection), the intensified counseling, the reference for care, or a combination of all these factors</p>

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None stated	First, self-reported information was used to identify mental health conditions among PWID. Second, outcome was determined from a question that was constructed in a way that compared people who needed but did not receive services to both those who did not need a service and those who needed and received services. Therefore, researchers could not separately examine the degree of increased self-reported inability to access services attributed to increased needs of services or increased barriers to access services. Third, although they have controlled for a number of covariates that are potentially associated with the outcome, they cannot rule out unmeasured confounding in the relationships they've tested. Finally, caution must be exercised in applying estimates to PWID populations in different settings, which may feature substantially different levels and quality of health and social services available to populations of PWID.	Researchers limited their purpose to examining whether their defined health conditions were associated with barriers to access besides other known factors, rather than make any causal inference, which is also consistent with their objective to identify access variations by health condition. (Not sure if here or in study limitations)	24/42=57.14%	22/42 = 52.38%	23/42=54.76%		
The sample population provides a unique opportunity to study the impact of HCV status notification among active injectors likely to have engaged in recent risky behaviors and potentially amenable to change	<ol style="list-style-type: none"> <li>1. Cannot be generalized to the PWID population in Montreal (participants not randomly selected, HIV-infected not included)</li> <li>2. loss to follow-up</li> <li>3. long-term changes should be interpreted with caution</li> <li>4. bias due to self-reporting</li> <li>5. no information on HCV treatment uptake after positive test</li> <li>6. small sample size</li> <li>7. possibility that PWID staying HCV seronegative had already modified his or her behavior before enrollment</li> <li>8. seropositive participants received individualized care and counseling but not taken into consideration</li> </ol>	The identification of health events, meaningful for PWID at the time of HCV status notification, whether results are positive or negative, could enhance the impact of counseling and the willingness to initiate changes	29/42= 69%	27/42=62%	69+62/2=65.6%		

1	2014	McNeil, R.; Dilley, L.B.; Guirguis-Younger, M.; Hwang, S.W.; Small, W.	Journal of the International AIDS Society	Impact of supervised drug consumption services on access to and engagement with care at a palliative and supportive care facility for people living with HIV/AIDS: a qualitative study	Empirical	Qualitative	BC - Vancouver	Other- Dr. Peter Centre (DPC), HIV/AIDS care facility	HIV
2	2013	Newman, A.I.; Beackstead, S.; Beking, D.; Finch, S.; Knorr, T.; Lynch, C.; MacKenzie, M.; Mayer, D.; Melles, B.; Shore, R.	Can. J. Gastroenterol.	Treatment of chronic hepatitis C infection among current and former injection drug users within a multidisciplinary treatment model at a community health centre	Empirical	Cohort - prospective	ON - Kingston	Clinic (The Street Health Centre)	HCV
3	2010	Grebely, J.; Knight, E.; Genoway, K.A.; Vijoen, M.; Khara, M.; Elliott, D.; Gallagher, L.; Stoms, M.; Raffa, J.D.; DeVlaming, S.; Duncan, F.; Conway, B.	European Journal of Gastroenterology & Hepatology	Optimizing assessment and treatment for hepatitis C virus infection in illicit drug users: a novel model incorporating multidisciplinary care and peer support	Empirical	Chart review - retrospective	BC - Vancouver	Community (Pender Community Health Centre)	HCV
4	Needle Exchange Programs / Clean Needle Programs / Syringe Exchange Programs / Kit Distribution Programs n=9								

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Palliative and supportive care	Palliative and supportive care services including comprehensive harm reduction services (including supervised drug consumption sites) for PLHIV	DPC residents	13	PLHIV	N/A	to explore how the integration of comprehensive harm reduction services, including supervised drug consumption services, into a Canadian palliative and supportive care facility for PLHIV shapes access to and engagement with care
Multidisciplinary care	SHC program developed to provide an accessible, supportive, multidisciplinary model of care in which a team of clinicians would assess and address medical, psychiatric and social stability before initiating HCV treatment. Patients are carefully monitored during treatment.	Patients who were self-referred to the hepatitis C treatment team or were referred through other SHC services (including MMT, needle exchange, counselling or primary care) were invited to participate in the study.	34	PWID with chronic HCV	A convenience sample of 34 patients was enrolled in the study between June 2006 and December 2008. Patients who were self-referred to the hepatitis C treatment team or were referred through other SHC services (including MMT, needle exchange, counselling or primary care) were invited to participate in the study. To be eligible for the study, patients were SHC clients with chronic HCV infection, ≥18 years of age and had an interest in undergoing HCV treatment. HCV infection was confirmed by a positive HCV-RNA test, including genotype, during initial treatment assessment. Psychiatric comorbidities or ongoing illicit drug use did not exclude patients from the study or from proceeding to treatment. All patients were former or current IDUs.	The purpose of the present study was to assess uptake and success of hepatitis C treatment among a group of former and current IDUs with chronic HCV infection at the SHC within SHC's multidisciplinary, integrated and collaborative treatment model of care centred on primary care professionals.
Integrated care facility	The Pender Community Health Centre provides primary care for an estimated 1,500 clients in the area. It also offers addiction services including methadone maintenance therapy, needle exchange, and counseling. There are up to seven physicians, four registered nurses (including a dedicated HCV research nurse), six drug and alcohol counselors and on-site infectious diseases specialists. Beginning in January 2002, this clinic initiated a program for the treatment of HCV infection among current and former illicit drug users.	HCV-positive illicit drug users	204	HCV+	From March 2005 to 2008, HCV-infected individuals were referred to a weekly peersupport group and assessed for HCV infection. A retrospective chart review of outcomes three years following the initiation of the group was conducted (including HCV assessment and treatment)	Evaluated the uptake of assessment and treatment for HCV infection among illicit drug users referred to a weekly peer-support group over a three year period at a multidisciplinary community health centre in Vancouver

<p>Analysis of transcripts focused on how the harm reduction supports provided by the DPC Residence shaped access to and engagement with palliative and supportive care services</p>	<p>N/A</p>	<p>the harm reduction approach was critical in (a) fostering an environment in which PLHIV who use drugs felt welcome, (b) improving healthcare interactions by minimizing drug-related stigma and (c) enabling safer drug use practices by promoting harm reduction, increased access to healthcare and environmental supports, including HAART, resulted in improved HIV treatment outcomes and survival</p>	<p>To integrate palliative and treatment approaches for HIV/AIDS, to include harm reduction services with HIV care; our findings illustrate how changes to the structural-environmental context of healthcare services delivery (i.e. accommodating illicit drug use in accordance with a harm reduction approach) improve access to and engagement with care among PLHIV who use drugs</p>	<p>Further studies are needed to determine whether this approach improves access to care at the population level and in other healthcare settings (e.g. hospitals), further research is needed to identify the impact of this programme on improvements in health (e.g. HAART adherence)</p>
<p>Sustained virological response (SVR): undetectable HCV viral load 24 weeks after completion of antiviral therapy for all genotypes</p>	<p>Demographics, injection drug use history, exposure to HCV risk factors, medical and clinical characteristics, psychiatric characteristics, alcohol use during treatment</p>	<p>Seventy per cent of study patients had no postsecondary education, 85% were unemployed and one-third were unstably housed. A majority of study patients self-reported mental health problems. Of the 14 patients who initiated antiviral treatment in the study period, eight (57%) achieved sustained virological response. Regardless of virological outcome, patients who initiated treatment showed positive trends toward increased social and psychiatric stability, and decreases in high-risk behaviours.</p>	<p>Study supports the use of a collaborative, multidisciplinary model for HCV treatment of current and former IDUs. Furthermore, the benefits of such a treatment model may extend beyond narrowly defined virological outcomes to improvements in other social determinants of health.</p>	<p>Future research should explore the most effective mix of services within a multidisciplinary approach to increase the likelihood of compliance and success of HCV treatment. Furthermore, outcomes, such as the prevention of HCV re-infection and other drug-related harms, should be evaluated through long-term follow-up of this population.</p>
<p>Uptake of HCV assessment and treatment</p>	<p>Factors associated with successful treatment for HCV infection, reasons for deferral/no indication for treatment</p>	<p>204 HCV antibody-positive illicit drug users accepted referral to a weekly HCV peer-support group. Assessment for HCV occurred in 53% (n=109), with 13% (n=14) having initiated or completed treatment for HCV infection prior to attending the support group, evaluation ongoing in 10% (n=11) and treatment deferred/not indicated in 25% (n=27). The major reasons for HCV treatment deferral included early disease (30%), drug dependence (37%), other medical (11%) or psychiatric co-morbidities (4%). Sixty-eight percent of those deferred for reasons other than early liver disease demonstrated multiple reasons for treatment deferral. The first four weeks of support group attendance predicted successful HCV assessment (OR 6.03, 95% CI 3.27-11.12, p&lt;0.001). Overall, 28% (n=57) received treatment. Among individuals having completed pegylated-interferon and ribavirin therapy with appropriate follow-up (n=19), the rate of SVR was 63% (12/19), despite illicit drug use in 53%. A high proportion of illicit drug users accepting referral to a weekly HCV peer-support group at a multidisciplinary health centre were assessed and treated for HCV infection. Peer-support coupled with multidisciplinary care is an effective strategy for engaging illicit drug users in HCV care</p>	<p>The results from this study demonstrate that a peer-based HCV support group can fit within the constraints of other settings and can be a powerful tool to significantly improve access to HCV care among current and former illicit drug users who may already be engaged in care for reasons unrelated to HCV infection.</p> <p>It is clear that the passive recruitment approach for engaging illicit drug users in HCV care is insufficient. In order to make progress, the next critical steps need to include efforts towards improved awareness and active referral of HCV-infected IDUs to multidisciplinary settings such as ours. For these programs to be maximally successful, strategies will be required to 1) improve patient education about HCV infection; 2) identify those most motivated to receive treatment; and 3) improve the proportion completing and responding to therapy. This may be partly achieved through the integration of HCV peer-support groups into existing multidisciplinary programs providing HCV care. Increasing the proportion of HCV infected illicit drug users assessed and treated for HCV infection is a crucial and necessary component towards reducing the future disease and death burden of HCV (and other</p>	<p>None stated</p>

<p>Generates preliminary insights into the potential role of harm reduction approaches to minimize barriers to inpatient healthcare services</p>	<p>Study relies on a small sample size that may not be representative of the experiences of all PLHIV who use drugs and are in need of palliative and supportive care, limited transferability to settings where healthcare is organized differently</p>	<p>Existing drug laws have prevented the scaling up of harm reduction approaches and thus limited evaluations of models of harm reduction healthcare</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>	<p>27/42 = 64.3%</p>		
<p>In terms of drug use, the comparison of urine toxicology screens to self-reported illicit drug use suggests reasonably high reliability of the self-reported data</p>	<p>Small sample size; weak external validity and the results may not be generalizable to other centres; relied heavily on self-reported data and face-to-face interviews, leading to recall bias and the reporting of socially desirable responses</p>	<p>None stated</p>	<p>28/42 = 66.7%</p>	<p>24/42 = 57.1%</p>	<p>26/42 = 61.9%</p>		
<p>This study also demonstrates the first successful application of a weekly peer-based HCV support group model developed by Sylvestre and colleagues [29] to a pre-existing multidisciplinary model for the treatment of HCV.</p>	<p>There are several limitations to the study methodology in this report. First, the results may not be generalizable to other populations of illicit drug users in Canada or elsewhere. However, the demographic characteristics in this study is similar to that of a large, community-based sample of illicit drug users in Vancouver [8], and our results may at least be applicable in a setting where a high concentration of IDUs in a well-defined geographic setting, where a program established in a single setting may be able to draw on a significant target population. Second, demographic information for those attending the group was collected by retrospective chart review and we were unable to specifically ascertain recent risk behavior information for individuals referred to the HCV support group. This limited our ability to make detailed comparisons of risk behaviours among those who did and did not follow through with formal assessment for treatment. It may well be that such attendance is a marker for specific illicit drug use behaviors or other factors and we will be able to evaluate this in further, ongoing prospective studies in our centre. Third, there may be significant biases associated with the fact that this study was performed among those accepting referral to an HCV peer-support group. This may have led to a bias towards the inclusion of individuals that access care more frequently and are engaged in the healthcare system, and that a significant proportion of our target population may not ever benefit from this intervention.</p>	<p>None stated</p>	<p>26/42 = 61.90%</p>	<p>25/42=64.3%</p>	<p>63.10%</p>		



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2019	Correctional Service Canada	Government of Canada	Prison Needle Exchange	Non-empirical	Report	Canada	Other - prisons	HCV, HIV
2018	Miskovic, M.; Carusone, S.C.; Guta, A.; O'Leary, B.; dePrinse, K.; Strike, C.	Am. J. Public Health	Distribution of Harm Reduction Kits in a Specialty HIV Hospital	Empirical	Interventional / program evaluation	ON - Toronto	Hospital (Casey House, hospital for people living with HIV)	Cellulitis, HIV, HBV, HCV and other bloodborne pathogens
2017	van der Meulen, E.	Substance Use and Misuse	"It Goes on Everywhere": Injection Drug Use in Canadian Federal Prisons	Empirical	Qualitative	ON	Other - Prison	HCV, HIV

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1	NEP	Needle exchange program	None	N/A	Inmates	N/A	Objectives of PNEP: -reduce the sharing of needles and the number of contraband needles in circulation in institutions -facilitate referral to available drug-dependence treatment programs, including mental health services and opiate agonist treatment (OAT) -reduce the transmission of blood-borne viral infections, including HIV/AIDS and HCV -reduce the occurrence of skin infections related to injection drug use and decrease the need for health care interventions related to injection-site abscesses
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15	Harm reduction kit distribution	harm-reduction injection and smoking kit distribution and disposal program	Casey House clients who use drugs and also their visitors	N/A	All (not necessarily restricted to HIV individuals, though provided in HIV hospital, since kit-distribution program was accessible to anyone)	N/A	In 2012, the Harm Reduction Advisory Group, comprising Casey House staff, recommended implementation of a kit-distribution program to increase client knowledge of drug-related harms and access to new equipment, reduce drug-related harms (e.g., cellulitis; transmission of HIV, hep- atitis B and C, and other bloodborne pathogens), promote the safe disposal of used harm-reduction equipment, and to encourage clients to speak with staff members about drug-related harms. Program evaluation.
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27	Harm reduction programming, specifically prison-based needle and syringe programs (PNSPs)	Harm reduction programming, specifically prison-based needle and syringe programs (PNSPs)	18 or older that have been incarcerated in a Canadian federal prison within the past six years, and had knowledge about injection drug use in prison, former prisoners from Ontario	30	Men and women who have been in prison previously for 2 years or more and have admitted to injecting drugs in prison or witnessing the injection of drugs including people who self-identify as trans, 2-spirit	N/A	To develop recommendations for improved harm reduction programming, specifically prison-based needle and syringe programs (PNSPs), from people who have lived experience of incarceration.
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N/A	N/A	None stated	None stated	None stated
Number of injection and smoking kits distributed	Qualitative interviews regarding the structure of the program	Receptionists who monitor the foyer through security cameras and are sometimes engaged in conversations by people picking up the kits estimated that most of the kits from this location were obtained by individuals who were not Casey House clients, were male, and were older than 35 years, and most kits were picked up between 5 PM and midnight and on weekends. When asked about interactions with those obtaining the kits, receptionists noted that they were often asked for and provided information about drug treatment, housing, social assistance, services for abused women, and naloxone kits. From November 14, 2014, to June 30, 2017, the program distributed 15 948 injection kits and 4907 smoking kits. Staff training helped. Sustainability was difficult but manageable through enlisting clients and sponsors to help with kit making. Neighbors complained about finding other contents of kits discarded on properties but no reports of used needles or glass stems.	Evaluation of the program points to the promise of hospital-based kit distribution programs as a structural intervention to reduce drug-related harms among inpatients and among other people who use drugs in the vicinity.	Furthermore, more formal evaluation of this and similar programs is needed to fully understand if and how different models of kit distribution influence access (e.g., distributed by clinical staff vs unsupervised distribution), reach, equipment sharing, and public order issues. This small evaluation contributes to the call for evaluation of implementation of needle-and-syringe programs in hospital settings.
Experience with injection drug use in federal prisons	None	Participants also talked about the kinds of equipment they used to inject, sometimes gained through illicit means and sometimes homemade, as well as the frequency of drug use overall. Injection equipment was usually shared among many prisoners, and in the rare instances in which supplies were disposed of, the toilet and garbage were reported as the most common receptacles. Given the availability of drugs, the frequency of injection drug use, and the customary sharing of injection supplies, the resulting high rates of HIV and HCV in Canadian federal prisons are not surprising. What is surprising, however, is the general lack of support from the prison service for harm reduction programs.	PNSPs can improve the overall safety of prisons, for both prisoners and staff, specifically reduction in needle sharing and transmission of HIV and hepatitis C. Advocate for the use of a multimodel approach which has been successful in other settings and could be applied in the Canadian context. Prisoners in the study also expressed support for this.	Inclusion of younger participants in the research as this may impact the results and recommendations. Correctional Service of Canada (CSC) should continue to examine the feasibility of needle exchange programs.

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None stated	None stated	None stated	N/A	N/A	N/A		
None stated	None stated	Gaps in evaluation and implementation of needle-and-syringe programs	15/42 = 35.7%	11/42 = 26.2%	13/42 = 31.0%		
The approach in the study was instrumental to the study, as it allowed for hypotheses and assumptions to be altered and revised throughout process, and for the emerging themes and findings to be validated by those with community-relevant knowledge	Inability to hold interviews or focus groups with current prisoners. Recruitment was restricted only to those who were not incarcerated or on parole at the time of data collection. Sample also comprised of an older group, ranging from 35–62 in age; inclusion of younger participants would have been beneficial, and may have impacted some of the results and recommendations. All of the former prisoners were recruited in Ontario, and so their experiences and recommendations may not be nationally representative.	Researchers reached saturation with the 30 former prisoner participants, with greater resources and a longer study time frame could have increased the sample size and targeted additional recruitment towards specific populations of interest, for example, people in their 20s. A larger sample size could have also been beneficial for analyzing gendered and racial differences in responses.	29/42=69%	24/42 = 57.14%	32/42 = 76.19%		

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2012	Hyshka, E.; Strathdee, S.; Wood, E.; Kerr, T.	Int J Drug Policy	Needle exchange and the HIV epidemic in Vancouver: Lessons learned from 15 years of research	Non-empirical	Literature review	BC - Vancouver	Community (mobile vans)	HIV
2011	Bruneau, J.; Daniel, M.; Abrahamowicz, M.; Zang, G.; Lamothe, F.; Vincelette, J.	American Journal of Epidemiology	Trends in human immunodeficiency virus incidence and risk behavior among injection drug users in montreal, Canada: a 16-year longitudinal study	Empirical	Cohort - prospective	QC - Montreal	Clinic (HIV post-test counseling and referrals) and Community (direct street-level recruitment)	HIV

For peer review only

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NEP	Needle exchange program	N/A	N/A	N/A	N/A	To review 15 years of peer-reviewed research on Vancouver's NEP to describe what has been learned through this work.
NEP	St. Luc Cohort program for PWID support systems in Montreal NEP participation, safe syringe acquisition	HIV-seronegative participants who injected drugs in the past 6 months	2137 HIV-seronegative IDUs	All : significant discussion on MSM	"St Luc Cohort: an open cohort of PWID started in Montreal in 1988 to study factors of HIV transmission. From 2001 to November 2004, recruitment of new participants was not carried out due to loss of funding. The 4 year gap in recruitment yielded 2 distinct waves of follow-up, 1988-2001 and 2004-2008. The current analyses include both waves of follow-up; however, first-wave participants recruited prior to 1992 were excluded because of changes in the questionnaire used since 1992. Eligibility: PWID who had injected drugs in the past 6 months and were 18 or more years of age. Cohort visits were scheduled after 3 months for the first follow-up visit and at 6-month intervals thereafter. Behavioral questionnaires were administered by trained interviewers with venous blood samples being drawn at each visit for HIV antibody testing. Participants were asked to return within 2 weeks for their serostatus test results, at which time when posttest counseling and referrals were provided. "	Primary purpose was to investigate secular trends in HIV incidence and to evaluate changes in risk behavior and HIV infection among IDUs followed between 1992 and 2008 in St. Luc Cohort based in Montreal. Secondary purpose was to examine associations between NEP participation, safe syringe acquisition and HIV seroconversion.

<p>N/A</p>	<p>N/A</p>	<p>1) NEP attendance is not causally associated with HIV infection, 2) frequent attendees of Vancouver's NEP have higher risk profiles which explain their increased risk of HIV seroconversion, and 3) a number of policy concerns, including needle exchange vs. needle distribution and policing practices, and the high prevalence of cocaine injecting contributed to the failure of the NEP to prevent the outbreak. Keys to success include refocusing the NEP away from an emphasis on public order objectives by separating distribution and collection functions, removing syringe distribution limits and decentralizing and diversifying NEP services</p>	<p>Shifting the focus of the NEP away from public order objectives by separating NEP distribution and exchange functions, and removing all distribution limits improved access to sterile syringes in the DTES. Decentralizing NEP sites, promoting peer-run initiatives, and diversifying syringe distribution methods helped the NEP better access hard-to-reach populations of IDU with high risk profiles. Involving people who use drugs in the delivery of NEPs can help extend the reach of conventional NEPs and ensure those at highest risk of HIV infection are being reached. Program staff, researchers and policymakers should pay considerable attention to local context when designing and implementing NEP. Understanding how internal aspects (program policies, logistics, etc.) and external aspects (local IDU population characteristics, policing practices, drug markets, etc.) impact the NEP is crucial for success.</p>	<p>Ongoing evaluation and monitoring of the NEP and its changing context using both quantitative and qualitative methods can identify factors that constrain and promote sterile syringe access. In assessing the merits of an NEP as a public health intervention, implementation and local environmental features and their impacts need to be considered on the program's ability to reach IDU and prevent the spread of HIV</p>
<p>The outcome was defined as the time from entry into the cohort until seroconversion, assumed to have occurred at the midpoint between the dates of the participant's visits corresponding to the last negative and the first positive HIV test</p>	<p>Except for baseline age, gender, education, and time of recruitment, all variables were modeled as time-dependent covariates. Thus, at any time during follow-up, we used the values from the most recent visit. To examine and account for secular trends in annual HIV incidence, the effect of calendar time was represented by a binary indicator of recruitment period (2004–2008 vs. 1992–2001) Variables used in Cox regression model: age, gender, living in unstable housing conditions, cocaine use in the past month, heroin use in the past month, sharing a syringe with a person known to be HIV-positive, "Booting", having sex with a person known to be HIV-positive, period of recruitment, Needle Exchange Program participation, obtaining 100% of syringes from a safe source</p>	<p>Of 2,137 HIV-seronegative IDUs at enrollment, 148 became HIV-positive within 4 years (incidence: 3.3 cases/100 person-years; 95% confidence interval: 2.8, 3.9). An annual HIV incidence decline of 0.06 cases/100 person-years prior to 2000 was followed by a more rapid annual decline of 0.24 cases/100 person-years during and after 2000. Behavioral trends included increasing cocaine and heroin use and decreasing proportions of IDUs reporting any syringe-sharing or sharing a syringe with an HIV-positive person. In multivariate analyses, HIV seroconversion was associated with male gender, unstable housing, intravenous cocaine use, and sharing syringes or having sex with an HIV-positive partner. Always acquiring syringes from safe sources conferred a reduced risk of HIV acquisition among participants recruited after 2004, but this association was not statistically significant for participants recruited earlier. In conclusion, HIV incidence has declined in this cohort, with an acceleration of the reduction in HIV transmission after 2000.</p>	<p>the stability of the continued high prevalence of high-risk drug and injection behaviors suggests a need for primary prevention in order to reduce initiation of injection drug use</p>	<p>None stated</p>

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None stated	None stated	NEPs represent an important tool in an arsenal of HIV prevention, drug treatment and health services and have the potential to drastically reduce HIV incidence if implemented effectively.	N/A	N/A	N/A		
None stated	<p>1. participants were not randomly selected so cannot be considered representative of all IDUs in Montreal</p> <p>2. males and chronic cocaine-using IDUs are overrepresented in the sample</p> <p>3. loss to follow-up</p> <p>4. residual confounding :</p> <p>5. data were not available on the size of the IDU population and the level of syringe coverage relative to the true needs of this community</p> <p>6. small number of seroconversions occurring during wave 2 and the related lack of statistical power</p> <p>7. lead-time bias</p>	None stated	27/42=64.2%	33/42=78.5%	71.4+71.4/2=71.4%		

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	2010	Ivsins, A.; Chow, C.; Marsh, D.; Macdonald, S.; Stockwell, T.; Vallance, K.	Centre for Addictions Research of British Columbia	Drug use trends in Victoria and Vancouver, and changes in injection drug use after the closure of Victoria's fixed site needle exchange	Non-empirical	Report	BC - Vancouver and Victoria	Community - Fixed site needle exchange	HIV and other blood-borne viruses
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2010	Gagnon, H��l��ne; Godin, Gaston; Alary, Michel; Bruneau, Julie; Otis, Joanne	AIDS and Behavior	A Randomized Trial to Evaluate the Efficacy of a Computer-Tailored Intervention to Promote Safer Injection Practices Among Drug Users	Empirical	Randomized controlled trial	QC - Montreal and Quebec City	Community	HCV, HIV

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NEP	Needle exchange program	Participants had lived in BC for at least 6 months, were at least 19 years old, and injected/used drugs at least once a month for the previous 3 months.	464 (226 in Vancouver, 238 in Victoria).	All	N/A	To examine trends in drug use and changes both before and after the fixed-site needle exchange closed in Victoria, using Vancouver, which has seen no similar disruption of harm reduction services, as a comparison.
NEP	Theory based intervention to increase the use of NEPs	Injection drug users (IDUs)	260	aged 18 or older, used a NEP and had injected themselves at least once during the month before the survey.	N/A	The aim of this study was to evaluate the efficacy of a theory-based intervention to increase the use of a new syringe for each injection among injection drug users (IDUs).

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<p>None</p>	<p>None</p>	<p>Victoria had significantly lower rates of crystal meth, heroin and marijuana use than Vancouver and significantly higher rates of injection of the prescribed opioids: dilaudid and morphine. Drugs whose use is increasing include methadone and crack in Vancouver and ecstasy in Victoria. Some changes were noted after the closure of the fixed site needle exchange in Victoria, June 2008. Although there was a substantial reduction in the number of clean needles distributed in Victoria, daily drug injection increased significantly over time. Conversely, in Vancouver, where clean needles were more accessible, daily drug injection significantly decreased. Across the whole study period, Victoria had significantly higher rates of needle sharing than Vancouver but significant trends over time were not observed for either city. Vancouver has several fixed site needle exchanges distributed across the metropolitan area and this may account for significantly lower rates of needle sharing intensity compared with Victoria. Across both cities, after tobacco, crack cocaine was the most widely used substance. The significant increase in the use of crack cocaine over the period of our study in Vancouver, as well as the overall increasing prevalence of this substance warrants other preventive and harm reduction initiatives.</p>	<p>Authors recommend an immediate abolishment of the "no-go zone" in downtown Victoria, to enable outreach workers and health service providers to adequately respond to the health needs of injection and other drug users. They further strongly recommend that in accordance with optimal best practice put forward elsewhere one or more fixed site needle exchanges be reintroduced in Victoria as part of a comprehensive plan of attending to the health needs of injecting drug users and preventing the spread of HIV and hepatitis C.</p>	<p>None stated</p>
<p>Two behavioral variables were studied: (1) proportion of dirty syringes used over the last week and (2) prevalence of safe behavior over the last week.</p>	<p>The first group of variables covered age, gender, recruitment site, randomization blocks and group. The psychosocial variables were intention, attitude and perceived behavioral control.</p>	<p>At baseline, 52.3% of participants reported that they had not always used new syringes in the previous week. The results indicate that it is possible for IDUs to adopt safer injection practices. One month after the intervention began, participants in the experimental group were using fewer dirty syringes compared to the control group (RR: 0.47 CI95% 0.28–0.79; P = .004). This short-term effect was no longer present 3 months later.</p> <p>These results suggest that the intervention developed and implemented during this evaluative study had a positive short-term effect on the adoption of safer injection practices among IDUs who visit NEPs. The proportion of dirty syringes used decreased and the proportion of participants who always used new syringes, or did not inject at all, increased.</p>	<p>As suggested by Des Jarlais and Friedman, including drug users in the design and operational decision-making of the prevention program may lead to much more effective programs. In this respect, we believe that community participation was indeed a key element in the short term effect of this intervention.</p>	<p>Additional studies in different settings and cultural contexts and further controlled research will be necessary to confirm the positive shortterm impact observed in this study</p>

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None stated	These distinct observations in each research site underscore the value of data collection in multiple cities, since results from one jurisdiction cannot be generalized to another jurisdiction.	None stated	N/A	N/A	N/A		
Notwithstanding the above limitations, this intervention seems to be useful in modifying injection behavior in the short term. The results suggest that IDUs can adopt safer injection practices when they are exposed to a tailored intervention in addition to the usual interventions offered by NEPs.	A few limitations must be acknowledged. First, given the study design, there was more contact with experimental participants than control participants. This may have introduced some bias in the dropout rate between the two groups. Likewise, the higher frequency of contact could have contributed to the behavioral change observed. A design including an attention-control condition might have been preferable. Secondly, it is possible that the attrition rate of 33% at the second post-test may have slightly decreased the statistical power of the analysis of long-term effect. Follow-up procedures are important, particularly when working with hard-to-reach populations. In spite of the efforts displayed to ensure a good follow-up of the participants, new techniques such as combining electronic and traditional tracking methods should be considered in future studies [33]. Thirdly, participants were recruited at two NEPs in the province of Quebec, Canada. Yet, in this province, more than 820 centers, located in 16 regions, provide access to injection material (community organizations, health establishments, drugstores) [34]. Moreover, some IDUs do not visit NEPs and cannot be contacted through these sites. Consequently, the results of this study cannot be applied to all IDUs or organizations that provide injection material.	None stated	31/42 = 73.81%	33/42 =78.6 %	76.20%		

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2010	Kerr, T; Small, W.; Buchner, C.; Zhang, R.; Li, K.; Montaner, J.; Wood, E.	Am J Public Health	Syringe sharing and HIV incidence among injection drug users and increased access to sterile syringes	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV
2009	Chu, S.	HIV/AIDS Policy Law Review	Clean switch: the case for prison needle and syringe programs	Non-empirical	Editorial literature review	Canada	Other - Federal Prisons	HCV, HIV
<b>Broad harm reduction strategies n=6</b>								
2019	Day, E.; Broder, T.; Bruneau, J.; Cruse, S.; Dickie, M.; Fish, S.; Grillon, C.; Luhmann, N.; Mason, K.; McLean, E.; Trooskin, S.; Treloar, C.; Grebely, J.	International Journal of Drug Policy	Priorities and recommended actions for how researchers, practitioners, policy makers, and the affected community can work together to improve access to hepatitis C care for people who use drugs	Non-empirical	Other - Synopsis of a round table discussion at the Harm Reduction Conference in Montreal on May 13th 2017	QC - Montreal	N/A	HCV

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SEP	Health authority in Vancouver modified is SEP policies in 2000 and 2002 on sterile syringe distribution making syringes more accessible	PWID in downtown Vancouver	1228 participants from the VIDUS cohort with 472 (38.4%) women and 351 (28.6%) individuals of aboriginal ancestry	All	Participants were from VIDUS ongoing prospective cohort study recruited through self referral and street outreach since May 1996. All participants complete an interviewer administered questionnaires and provide blood samples at baseline and semiannually follow up visits so that drug use, HIV risk behaviour and HIV incidence can be tracked longitudinally	Evaluate the effects of a syringe exchange program policy on rates of HIV risk behaviour and HIV incidence among injection drug users
NEP	Description and argument as for clean needle program in prisons	Prisoners in Canadian Prisons	N/A	Prisoners	N/A	Pose an legal argument for why PWID held in Canadian Prisons should have access to clean needles
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Harm reduction	Highlights the key priorities enhancing global coverage of harm reduction services; punitive drug polices; affordable diagnosis and treatment; improving evidence base for HCV prevention, testing, linkage to care and treatment programs; implimenting intergrated HCV programs; peer based models of care; and tackling social determinants of health inequalities	PWID infected with HCV globally	N/A	All	N/A	Highlights the key priorities enhancing global coverage of harm reduction services; punitive drug polices; affordable diagnosis and treatment; improving evidence based for HCV prevention, testing, linkage to care and treatment programs; implimenting integrated HCV programs; peer based models of care; and tackling social determinants of health inequalities

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<p>Main outcome of the study was the investigation of patterns of rates of syringe borrowing and syringe lending</p>	<p>Factors that remained independently associated with syringe borrowing included age,daily heroin injection,daily cocaine injection,HIV-positive serostatus and the period following the change in SEP policy.Factors that remained independently associated with syringe lending included age, gender, Aboriginal ancestry, daily heroin injection, daily cocaine injection , HIV-positive serostatus , and the period following the change in SEP policy.Factors that remained independently associated with HIV incidence included Aboriginal ancestry, daily cocaine injection , and the period following the change in SEP policy</p>	<p>Increase access to sterile syringes was independently associated with substantial reduction in syringe borrowing, syringe lending and HIV incidence among local IDU</p>	<p>To maximizethe benefits of SEPs, efforts must be made to ensure that policies and programmatic limitations do not undermine SEP effectiveness</p>	<p>None stated</p>
<p>N/A</p>	<p>N/A</p>	<p>The author describes legal precedents for the introduction of clean needle programs in prisons</p>	<p>safe access to clean needles within Canadian prisons must be met to ensure that the rights enshrined</p>	<p>None stated</p>
<p>N/A</p>	<p>N/A</p>	<p>1) Enhancing Global coverage of harm reduction services through; addressing stigma; increasing financial support of harm reduction services;provide education to practitioners 2)Addressing drug policies and criminalization through;policy reform; alternatives to imprisonment; decriminalize use of clean needles; delivery of OST and overdose prevention 3)Ensure access to affordable HCV diagnosis and treatment through; simplification of diagnostics; broader access to HCV testing; negotiate lower prices 4)Implementation of intergrated HCV prevention and care programs through; knowledge exchange and dissemination of research on integrative models of care; make services accessible; use cascade of care model; educate and empower practitioners to treat HCV; improve data collection and dissemination 4) Advance peer based models of care through;increased financial support from government; data collection tools and guidelines; peer worker training; remove criminal record checks for peers to work in health services; peer based models into framework for networking 5)Improving the evidence based for testing, prevention, linkage of care and treatment through; uptodate population size estimates; facilitate partnerships; importance of data in supporting advocacy efforts; develop policy briefs; research studies using real world data 6) Tackling power structures and social determinants of health inequalities for PWID</p>	<p>Obtain WHO target to eliminate HCV as a major global health threat by 2030</p>	<p>None stated</p>

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None stated	Our study has limitations. First, this is an observational study, and therefore we cannot infer causation. Second, it is likely that the new SEP policies studied herein were not implemented in a uniform fashion, and it is difficult to know which specific policy changes accounted for the changes in syringe sharing and HIV incidence observed in the present study. Third, although it would have been ideal to incorporate a robust measure of SEP use, previous studies have shown that because high-risk IDU may over-report SEP use, statistical evidence of program benefits may be diminished. Further, we have previously shown that frequent SEP users tend to possess other behavioral characteristics that render them more vulnerable to HIV infection, and therefore measures of intensity of SEP use tend to be fraught with selection bias. Fourth, VIDUS is not a random sample, and therefore the IDU participating in the present study may not be representative of local IDU. Fifth, the observed declines in HIV risk behavior and HIV incidence may reflect a cohort effect whereby lower-risk IDUs are less likely to be lost during follow-up. However, VIDUS is an open, prospective cohort study, and ongoing enrollment has been employed to address problems related to this type of cohort effect. Sixth, although studies have indicated that IDU may underreport some behaviors, self-reports of illicit drug use behaviors by IDU have been shown to be valid.	None stated	29/42=69%	31/42=73.8%	71.40%		
None stated	None stated	None stated	N/A	N/A	N/A		
None stated	None stated	None stated	NA	N/A	N/A		



1 2 3 4 5 6 7 8 9 10 11 12 13 14	2018	Skinner, S.; Cote, G.; Khan, I.	Implementation Science	Hepatitis C virus infection in Saskatchewan First Nations communities: Challenges and innovations	Non-empirical	Literature review	SK	Community (FNs communities)	HCV
15 16 17 18 19 20 21 22 23 24 25 26	2017	Boyd, J.; Fast, D.; Hobbins, M.; McNeil, R.; Small, W.	Harm Reduction Journal	Social-structural factors influencing periods of injection cessation among marginalized youth who inject drugs in Vancouver, Canada: an ethno-epidemiological study	Empirical	Qualitative - ethnoepidemiological	BC - Vancouver	Not specified	HIV
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2016	Rutherford, A.R.; Ramadanovic, B.; Ahrenberg, L.; Michelow, W.; Marshall, B.D.L.; Small, W.; Deering, K.; Montaner, J.S.G.; Vasarhelyi, K.	Proceedings of the 2016 Winter Simulation Conference	Control of an HIV epidemic among injection drug users: simulation modeling on complex networks	Empirical	Mathematical modelling	BC - Vancouver (Downtown Eastside)	Community	HIV

Harm reduction	Extending the in-community and community-driven programs to other FN's communities and to the prison population Includes harm reduction (NEP, know your status programs), mobile HCV clinics	HCV infection in FN's people	N/A	First Nations	N/A	To analyse the challenges and innovations of Hepatitis C virus infection in Saskatchewan First Nations communities.
Harm reduction	No specific focus: mention OAT, drug treatment programs, harm reduction, social support, access to housing	marginalized youth who inject drugs	22 (purposely recruited) street-involved youth who inject drugs	Age ranged from 20 to 31 with a mean age of 26; 8 identified as women and 14 as men; 3 identified as Indigenous	Participants for this ethno-epidemiological study were recruited from the At-Risk Youth Study (ARYS) - a prospective cohort of street-involved and drug-using youth between 14 and 26 years of age at the time of enrolment. Self-report of the use of illicit drugs during the past 30 days. Baseline and biannual follow-up visits consist of interviewer-administered questionnaire and blood tests for HIV and HCV antibodies.  For this study, 22 youth were recruited from ARYS cohort who had a history of injection drug use and who reported cessation of injection drug use for a minimum of one 6-month period at a biannual visit. Semi-structured interviews were carried out in two waves between May 2013 and September 2015.	To examine how street-involved young people who inject drugs in Vancouver transitioned into periods of injection cessation and perceived barriers to injection cessation.
Harm reduction	A network model of an inner-city community was constructed and strategies were simulated to address the HIV epidemic in this community. Simulations were used to assess 4 strategies: reduced syringe sharing, reduced time to diagnosis, reduced time to treatment initiation, improvements to treatment retention (providing clean syringes, SIS, TasP, testing)	PWID and women involved in sex work in Vancouver's Downtown East Side	N/A- focus groups were used to develop the models but the study was based on network model simulations and no actual participants were recruited. # of focus group participants unknown	PWID, female sex workers. The model was based on 4 vertex states: gender risk, HIV status, IVDU status, prison status. Transgender individuals were not included due to data limitations.	N/A - data from cohort studies and public health surveillance was used to develop the network but not part of this study itself	Assess potential strategies to control the HIV epidemic in Vancouver's downtown east side

<p>N/A</p>	<p>None</p>	<p>There are multiple factors associated with the high rates of HCV in FN communities, including barriers to access preventive services, early diagnosis and treatment. These access issues predominantly relate to remoteness, transportation, education and awareness and a health care system designed around urban health. Instigation of new and innovative ways of delivering information and services, such as the mobile hepatitis C clinic and the community-driven STBBI Know Your Status model of care, are proving invaluable in remote FN communities. Extending these programs to other FN communities and to the prison population, which often has a disproportionately high population of both FN individuals and HCV-infected individuals, could prove to be invaluable in addressing HCV infection and helping Canada meet the global goal of HCV elimination.</p>	<p>Partnerships between on and off reserve programs are needed to optimize care and provide outreach support and awareness campaigns across various national and provincial jurisdictions. It will be important to address attitudes that may interfere with the prevention, treatment and care activities, and to reduce HCV and HIV-related stigma and discrimination across the spectrum of services. Targeted HCV initiatives by and for FN inmates are needed in Saskatchewan. The FN HCV programs already present at the community level could be linked to care in prisons. Interventions targeting modifiable risk factors, such as substance use, smoking, proper adherence to antiretroviral therapy and timely provision of HCV therapy could substantially reduce complications and lower death rates.</p>	<p>Further research is needed to evaluate the extent and the determinants associated with HCV infection, obtain population-based estimates of HCV prevalence and incidence in the Saskatchewan FN population, develop FN community-led programs to prevent new infection, better understand HCV infection, and implement more effective methods of addiction management in HCV-positive patients.</p>
<p>Experiences with drug injection cessation and barriers to cessation</p>	<p>HIV and HCV testing every 6 months following baseline</p>	<p>Results show that the factors that influenced periods of injection cessation were access to harm reduction -informed youth-focused services, transitions in route of administration (e.g. from injecting to smoking), and the provision of housing and social supports (e.g. friends, family, care providers). Conversely, participants indicated that inadequate social supports and, for some, abstinence-focused treatment methods hindered efforts to stop injecting.</p>	<p>It is necessary to include the views of young people who inject drugs in policy discussions and concentrate on socio-economic roots of poverty, drug policy, and related social and health harms. Comprehensive system of care for young PWID with a focus on better treatment access for young marginalized populations and developing youth oriented services attentive to diversity and youth perspectives. Increased consideration of the promotion of non-injection routes of drug administration, rather than more singular emphasis on abstinence.</p>	<p>Further study of innovative means of engaging youth</p>
<p>Changes in equilibrium HIV prevalence in the network simulations</p>	<p>None stated</p>	<p>HIV prevalence was reduced by all control strategies. Syringe sharing contributes significantly to HIV prevalence in the DTES and affects non-IVDU due to sexual transmission. Close connections between syringe sharing and sexual networks in closely linked communities may be avenues for rapid HIV transmission. Earlier diagnosis, increased treatment retention and (to a lesser extent) shorter time to treatment also reduced equilibrium HIV prevalence in the model.</p>	<p>A combination of both harm reduction and treatment measures would be most effective in the DTES. Harm reduction programs which reduce syringe sharing could reduce new HIV infections. Treatment as Prevention could be the most effective strategy, if there was a robust testing program and effective patient retention in treatment. This analysis also shows that network modeling can provide insight into epidemic control strategies.</p>	<p>Network modeling may be a useful tool for operational public health research</p>

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None stated	None stated	There are significant limitations in HCV surveillance. Access to testing is not available in the some of FN communities in Saskatchewan and many do not have access to primary care. National surveillance data are insufficient for determining the number of cases of hepatitis C among FNs populations, largely because many provinces do not collect information according to ethnicity.	N/A	N/A	N/A		
Results of qualitative interview were triangulated with the results of a longitudinal program of ethnographic research with street youth who inject drugs.	<ol style="list-style-type: none"> <li>1. social desirability bias (self-report of the use of illicit drugs)</li> <li>2. may not be reflective of the experiences of the larger injection drug using youth community either locally or nationally.</li> <li>3. the underrepresentation of Indigenous participants</li> <li>4. only 22 participants and not really youth at mean age of 26yo</li> </ol>	None stated	26/42=61.9%	21/42=50%	61.9+50/2=56%		
Network modelling allowed authors to consider complex and multiple interacting factors that drive the epidemic and influence effectiveness of interventions.	Simplications were made to ensure model reliability and tractability (not capturing full range of interacting factors, just a subset). Only 1 network was generated. The model does not consider situations in which IV drug use and needle sharing are independent (decoupled), and assumes that they always occur together. Not enough data to include transgender individuals. General limitations of network modeling: needs significant data and resources, analytics	Future research about network-based strategies requires simulation with more accurate underlying social network. Future studies: simulation of potential gains achieved by combining resource allocation and treatment strategies. Analysis of control strategies on HIV incidence (better short-term measure than prevalence). Lack of data about transgender individuals, more data from other cohort studies could be used to expand this	24/48 = 50% (interpreted this as mixed methods but unsure)	32/48=66.7%	30/48=64.58%		

1	2013	Strike, C.; Hopkins, S.; Watson, T.M.; Gohil, H.; Leece, P.; Young, S.; Buxton, J.; Challacombe, L.; Demel, G.; Heywood, D.; Lampkin, H.; Leonard, L.; Lebounga Vouma, J.; Lockie, L.; Millson, P.; Morissette, C.; Nielsen, D.; Petersen, D.; Tzemis, D.; Zurba, N.	Working Group on Best Practice for Harm Reduction Programs in Canada	Best practice recommendations for Canadian harm reduction programs that provide service to people who use drugs and are at risk for HIV, HCV, and other harms: part 1	Empirical	Evidence Review / systematic review	Canada	Not specified	HIV, HCV, HBV	
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13	2011	P.R.W. Kendall Prepared by Gilbert, M.; Buxton, J.; Tupper, K. (multiple contributing authors)	Office of the Provincial Health Officer	DECREASING HIV INFECTIONS AMONG PEOPLE WHO USE DRUGS BY INJECTION IN BRITISH COLUMBIA: Potential explanations and recommendations for further action Report from the Office of the Provincial Health Officer	Non-empirical	Report	BC	Multiple-hospital, clinic, community	HIV, HCV	
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33	<b>Mobile Care Initiatives / Telehealth n=5</b>									
34	2017	Cooper, C.L.; Hatashita, H.; Corsi, D.J.; Parmar, P.; Corrin, R.; Garber, G.	Annals of Hepatology	Direct-Acting Antiviral Therapy Outcomes in Canadian Chronic Hepatitis C Telemedicine Patients	Empirical	Cohort - retrospective	ON - Ottawa	Other (Telemedicine through Ottawa Hospital and Regional Viral Hepatitis Program)	HCV	
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13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	Harm reduction	This report summarizes the discussion of this expert working group. Part 1 analyzes the trends in HIV and hepatitis C (HCV) infections in IDU in BC. Part 2 reviews the potential hypotheses for what factors might underlie these trends and evidence where it is available to support or refute each hypothesis. The report concludes by summarizing the opinions of the working group on the most likely explanations for the decrease in new positive HIV tests among IDU, reviewing the current understanding of the nature of addiction and rationale for alternatives to enforcement-based drug policies, and recommending future actions to prevent further transmission of blood-borne infections, including HIV, among IDU in BC.	All PWID within British Columbia	N/A	All	N/A	This report provides a review of ecological data and considers a broad range of evidence and data sources of varying data quality and relationship to the hypotheses in question.
34 35 36 37 38 39 40 41 42 43 44 45 46 47	Telemedicine	Development of a telemedicine program staffed by multidisciplinary team of HCV healthcare professionals with a comparisons between TM and non-TM populations.	TM connected clinics throughout Ontario (1583 sites)	157 TM and 1130 non-TM patients	History of IDU 70.1% in TM and 54.9% in non-TM group	Telemedicine program development for HCV treatment from Jan 2012 to Aug 2016 compared to non-TM populations. Inclusion criteria 18yo with chronic HCV infection. Clinical outcome included pre-treatment access to biopsy, transient elastography, initiation and type of HCV treatment, and SVR (free of virus >12 wks after treatment)	Evaluate the effectiveness of the TM health care delivery model for chronic HCV

Multiple	Multiple	Recommended best practice policies about:1.Needle and syringe distribution; 2.Cooker distribution; 3.Filter distribution; 4.Ascorbic acid distribution; 5.Sterile water distribution; 6.Alcohol swab distribution; 7.Tourniquet distribution; 8.Safer crack cocaine smoking equipment distribution; 9.Disposal and handling of used drug use equipment; 10.Safer drug use education; 11.Opioid overdose prevention: education and naloxone distribution ;	Policies that limit the number of needles distributed limit the effectiveness of NSPs to prevent HIV and HCV transmission.There are also few empirical studies that address injecting equipment distribution policies and coverage was lacking. Policy and practice guidelines developed from evidence summary for each chapter.	Studies that are well designed to measure the magnitude of risk of HIV, HCV, and other bloodborne pathogen transmission from sharing each item of injecting equipment are needed.
N/A	N/A	Full participation in harm reduction programs, including needle distribution and methadone maintenance therapy (MMT), has been found to be associated with decreased risk for HIV and HCV. These harm reduction programs are available across BC and may be having an impact on observed HIV trends in IDU.	In addition to expanding access to HAART, this response includes the delivery of effective harm reduction services (including established interventions such as needle distribution and substitution therapy, and innovations such as supervised injection facilities and prescription opioids) and community-based HIV prevention services. This provincial response needs to be sustained and new opportunities for further prevention of HIV in IDU explored. This success also challenges the health system in BC to ensure that equivalent sustained, multi-level HIV prevention responses exist equally in all populations affected by HIV and HepC.1) Expand access to, uptake of, and adherence to, HAART. 2) Expand harm reduction programs 3)Improve data and monitoring systems 4)Ensure equity of access to services 5)Expand testing for HIV and HCV 6)Support initiatives that address the determinants of health	Further research in these areas would be informative; for example, research into the HIV testing patterns of IDU over time, changes in the age distribution of IDU, and access of younger IDU to health and harm reduction services.
Main clinical outcome was Sustained Viral Response (free of virus >12 wks after treatment)	Clinical outcome included pre-treatment access to biopsy, transient elastography, initiation and type of HCV treatment	TM patients more frequently indigenous (7.0% vs 2.2), IDU (70.1% vs 54.9%), alcohol use (69.4% vs 56.9%) and incarceration (46.5 vs 35.5%) and materially deprived (31.8% vs 17.0%); TM patients less likely to have liver biopsy (15.9% vs 39.2%) and less likely to initiate anti-retroviral treatment (5.1% vs 19.5%); TM equally likely to have a fibroscan (59.2% vs 61.8%).	Multidisciplinary TM approach can engage and retain patients in remote areas in the treatment of HCV. TM program offers increase access to specialty care for isolated populations. Reported that TM saved patients time, diminished distance traveled and missed work days with high satisfaction	None stated

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None stated	Found limitations of their evidence base, including lack of program evaluation of education initiatives, variance in study design and sample size and representativeness.	Although the evidence base has grown in recent years, there are notable gaps in the literature on other injecting equipment. Studies that are well designed to measure the magnitude of risk of HIV, HCV, and other blood-borne pathogen transmission from sharing each item of injecting equipment are needed. There are also few empirical studies that address injecting equipment distribution policies and coverage was lacking.	36/48=75%	30/48=62.5%	68.75%		
None stated	None stated	<p>a. Monitoring systems for community-based prevention services are needed in order to evaluate their impact. An HIV/HCV Outcomes for BC Working Group has been established and is working on provincial process evaluation tools and data collection systems for community-based HIV and HCV prevention services.</p> <p>b. Better data are needed on the population dynamics of IDU in BC, to address the question of whether the decrease in new positive HIV tests among younger IDU is related to less injection, or less engagement of younger IDU with harm reduction and testing services.</p> <p>c. Improvements to provincial HIV surveillance data are needed in order to track HIV infections that may be related to non-injection drug use. Linkage of provincial HIV surveillance to HIV drug treatment data is required in order to characterize trends in the rates of infection at</p>	N/A	N/A	N/A		
	The TM sample was too small to comment on SRV outcomes relative to non-TM	Not all marginalized populations benefited equally. Indigenous population SVR rates with DAA treatment was lower suggesting they need more attention ie peer navigators.	33/42=78%	28/42=66.6%	69.0+71.4/2=70.2%		



1 2 3 4 5 6 7	2016	Jongbloed, K.; Friedman, A.J.; Pearce, M.E.; Van Der Kop, M.L.; Thomas, V.; Demerais, L.; Pooyak, S.; Schechter, M.T.; Lester, R.T.; Spittal, P.M.	Trials	The Cedar Project WeITel mHealth intervention for HIV prevention in young Indigenous people who use illicit drugs: study protocol for a randomized controlled trial	Empirical	(pre-)RCT (protocol paper)	BC - Vancouver and Prince George	Community	HCV, HIV
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	2011	Deering, K.N.; Kerr, T.; Tyndall, M.W.; Montaner, J.S.G.; Gibson, K.; Irons, L.; Shannon, K.	Drug and Alcohol Dependence	A peer-led mobile outreach program and increased utilization of detoxification and residential drug treatment among female sex workers who use drugs in a Canadian setting	Empirical	Cohort - prospective survey	BC - Vancouver	Community	HCV, HIV, STI
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	2010	Hayashi, K.; Wood, E.; Wiebe, L.; Qi, J.; Kerr, T.	Int J Drug Policy	An external evaluation of a peer-run outreach- based syringe exchange in Vancouver, Canada	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV

mHealth	The Cedar Project WeiTel mHealth intervention uses a structured mobile-phone initiative to connect young Indigenous people who use drugs with Cedar Case Managers in a community-based setting.	young Indigenous people who use illicit drugs	Planned sample size - 200	Indigenous youth	Cedar Project - a cohort study addressing HIV and hepatitis C vulnerability among young Indigenous people who use drugs in Vancouver and Prince George, BC; Started 2003-2007 and reopened in 2011. 738 participants enrolled; eligibility criteria - 14-30 yo, informed consent, Indigenous ancestry, smoking or injecting drugs at enrollment; enrollment visit and follow-ups every 6 mo; data - questionnaires for demographic, behavioural and health intervention, blood sample for HIV/Hep C.	To measure the effect of a culturally safe, strengths-based two-way supportive text-message intervention to reduce HIV vulnerability among young Indigenous people who use illicit drugs
Mobile Care Initiative	A peer-lead mobile outreach program among street-based sex workers using a prospective cohort dataset available over an 18 month period to evaluate the relationship between use of MAP program and utilization of addiction treatment. Baseline and biannual interview questionnaires and voluntary HIV screening.	Street based female sex workers in Vancouver, BC	242 FSW with 479 observations and the median number of observations per person was 2.	Street based female sex workers, 122 self reported as being Caucasian, 102 aboriginal ancestry, 16 were other ethnic heritage	Study was between April 2006 to May 2008 Inclusion Criteria: woman age 14 or older who smoked (excluding marijuana) or injected illicit drugs in the last month and engaged in street-level sex work in Vancouver. Primary outcome measure time updated dichotomous variable describing use of mobile outreach program in the previous 6 months period. Secondary outcome: drug treatment outcomes 1) methadone maintenance therapy 2) addiction counselling 3) inpatient detoxification and 4) residential drug recovery houses	Impact of peer outreach program on PWID FSW
Mobile Care Initiative	The Alley Patrol was established in 2000 by the Vancouver Area Network of Drug Users (VANDU), a local drug user organization. Trained peer-volunteers were paired up and worked 4-hour shifts to distribute sterile injection equipment and condoms, collect used syringes and provide harm reduction education to IDU in public places in Vancouver's Downtown Eastside, where public drug use was concentrated. The program ended in 2005 but an Injection Support Team was created to support IDU experiencing difficulty with injecting in the open drug scene.	Participants in the Vancouver Injection Drug Users Study (VIDUS) who reported having injected drugs during the prior 6 months.	854 IDU were eligible for the analysis	All	Vancouver Injection Drug Users Study (VIDUS), prospective cohort study of IDU recruited through self-referrals and street outreach since May 1996. Eligibility criteria include injecting drugs a minimum of once in the previous month, residing in the greater Vancouver region and providing written informed consent. Participants complete an interviewer-administered questionnaire and provide a blood sample semi-annually. Drug use, HIV risk behaviour and HIV incidence is tracked longitudinally.	To conduct an external evaluation of a peer-run outreach-based syringe exchange programme (SEP) initiated by the Vancouver Area Network of Drug Users (VANDU), a local drug user organization.

<p>HIV propensity score at 6 months</p>	<p>HIV propensity at 1 year, HIV risk, resilience, psychological distress, access to drug-related services, and connection to culture measured at 6 months and 1 year</p>	<p>N/A - no results yet as protocol paper</p>	<p>Innovative, culturally safe interventions that address the barriers to HIV prevention while supporting the strength of young Indigenous people who use drugs are urgently needed</p>	<p>N/A</p>
<p>Primary outcome measure time updated dichotomous variable describing use of mobile outreach program in the previous 6 months period</p>	<p>Secondary outcome: drug treatment outcomes 1) methadone maintenance therapy 2) addiction counseling 3) inpatient detoxification and 4) residential drug recovery houses</p>	<p>FSWs servicing a higher volume of clients per week (10+ compared to &lt;10) and those soliciting clients in more isolated public spaces (alleys, side streets and industrial settings compared to main streets, commercial, or residential settings) were more likely to use the mobile program. At the same time, youth (&lt;24 years) were less likely than older women (25+ years) to access the mobile outreach program. Of particular importance, reporting use of the mobile outreach program in the last 6 months (compared to not reporting use) was independently associated with a four-fold elevated proportional odds of using inpatient addiction treatment, even after adjusting for individual drug use and environmental-structural factors and accounting for repeated measures on the same individual.</p>	<p>Unsuccessful attempt to access drug treatment is associated with elevated odds of violence against female sex workers (FSWs); that peer-based mobile outreach remain a critical strategy for facilitating utilization of addiction treatment services. Indeed, previous research has shown that FSWs, particularly those who use drugs, often exist outside of conventional public health programs and services; programs are a critical 'safer environment intervention', modifying the physical and social environments by reaching sex workers where and when they work and therefore reducing barriers to accessing harm reduction supplies and health and social services, including addiction treatment; mobile outreach programs have the opportunity to play an important role in HIV/STI prevention through distribution of resources to some of the most vulnerable women in sex work, including those with higher numbers of clients. Higher client volume has also been identified as an important driver of STI/HIV transmission among FSWs in several international settings.</p>	<p>Future research should concentrate on understanding how specific characteristics of mobile outreach programs may facilitate entry into inpatient addiction treatment or connect women to other services. This will have important implications for the development and scale up of peer-based outreach programs in this and similar settings</p>
<p>Use of the VANDU Alley Patrol SEP during 6 months prior to the interviews.</p>	<p>Explanatory variables - age, gender, Aboriginal ancestry, HIV ser-status, unstable housing, sex work, daily heroin and cocaine injection, injecting in public, injecting with others, requiring help injecting, having difficulty accessing sterile syringes, borrowing syringes, average needle reuse (&gt;once vs once), syringe disposal, and non-fatal overdose.</p>	<p>Of 854 IDU eligible for analysis, 350 (41%) were female, 292 (34.2%) were of Aboriginal ancestry. 233 (27.3% participants reported obtaining syringes from VANDU Alley Patrol volunteers during the study period. The proportion of use increased during the study period. Service use was associated with unstable housing (Adjusted Odds Ratio [AOR] = 1.83, 95% CI: 1.39–2.40), frequent heroin injection (AOR = 1.31, 95% CI: 1.01 – 1.70), frequent cocaine injection (AOR = 1.34, 95% CI: 1.03 – 1.73), injecting in public (AOR = 3.07, 95% CI: 2.32– 4.06), and needle reuse (AOR = 0.65, 95% CI: 0.46 – 0.92).</p>	<p>Needle reuse was independently and negatively associated with the use of the VANDU Alley Patrol SEP, even though this population was high risk for factors that typically increase needle reuse, showing that this program may have contributed to reducing needle reuse among local IDU. Peer-based outreach programs can reach subpopulations of IDU that are high risk of HIV infection. Importantly, the Alley Patrol SEP continued to serve this vulnerable population during periodic policy crackdowns. The findings highlight the important role that drug user-led initiatives can play in extending the reach of conventional public health programs.</p>	<p>None stated</p>

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None stated	Over-sampling in the intervention arm to adjust for refusals to participate or difficulty locating participants may result in a dilution of the effect of the intervention in ITT analysis.	Same as policy implications	31/42=73.8%	36/42 = 85.7%	31/42=73.8%		
<p>e mobile outreach program was designed explicitly for street-based FSWs, and thus our prospective cohort offers a good representative sample of FSWs both using and not using MAP for external evaluation; time-space sampling was used to systematically sample women at staggered times and locations based on street-level solicitation spaces identified through mapping, therefore helping attract a representative sample; targeted a difficult-to-access, hidden and marginalized population with high health care and drug treatment needs; r primary association between using the mobile outreach program and accessing inpatient addiction treatment was very strong (&gt;4-fold), even after adjusting for individual drug use and environmental-structural factors, and outpatient addiction treatment</p>	<p>study population included only women in street-level sex work; since sex work is conducted across many other types of venues (e.g., massage parlours, brothels), the results may not be generalizable to sex workers in other venue; sampling frames are difficult to construct for hidden populations, the sample was not randomly generated and may not be representative of street-based FSWs in other settings; sample size was relatively small; self-reported behaviour may be subject to social desirability bias or higher non-response rates; the study design is observational in nature and thus cannot determine causal relationships</p>	it is important that innovative evidence-based structural interventions that support the ability of FSWs to engage in HIV risk reduction practices and improve their access to and utilization of health and social services continue to be developed and evaluated.	40/42=95%	31/42=73.8%	80.9+78.5/2=79.7%		
None stated	As an observational study, causation cannot be established. VIDUS is not a random sample, so findings may not be generalizable to other IDU populations. Self-reported data could be affected by socially desirable reporting. However, participants and interviewers were blinded to use of data, so this reporting bias may not have been a large concern. It is unknown if Alley Patrol SEP users would have used other SEPs in the area if this program did not exist.	None stated	28/42 = 66.7%	28/42=66.7%	66.70%		

1	2009	Hilton, B.A.; Thompson, R.; Moore-Dempsey, L.	Canadian Journal of Nursing Research	Evaluation of the AIDS Prevention Street Nurse Program: One step at a time	Empirical	Qualitative - participatory research and responsive evaluation	BC - Vancouver	Multiple - streets and established sites of contact, such as jails, detoxification centres, clinics, and drop-in centres, door-to-door, on foot or via mobile van	HIV, STIs	
2	<b>Peer-delivered services n=3</b>									
3	2014	Jozaghi, E.	Journal of Substance Use	The role of drug users' advocacy group in changing the dynamics of life in the Downtown Eastside of Vancouver, Canada	Empirical	Qualitative - community-based case study	BC - Vancouver (Downtown Eastside)	Community	HCV, HIV	
4	2014	Markwick, N.; Ti, L.; Callon, C.; Feng, C.; Wood, E.; Kerr, T.	J Epidemiol Community Health	Willingness to engage in peer-delivered HIV voluntary counselling and testing among people who inject drugs in a Canadian setting	Empirical	Cohort - retrospective	BC - Vancouver	Suggested community locations: InSite, Vancouver Area Network of Drug Users (VANDU)	HIV	

peer review only

1 2 3 4 5 6 7 8 9 10 11	Mobile Care Initiative	The AIDS Prevention Street Nurse Program, uses specially prepared community health nurses to work "on the street," piloted in Vancouver, BC in January 1988 directed in response to the HIV/AIDS epidemic. The nurses work with challenging clients and complex situations in an expanded nursing practice role that includes several delegated medical functions.	marginalized, hard-to-reach, and high-risk street-involved adults and youth, non-street involved gay, lesbian, bisexual and transgendered populations, and refugees and immigrants at risk for HIV and STD who may or may not be street-involved.	63 interviews and focus groups with 84 participants, including clients, street nurses, other service providers, and representatives of other HIV/STD programs in the province of BC.	marginalized, hard-to-reach, and high-risk street-involved adults and youth	N/A	To describe the work of the street nurses and the challenges posed by that work from the perspective of the nurses and others, and to identify changes resulting from the nurses' work. To articulate the roles and contributions of the nurses and to identify ways in which the program might be made more effective.
12 13 14 15 16 17 18 19 20	Peer-delivered counseling and advocacy	Former and current drug users mobilized in an effort to prevent ongoing spread of HIV and overdose among their peers in DTES, which led to the creation of the Vancouver Area Network of Drug Users (VANDU) in 1997. VANDU has an office in DTES and operates a variety of programs in the DTES tailored towards drug-user harm reduction programs.	VANDU volunteers living in DTES	11	VANDU volunteers, including VANDU Board members and IDUs who used the services at VANDU, living in DTES	N/A	To assess how drug user organizations such as VANDU intervene to help shape the neighbourhoods and capture the transformative role of peer led intervention in the lives of IDUs in the DTES
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	Peer delivered counselling and testing	peer delivered voluntary counselling and testing (VCT)	VIDUS participants who completed a survey between December 2011 and May 2012	600; 7 observations with missing data were excluded from analysis	HIV-negative IDU	Vancouver Injection Drug Users Study (VIDUS): a prospective cohort of HIV-negative IDU recruited through street outreach and self-referral since 1996, collects demographic data, info on drug use, HIV risk behaviours, blood samples collected for serologic testing	to characterize IDU's willingness to receive peer-delivered VCT

<p>Themes around the roles and contributions of the nurses and to identify changes resulting from the nurses' work.</p>	<p>N/A</p>	<p>Major areas of impact on clients: knowing more about HIV/AIDS/STDs, their own situation, and their options; receiving essential supplies to reduce harm and promote health; changing behaviour to reduce disease transmission, improve resistance, and promote health and well-being; connecting with help or care; changing feelings about themselves and others; feeling supported; influencing others; receiving earlier attention, thereby reducing the severity of problems; being healthier with or without HIV; making major changes in drug use; and changing indicators likely reflective of decreased morbidity and mortality.</p>	<p>The program's benefits progressed through a series of stages, consistent with the "hierarchy of changes" by Cohen and Kibel (1993) (first generate interest and prove "effects", then turn effects into "gains", to get the client to buy-in, "capacity enhancements" changes lead to "outcomes" and the fifth level are "impacts" and consistent with the process of empowerment. It is important to empower clients to make changes, by providing resources, skills, and opportunities within an atmosphere of mutual trust and respect, education and support, participation and commitment, and power-sharing.</p>	<p>None stated</p>
<p>Themes around work as a peer IDU at VANDU, the impact they believe their work has had in the community, the DTES situation prior to VANDU, the DTES after the establishment of VANDU and suggestions related to the ways risky behaviours could be reduced</p>	<p>N/A</p>	<p>Themes include: The DTES change, Changes in behaviour, Change in stigmatization. VANDU helped shape the neighborhood by advocating for harm reduction but also social and environmental changes in the neighborhood. Drug users feel empowered and increase their self-esteem. Women particularly are at risk of violence relating to drug use, and VANDU set up groups to be in the alleys to help IDUs. IDUs also learn about safe injecting and the importance of not sharing, which lowers transmission of ID. Lastly, by advocating, VANDU has been able to help decrease stigma around IDU.</p>	<p>VANDU has been able to reduce risky injection behaviour and reduce risk of overdose death by establishing unsanctioned safe injection site (SIF) and the social support provided by a drug organization like VANDU, helps IDUs maintain lower-risk injection behaviour. VANDU has given a political voice to the most marginalized members of society who otherwise would not be represented. Peer-led organizations for IDU may help increase the reach of harm reduction to the most marginalized and give IDU a political voice.</p>	<p>None stated</p>
<p>Willingness to receive peer-delivered pretest counselling, peer-delivered rapid HIV testing and peer-delivered post-test counselling.</p>	<p>None</p>	<p>309 individuals (51.5%) indicated willingness to receive peer-delivered pre-test counselling, 244 (40.7%) to receive peer-delivered rapid HIV testing, and 257 (42.8%) indicated willingness to receive peer-delivered post-test counselling.</p>	<p>implementing peer-delivered VCT within already established peer-run organizations to increase access to VCT within the community; Potential for peer-based services to help address issues such as lack of trust in the healthcare system, physicians' unfamiliarity with the social conditions surrounding IDU, and discomfort awaiting test results</p>	<p>study could be extended by future longitudinal and intervention research assessing how reported willingness compares to actual willingness to receive peer-delivered VCT.</p>

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<p>Sample is reasonably representative of the thoughts and concerns of nurses, other providers and clients.</p>	<p>Only those clients who consented participated in the study, which may have introduced bias, even though variation was sought. Ex-clients were not able to be reached because there was no way to contact them.</p>	<p>For maximal effectiveness, all parties concerned should take advantage of every opportunity for partnering, coordinating, collaborating on current and future healthcare delivery. This is a good example of successful community collaborating and partnering.</p>	<p>33/42 = 78.6%</p>	<p>38/48=79.2%</p>	<p>78.90%</p>		
<p>None stated</p>	<p>None stated</p>	<p>None stated</p>	<p>16/42=38.1%</p>	<p>17/42 = 40.5%</p>	<p>39.30%</p>		
<p>Findings are consistent with research in Melbourne, Australia, also investigated a program of peer-delivered hepatitis C counselling and testing among IDU and found improvement in risk behaviours and knowledge of hepatitis C.</p>	<p>sample was built using snowball sampling methods and was not randomly selected; therefore, residual confounding may exist and results may not be generalizable, self-reporting may subject results to response bias</p>	<p>None stated</p>	<p>23/42 = 54.8%</p>	<p>19/42 = 45.2%</p>	<p>21/42 = 50.0%</p>		



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2014	McNeil, R.; Small, W.; Lampkin, H.; Shannon, K.; Kerr, T.	AIDS Behav.	"People Knew They Could Come Here to Get Help": An Ethnographic Study of Assisted Injection Practices at a Peer-Run 'Unsanctioned' Supervised Drug Consumption Room in a Canadian Setting	Empirical	Qualitative - ethnographic	BC - Vancouver	Community (VANDU unsanctioned drug consumption room (DCR))	HIV, HCV
<b>Infective Endocarditis Surgical v. Medical Management n=2</b>								
2018	Rodger, L.; Dresden Glockler-Lauf, S.; Shojaei, E.; Sherazi, A.; Hallam, B.; Koivu, S.; Gupta, K.; Hosseini-Moghaddam, S.M.; Silverman, M.	JAMA Network Open; Infectious Diseases	Clinical Characteristics and Factors Associated with Morbidity in First-Episode Infective Endocarditis Among Persons Who Inject Drugs	Empirical	Case series	ON - London	Hospital (3 acute care hospitals)	Infective Endocarditis

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Peer delivered injections	Peer assisted injections at VANDU's DCR	23 participants, including 11 women and 12 men. Participants were an average of 40 years of age (range 27–59 years), with 35% self-identifying as a member of a visible minority (i.e. Aboriginal, African-Canadian, or Indo-Canadian). 17 participants reported that they had injected drugs within the past thirty days, with the most frequently injected drugs being heroin (12), hydromorphone (8), and cocaine (6). 15 of these participants (11 women, 4 men) reported that they regularly required help injecting, including 8 who always required help injecting (6 women, 2 men). 8 participants (3 women, 5 men) worked as peer volunteers at VANDU and regularly provided manual assistance injecting.	23	All	NA	To explore how people who require help injecting experience assisted injection support within this unsanctioned DCR, with an emphasis on how these assisted injections differed from those received within the street-based drug scene
Surgical vs medical management	Surgical vs medical management	PWID treated for a first episode of infective endocarditis	202	All	All patients were adult (aged 18+) inpatients admitted between April 1 2007-March 30 2016, last follow-up time was Nov 2017. Study population included only patients with a definite IE per the modified Duke criteria; criteria have been demonstrated to accurately classify IE among PWID. Of 370 total first-episode cases of IE, 202 were in PWID.	To compare clinical characteristics in first-episode infective endocarditis in PWID who are surgically vs medically managed and to identify variables associated with mortality.

<p>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22</p> <p>Interview guide addressed a range of topics, including but not limited to: a) factors that shaped assisted injection practices within the local drug scene; b) how the unsanctioned DCR shaped assisted injection practices, particularly in comparison to other injection settings; and, c) the social context of assisted injections performed within this unsanctioned DCR</p>	<p>Population characteristics (e.g. age, gender, ethnicity, last drug injection, etc.)</p>	<p>Findings underscore how people who require assistance injecting, and especially women and people with disabilities, are vulnerable to an array of health harms due to intersecting social and structural factors that constrain access to the sanctioned SIF. We found that, by providing assistance injecting in a regulated environment and in accordance with a harm reduction policy, this peer-run 'unsanctioned' supervised drug consumption facility mitigated these barriers, and in tum was functioning to establish safer injecting routines and provide an escape from everyday violence. Furthermore, our findings emphasize how VANDU disrupted social practices that produce HIV and HCV risks, while reinforcing overdose prevention messages. Rules prohibiting assisted injections were a structural-environmental barrier that constrained access to the sanctioned SIF. <b>In addition, our findings demonstrate that drug user-led organizations can play a central role in the delivery of harm reduction programs - people who require help injecting may more readily respond to peer volunteers who share similar life experiences.</b></p>	<p>Changes to supervised drug consumption facilities are urgently needed to accommodate a wider range of drug-using subjects, and thereby minimize structural vulnerabilities to drug-related ham (need for changes to legal frameworks and SCF regulations to accommodate assisted injections), consideration of peer based delivery models for SCF.</p>	<p>Greater attention is needed to how harm reduction programs emphasize particular bodies (e.g. autonomous, self-injecting) at the expense of others (e.g. women, people with disability)</p>
<p>23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47</p> <p>Survival among PWID</p>	<p>causative organisms, site of infection, and cardiac as well as noncardiac complications; referral to addiction services, and survival vs medical management. Demographic information collected for each patient included age, sex, comorbid conditions (eg, HIV or hepatitis C infection), and predisposing conditions (eg, heart disease, chronic venous access, intracardiac devices, or prosthetic valve).</p>	<p>Of the 202 patients included, 105 (52%) were male, the median (interquartile range) age was 34 (28-42) years, and patients were predominantly positive for the hepatitis C virus (69.8% [141 of 202]). Right-sided infection was more common (61.4% [124 of 202]), and most infections were caused by Staphylococcus aureus (77.2% [156 of 202]). Surgery occurred in 19.3% of patients (39 of 202). The all-cause mortality rate was 33.7% (68 of 202). Adjusting for age and sex, survival analysis demonstrated that surgery was associated with lower mortality, as was referral to addiction treatment (HR, 0.29; 95% CI, 0.12-0.73; P = .008). Higher mortality was associated with left-sided infection and bilateral involvement.</p> <p>Our data are in keeping with previous studies showing that PWID with IE have predominantly right-sided disease caused by S aureus and high mortality.</p>	<p>Surgery appeared to be associated with significantly lower mortality, but we cannot rule out the presence of other unmeasured confounders. It is notable that presently the American Society for Thoracic Surgery consensus guidelines recommend using the same criteria for surgery in patients who inject drugs and those who do not. An optimal approach to surgical treatment of PWID involves a multidisciplinary team, in which involvement of ethics or patient commitment to rehabilitation prior to operation should be considered part of a complete treatment plan.</p> <p>Our findings support the recent recommendations from the National Academies of Sciences, Engineering, and Medicine that emphasize the importance of integrating treatment for opioid use disorder with acute care for infectious diseases.</p>	<p>Further study to identify PWID who would benefit from surgery is warranted. Should also explore increased use of addiction treatment.</p>

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None stated	Findings are not be representative of the experiences of all those who require help injecting within the local drug scene, especially those who do not access this facility, and might therefore overlook important factors that shape access to this supervised DCR; people who use drugs may give socially desirable responses during research interviews; because of the unique combination of social, structural, and spatial factors that shape injection drug use in any particular locale, our findings might not be transferable to supervised drug consumption facilities in all settings	None stated	33/42 = 78.6%	35/42 = 83.3%	34/42 = 81.0%		
To our knowledge, this is one of the largest, most contemporary cohorts of PWID with IE. In contrast to previous studies, our analysis of a large cohort of PWID with IE allowed assessment of the association between surgery and survival by comparing PWID treated surgically vs nonsurgically.	<ol style="list-style-type: none"> <li>1) Retrospective in nature</li> <li>2) Results limited to patients who fulfilled modified Duke criteria; results cannot be generalized to population of patients since patients with possible endocarditis were excluded.</li> <li>3) Data regarding specifics of medical treatment following discharge (agent, duration and completion) were not collected. Homecare notes regarding IV treatment was unavailable.</li> <li>4) We cannot rule out the possibility that the patients selected for surgery were felt to have less severe addiction issues and therefore were a select group with better addiction prognosis, although it is important to note the association with lower mortality identified in the multivariable model</li> <li>5) Surgery was associated with lower mortality in multivariable models that included referral to addictions services and discharge with OST. Although surgery was associated with a reduction in mortality, we cannot rule out that unmeasured variables (such as a clinical impression of low risk for relapse of drug use) led to selection of patients with improved prognosis for surgery</li> <li>6) Owing to sample size, it was not possible to assess the impact of valve repair vs valve replacement; this is significant when considering surgery in PWID because of the risk of reinfection of a prosthetic valve. It is likely that reinfection of a repaired valve may not have the same grave prognosis as prosthetic valve endocarditis</li> </ol>	Factors associated with mortality in PWID populations have not been well described.	30/42 = 71.4%	30/42 = 71.4%	30/42 = 71.4%		

1	2016	Shetty, N.; Nagpal, D.; Koivu, S.; Mrkobrada, M.	Journal of Cardiac Surgery	Surgical and Medical Management of Isolated Tricuspid Valve Infective Endocarditis in Intravenous Drug Users	Empirical	Cohort - retrospective	ON - London	Hospital (London Health Sciences Centre (LHSC), a care facility that sees high rates of IVDU-related complications)	Infective Endocarditis
2	<b>Other n=4</b>								
3	2018	Jaworsky, D.; Phillips, P.; Cui, Z.; Chau, W.; Colley, G.; Dutta, R.; Yip, B.; Kremer, H.; Eyawo, O.; Montaner, J.S.G.; Hull, M.W.	AIDS Care	Trends in discharges from the HIV/AIDS ward at a tertiary Canadian hospital from 2005 to 2014	Empirical	Chart review - retrospective	BC - Vancouver	Hospital	HIV, HCV, opportunistic infections, other infections
4	2015	Bertrand, K.; Roy, É.; Vaillancourt, É.; Vandemeersch, J.; Berbiche, D.; Boivin, J.F.	Addiction	Randomized controlled trial of motivational interviewing for reducing injection risk behaviours among people who inject drugs	Empirical	Randomized controlled trial	QC - Montreal	Community	HIV

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Surgical vs medical management	Medical or surgical management of native cases of tricuspid valve infective endocarditis associated with IVDU	Patients admitted with native TV IE related to IVDU at LHSC	38	Patients admitted with native TV IE as proven by transthoracic or transesophageal echo.	38 participants. All had diagnosis of isolated native TV IE treated at LHSC between March 2008-December 2011. Excluded: age < 18, noninfective cause of endocarditis, suspected endocarditis w/o echo evidence of vegetation, prosthetic valve endocarditis, involvement of aortic/mitral valve/intracardiac device	To assess the long-term outcomes of native tricuspid valve infective endocarditis cases associated with IVDU that were managed medically or surgically at LHSC.
Tertiary hospital - St. Paul's dedicated HIV/AIDS ward	St. Paul's Hospital is a tertiary-level acute care centre in Vancouver, BC. It opened a ward in 1997 dedicated to HIV/AIDS, which supports clinical care, teaching and research and is staffed by physicians, nurses and allied health practitioners with expertise in HIV/AIDS management and substance use-related conditions. In July 2014, the ward was repurposed to the "Urban Health Infection Unit" and expanded to include HIV-negative individuals with infectious conditions arising from addictions comorbidities.	Individuals 18 or over with documented history of HIV infection who were admitted or transferred to the HIV/AIDS ward at St. Paul's Hospital between July 1, 2005-June 30, 2014.	1595 individuals	People with HIV admitted to a hospital ward	N/A	To examine trends over time in causes for hospital admission to the St. Paul's Hospital HIV/AIDS ward in Vancouver, Canada from 2005-2014. And, to describe antiretroviral use and associated virologic suppression among individuals admitted during this period.
Motivational interviewing	PWID were randomized to receive individualized 90min motivational interviewing or educational interviewing and efficacy of the interventions on high risk injection behaviours	participants who have injected drugs in the previous month to recruitment, have shared drug injection equipment (syringe, container, filter, water) or shared drugs by backloading or frontloading in the same month and be 16 years old or more	219	All	N/A	To examine the efficacy of Motivational Interviewing on high-risk injection behaviors among PWID by comparing it with educational intervention

<p>1 2 3 4 5 6</p> <p>Incidence of death at 2 years from diagnosis</p>	<p>Outcome (death) related to timing of surgery (ex. perioperative vs. 2 months after)</p>	<p>No difference in patient characteristics or 2-year mortality for surgical vs. medical management. Same outcomes for early vs. late surgery. Highest risk for mortality associated with recurrent endocarditis due to repeated IVDU.</p>	<p>This research supports focusing on addictions management resources for patients with infective endocarditis (medically and surgically managed) to reduce morbidity and mortality.</p>	<p>None stated</p>
<p>7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27</p> <p>Annual proportion of participants admitted to the HIV/AIDS ward due to a stage 3 defining opportunistic illness in HIV.</p>	<p>Most frequent discharge diagnoses, proportion of participants admitted due to AIDS-defining malignancies compared to non-AIDS-defining malignancies, proportion on ART at time of admission, proportion with virologic suppression at time of admission and median CD4 count at admission.</p>	<p>3919 discharges were captured for 1,595 unique participants. There were 497 deaths reported over the study period (31.2% of participants). 1,014 (63%) of individuals and 2,957 (75.5%) of admissions were in people with IDU. And, 985 (61.8%) of individuals and 2,851 (72.7%) of visits were in people who were HCV antibody positive. Median length of stay declined from 9 days in 2005-6 to 7 days in 2013-4. Opportunistic infections accounted for 10.7% of admissions over the study period. Adjusted for calendar year, participants with a history of IDU were more likely to have a discharge diagnosis of bone and joint infections (aRR 3.07, 95% CI: 1.44,6.54) and endocarditis/bacteremia (aRR 2.21, 95% CI: 1.25,3.91), and less likely to have a discharge diagnosis of opportunistic infections (aRR 0.35, 95% CI: 0.25, 0.48) or any malignancy (aRR 0.29, 90% CI: 0.20,0.43)</p>	<p>As people with HIV age, comprehensive HIV care programs should consider offering services in smoking cessation, screening for lung disease and optimization of treatment for existing obstructive lung disease, since pulmonary infections are so common in PLHIV. The decreased proportion of discharge diagnoses reported as AIDS defining illnesses correspond to dedicated regional and provincial programs designed to improve rates of HIV diagnosis and enhance access to ART, known as the Seek and Treat for Optimal Prevention of HIV/AIDS in BC (STOP HIV/AIDS in BC) initiative. Even though improvement in clinical markers are shown with highly active ART, there are still PLHIV presenting to hospital with opportunistic illnesses. Efforts are needed to identify populations at risk of opportunistic illnesses and to optimize their HIV management. HIV screening programs can be scaled up in order to reduce late HIV diagnosis. Improved preventive medicine and early ambulatory care for respiratory infections may help to reduce hospitalizations. Increased uptake of routine pneumococcal and influenza vaccinations and low-barrier access to urgent primary care is needed. High rates of admission for complications related to IDU is a target for intervention. Increased access to harm reduction and addictions services are needed in this population to optimize health outcomes,</p>	<p>Future studies focused on hospital-wide administrative data can be considered to better capture reasons for hospitalization among PLHIV.</p>
<p>28 29 30 31 32 33 34 35</p> <p>having any of these risk behaviors at 6 months (having shared syringes, containers, filters or water to inject drugs in the previous month, backloading/frontloading and using equipment excluding syringe)</p>	<p>Each risk behavior was examined separately as secondary outcomes</p>	<p>The probability of reporting a risk injection behavior decreased in both educational intervention (EI) and motivational interviewing (MI) groups. At 6-month follow-up participants who reported any risk behaviors were 50% (odds ratio = 0.50, CI: 0.13-0.87) less likely to be in the MI group than in the EI group. Similar results were observed for those who reported sharing containers (odds ratio = 0.50, CI: 0.09-0.90). Those who reported sharing equipment excluding syringes were 53% less likely to be in the MI group (odds ratio = 0.47, CI: 0.11-0.84).</p>	<p>EI could be used by people working in Needle Exchange Program. MI could be considered for PWID who go to NEP regularly and who present recurrent injection risk behaviors</p>	<p>Important to conduct effectiveness studies in a natural environment to examine the feasibility of applying this intervention model in the community</p>

1 2 3 4 5 6	None stated	Small sample size in surgically treated group. Small # of surgical cases limits ability to detect statistically significant differences between the outcomes of both groups. Retrospective design means that unmeasured biases exist, and no definite conclusions can be drawn.	None stated	17/42 = 40.48%	14/42=33.3%	16/42 = 38.10%		
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	One of few studies to report trends of hospitalization in dedicated HIV/AIDS ward. Data on ART utilization and virologic suppression are very complete given a centralized distribution of ART through BC.	This program runs in a region with a publicly-funded program providing access to antiretroviral therapies at no cost to patients. There might be enrolment bias since the ward is not equipped with telemetry or critical care capabilities, leading to potential for underrepresentation of cardiac disease and critical illness, trauma, cancer, or psychiatric comorbidities. As it is located in an area surrounded by high IDU, the prevalence of individuals admitted to the ward with a history of IDU is higher than other provincial estimates. Lack of validated case definitions may lead to under-reporting of AIDS-defining conditions and opportunistic infections may be missed if not the primary discharge diagnosis. Data on cause of death were missing for 23.7% of deaths.	Same as implications for policy and practice: especially High rates of admission for complications related to IDU is a target for intervention. Increased access to harm reduction and addictions services are needed in this population to optimize health outcomes, reduce substance use-related deaths, and decrease hospital utilization.	30/42 = 71.4%	31/42=73.8%	72.60%		
28 29 30 31 32 33 34 35	The MI and EI interventions meet the 'bona fide' criteria, which is consistent with the fact that they have similar effects on some injection risk behaviors; trial demonstrates the feasibility of carrying out thorough studies of PWID in the community; attrition rates were low given the target population's characteristics	1. Adding a third comparison group (no intervention) would have enhanced the results 2. Self-reported data may lead to recall and social desirability bias 3. Unable to document long-term maintenance of change (beyond 6 months); 4. trial does not shed light on the process that explain the possible effects of MI and EI	None stated	31/42=73.8%	31/42=73.8%	73.8+73.8/2=73.8%		



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2014	Hammett, T.M.; Phan, S.; Gaggin, J.; Case, P.; Zaller, N.; Lutnick, A.; Kral, A.H.; Federova, E.V.; Heimer, R.; Small, W.; Pollini, R.; Beletsky, L.; Latkin, C.; Des Jarlais, D.C.	BMC Health Services Research	Pharmacies as providers of expanded health services for people who inject drugs: a review of laws, policies, and barriers in six countries	Empirical	Mixed methods - qualitative interviews, quantitative surveys, review of legal and policy documents	Multi-country: US, Russia, Vietnam, China, Canada and Mexico	Community (pharmacies)	HIV, HBV, abscess
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	2012	Fairbairn, N.; Milloy, M.-J.; Zhang, R.; Lai, C.; Grafstein, E.; Kerr, T.; Wood, E.	Journal of Emergency Medicine	Emergency Department Utilization Among a Cohort of HIV-Positive Injecting Drug Users in a Canadian Setting	Empirical	Cohort - prospective	BC - Vancouver	Community	HIV

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Pharmacies providing expanded services to PWID	Pharmacies as providers of expanded health services for people who inject drugs - needle and syringe sales/distribution; needle & syringe disposal; HIV testing; HBV/Other vaccination; MMT/OST; Naloxone overdose prevention; abscess treatment	Key stakeholders - government officials, health care providers, pharmacists, PWID	Not specified	PWID generally who would use pharmacy services	N/A	To assess feasibility of expanded pharmacy services for PWID
Emergency department	Community-recruited open prospective cohort study of HIV-positive IDU through the AIDS Care Cohort to Evaluate Exposure to Survival Services (ACCESS) to examine the prevalence and correlates emergency department use, primary ED diagnoses and hospital admission rates.	Self referral and street outreach from Vancouver's Downtown Eastside neighborhood with a large open drug scene with an estimated 4700 IDU residing in the area	437 HIV positive IDU were recruited with nine individuals excluded for lack of baseline CD4 count. 428 eligible participants.	All- age (36-47); Female Gender 170 (39.72%); Aboriginal Ethnicity 178 (41.59%); DTES resident 291 (68%)	Recruitment was between 5 December 2005, and 30 April 2008 Participants were eligible for the study if they were 18 years of age or older, resided in the greater Vancouver region, tested HIV-positive upon entry, had injected an illegal drug during the previous month, and provided informed consent. The primary endpoint of interest in the present analysis was time to first ED visit among cohort participants and we were particularly interested in the potential role of clinical characteristics and unstable housing on ED use. Factors associated with time to first ED visit. DTES residence, unstable housing, inability to access needed health services and history of physical assault were each significantly associated with less time to first ED visit. Most common ED diagnosis, admission rates and discharge data was also collected.	Examination of the prevalence and correlates of ED use, as well as primary ED diagnoses and hospital admission rates, among a community-recruited cohort of HIV-positive IDU.

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<p>Qualitative description of laws, policies, attitudes, practices, behaviours surrounding possibility of expanding pharmacy services for PWID</p>	<p>None</p>	<p>For Vancouver, Canada - Needle &amp; syringe sales, distribution and disposal - no legal barriers but individual stores set own policies and many stores did not sell; Provincial requirements for pre-/post-test counseling may constrain pharmacy-based testing for HIV and not offered; HBV/Other vaccination - no legal barriers, but requires sufficient and trained staff; MMT/OST - do not prescribe but can dispense methadone; Naloxone - there were regulatory barriers to prescribing to individuals at the time of the paper; Abscess treatment - no legal barriers but usually refer to health clinics; Brief counseling/materials - no legal barriers but often not available; Referrals - no legal barriers and done currently.</p>	<p>The most commonly identified challenges occur at the macro-level where legal and policy provisions block provision of some services and medications in pharmacies and persistent stigma and its internalization by PWID reduce uptake of services that do exist. Meso-level - variations in policy and practice related to services for PWID across police agencies and pharmacy chains. Micro-level - differences in knowledge and attitudes create barriers to providing services to PWID.</p>	<p>None stated</p>
<p>The primary endpoint of interest in the present analysis was time to first ED visit among cohort participants and we were particularly interested in the potential role of clinical characteristics and unstable housing on ED use.</p>	<p>Other factors associated with time to first ED visit. DTES residence, unstable housing, inability to access needed health services and history of physical assault were each significantly associated with less time to first ED visit. Most common ED diagnosis, admission rates and discharge data was also collected.</p>	<p>Our study demonstrates high rates of ED use among a cohort of HIV-positive IDU. Interestingly, living in unstable housing and being unable to obtain needed health care services were both independently associated with time to first ED visit during the study period, whereas baseline CD4 cell count and viral load did not predict ED use. SSTI, including abscesses and cellulitis (17.6%), and medication refills and aftercare (17.5%) accounted for the greatest proportion of ED visits. Of the 2461 visits to the ED, 419 (17.6%) were admitted to hospital. A key finding of the present study is the independent association between residing in unstable housing environments and shorter time to first visiting the ED. SSTI, a common injection-related complication, was the most common ED diagnoses.</p>	<p>Living in unstable housing may act as a barrier for IDU to access primary care services, as the immediate sustenance needs implicit in being homeless must compete with health care needs. unstable housing among IDU is associated with hazardous and unhygienic injecting practices that may also predispose individuals to infection. The high cumulative incidence of ED visits among local IDU and the association with unstable housing indicates a pressing need for affordable housing. Inability to access needed health services was also independently associated with time to ED use. Primary care services (SSI and MMT) that implement an integrated model of care, including harm reduction and drug treatment, may be viewed as less stigmatizing of drug use and prove to be more effective in reducing perceived barriers to health care access.</p>	<p>Future studies should assess the impact of interventions for this population in the ED on subsequent health care utilization patterns including return to the ED.</p>

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None stated	None stated	Need for advocacy based on context and including multiple stakeholders. Macro-level may require advocacy to change laws and policies. Community-level efforts to deal with stigma, discrimination and resistance to harm reduction interventions. No legal or policy changes are required for expanded provision of counseling and information materials, but insurance coverage may need to change to compensate pharmacists for these interventions. More attention needs to be paid on implementation of laws and policies as these are variable.	19/48 = 39.6%	25/48=52.1%	21/48 = 43.8 %		
None stated	This study has several limitations. First, we may have underestimated the level of ED use as participants may have sought care at other facilities in the city. Second, the current study relies on self-report of drug use and other stigmatized behaviors (e.g. sexual behaviors) and may be susceptible to socially desirable reporting. In this regard, it is noteworthy that CD4 and viral load information were not susceptible to this concern. Third, although ED usage was ascertained through a linkage to an external database, migration away from the city or other reasons for loss of participants to follow-up may nevertheless introduce some degree of bias into the study results. Fourth, although our cohort includes an estimated 20 per cent of all IDU living in the Downtown Eastside, our sample may not be representative of all IDU in the area. Finally, our study was unable to access follow-up information on health care use after discharge from the ED.	None stated	35/42=83%	31/42=73.8%	76.1+76.1/2=76.1%		

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3 **Full string:** infecti\*, endocarditis, hepatitis, HIV, AIDS, pneumonia, abscess,  
4 osteomyelitis, septicemia, tetanus), AND (drug use\*, drug abuse, drug misuse, injection  
5 drug, drug inject\*, IDU, IVDU, PWID, intravenous, overdose, illicit), AND (Canada,  
6 Alberta, British Columbia, BC, Manitoba, New Brunswick, Newfoundland Labrador,  
7 Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan, Nunavut,  
8 Northwest Territories, Yukon  
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19 title/topic: 10 years limit, English, exclude immunology, microbiology and  
20 pharmacology  
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23 Search for "infection" and "who inject drugs"  
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25 5) Canadian Institute for Substance Use Research  
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## Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	6
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence§		the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	7
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	7-8 (See Fig.1)
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	8-9
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8 (See Supplementary Table 1)
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8-18
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8-18
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	23
Limitations	20	Discuss the limitations of the scoping review process.	23-24
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	26
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	27

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467–473. doi: 10.7326/M18-0850.