

Best practices to increase the uptake of HIV and HCV testing among people who use drugs

Question

What are best practices to increase the uptake of HIV and HCV testing among people who use drugs?

Key Take-Home Messages

- Interventions that provide HIV and/or HCV testing have been offered in a variety of settings. These include community settings such as outpatient drug treatment clinics (1–5), mobile clinics (6), harm reduction services such as needle exchange programs (7), and traditional healthcare settings such as residential inpatient drug treatment programs (8), visits to a general practitioner (9), hospital stays (10), emergency departments (11–15), pharmacies (16, 17), as well as at home with self-testing or self-collection kits (18, 19).
- These different settings have implemented a variety of strategies to increase HIV and/or HCV testing among people who use drugs. Offering point-of-care testing among people who inject drugs at community-based services appears to have promising results (1–7), though outcome measures varied across studies. Incentivizing testing at community events is another strategy that can be employed to increase testing uptake (20).
- Different approaches, such as rapid point-of-care testing, routinized testing (where protocol is to offer all clients testing with the option to decline), and streamlined testing (a brief statement about the test is offered with the option to decline) in substance use treatment programs have all been found to be effective and feasible (21).

Rapid Response: Evidence into Action

The OHTN Rapid Response Service offers quick access to research evidence to help inform decision making, service delivery, and advocacy. In response to a question, the Rapid Response Team reviews the scientific and grey literature, consults with experts if required, and prepares a review summarizing the current evidence and its implications for policy and practice.

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Prepared by

Danielle Giliauskas

Program Leads / Editors

David Gogolishvili

Contact

rapidresponse@ohntn.on.ca

For more information visit

www.ohntn.on.ca/rapid-response-service

The Ontario HIV Treatment Network
1300 Yonge Street, Suite 600
Toronto ON M4T 1X3
www.ohntn.on.ca

- Emergency departments (EDs) have been identified as a setting where missed opportunities for HIV and/or HCV screening occur (22–24). Numerous studies have demonstrated that ED screening programs can be successful in identifying HCV RNA positive individuals with a history of injecting drug use (11–15). Additionally, EDs can make significant contributions to the identification of new HIV cases during an outbreak among people who inject drugs (25).
- Community-based, targeted outreach initiatives appear to be a successful way to engage people who use drugs in HIV and/or HCV testing; studies have found that street-based outreach to recruit people who use drugs for HIV testing had high uptake (26), peers are able to efficiently reach individuals with a history of injection drug use for HCV testing (27), community outreach models build rapport with potential clients to increase HCV testing and treatment literacy prior to engagement in the HCV care cascade (28), and people who inject drugs are able to successfully recruit network members for HCV testing and linkage to care (29).
- Facilitating HIV and/or HCV point-of-care testing in pharmacies may be another way to increase screening uptake among people who use drugs (16, 17). One pharmacy offering medication-assisted therapy updated their intake form to include HCV and HIV screening as part of enrollment into the treatment program (30).
- Some evidence illustrates that technology-based interventions (delivered via tablet or computer) may also be useful to increase HIV and/or HCV testing uptake when delivered on-site to clients of syringe exchange programs (31, 32). Integrating HCV-related content into a smartphone app for individuals with substance use disorder could increase uptake of HCV screening among those who reported injection drug use and/or shared injection equipment (33).
- The literature also showed successful implementation of HIV and/or HCV testing strategies when facilitated by nurses (3, 4, 34) or when using electronic medical record (EMR) alerts and integration (10, 12, 25, 35, 36).

The Issue and Why it's Important

HIV and hepatitis C virus (HCV) are two bloodborne pathogens (37) of concern for people who use drugs (38, 39). Both viruses can be transmitted when the blood of an infected person comes into contact with the blood of an uninfected person—for example, when equipment used to prepare and inject drugs is shared (38–40). A systematic review published in 2021 examined programs and services in Canada that address the prevention and management of infectious

References

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2. Rowan SE, Kamis KF, Beum R, Bryan K, Gawenus L, Colon Sanchez D, et al. Viral hepatitis and human immunodeficiency virus testing and linkage to care for individuals enrolled in an opioid treatment program. *Journal of Infectious Diseases*. 2020;222(Suppl 5):S384–S391.
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5. Harney BL, Brereton R, Whitton B, Pietrzak D, Paige E, Roberts SK, et al. Hepatitis C treatment in a co-located mental health and alcohol and drug service using a nurse-led model of care. *Journal of Viral Hepatitis*. 2021;28(5):771–8.

disease in people who inject drugs and found that discussion of HCV and/or HIV infection far outweighed discussion of other diseases related to injection drug use (41). Sharing equipment for smoking or snorting drugs is also a risk factor for HCV transmission, as microscopic amounts of blood from nosebleeds or cracked lips can be found on crackpipes and cocaine straws (39).

Consequently, injection drug use contributes to the increased burden of disease of HIV and HCV through needle and syringe sharing (42, 43). The World Health Organization (WHO) reports that 10% of new HIV infections and an estimated 23–39% of new HCV infections globally are among people who inject drugs (44). Accordingly, a global systematic review from 2011 found that the prevalence of HCV antibodies among people who use drugs is higher than the prevalence of HIV (45). Data from the Tracks survey (formerly I-Track), a survey among people who inject drugs in Canada, supports this finding: between 2017 and 2019, 10.3% of participants were living with HIV and 64.2% tested positive for HCV antibodies (46). Also, liver disease due to HCV is a prominent problem among homeless people who use alcohol and inject drugs, according to a 2021 meta-analysis (47).

The number of people who inject drugs appears to be increasing: between 2011 and 2016, the number of people who inject drugs in Canada increased from 0.55% (n=130,000) to 0.70% (n=171,900) (42). Additionally, of the 2,242 new HIV infections in Canada in 2018, it is estimated that 13.9% (n=312) can be attributed to injection drug use, up from 12.4% in 2016 (48). In the U.S., one study examined national estimates of acute HCV infection and injection drug use from 2004–2014 and found concurrent increases: the annual incidence rate of acute HCV increased 133% (from 0.3 to 0.7 cases/100,000 population), while admissions to substance use disorder treatment facilities attributed to any injection drug use increased by 76% (from 12.7 to 22.3/100 admissions) (49). However, it should be noted that in a recent study among a cohort of people living with HIV in Ontario, HCV testing did increase from 14.3% in 2000 to 57.7% in 2015 among those reporting recent injecting drug use risk factors (50). Other studies have found that those receiving treatment for opioid use disorder have greater odds of being screened for HCV (51).

While both HIV and HCV can be transmitted by sharing drug injection equipment, each virus impacts the body in different way. HIV targets the body's immune system, and if left untreated, causes AIDS (52). While there is no cure for HIV, by adhering to a regimen of antiretroviral medication, people living with HIV are able to control the virus and thus remain healthy (53). It is important to note that individuals living with HIV who achieve and maintain an undetectable viral load (i.e. viral suppression) effectively cannot transmit the virus sexually (54); it is very likely that an undetectable viral load reduces the risk of HIV through injection drug use as well, but it is unclear by how much (53).

6. Rosecrans A, Harris R, Saxton RE, Cotterell M, Zoltick M, Willman C, et al. Mobile low-threshold buprenorphine integrated with infectious disease services. *Journal of Substance Abuse Treatment*. 2022;133:108553.
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Some individuals who contract HCV spontaneously clear the virus (55, 56); one meta-analysis among people who inject drugs estimated that nearly 25% of individuals reported spontaneous viral clearance (56). With chronic HCV, i.e. when the virus does not spontaneously clear within the usual 6–12 months (55), the virus targets the liver: inflammation destroys healthy liver cells which are replaced with scar tissue in a process called fibrosis (57). If left untreated, this can lead to extensive liver injury or scarring called cirrhosis, which can cause liver failure or liver cancer (58). HCV can be cured in most people though a regimen of direct-acting antivirals (DAAs), which prevent further liver injury (59). The previously available therapy for HCV was interferon-based; it was poorly tolerated, had the potential for multiple side effects, required injections over 24–48 weeks, and was associated with a lower likelihood of cure (60, 61). The regimen for DAA treatment is simpler: DAAs are taken orally once a day for 8–12 weeks, have fewer side effects, and have a >95% cure rate (61). Additionally, some research has found that HCV knowledge among patients maybe be changing in the DAA era: a study from British Columbia reported that a cohort of individuals successfully treated with DAAs, where 84.1% (n=191) reported current or past injection drug use, had a high knowledge and awareness of HCV reinfection (62). Nonetheless, uptake of DAAs varies: a 2021 systematic review estimated that among people with chronic HCV who inject drugs, uptake of DAAs was 40% in Canada, 37% in Australia, and 13% in the U.S. (63). However, HCV reinfection is still possible even after the virus has cleared; additionally, there is no vaccine to prevent HCV infection (57).

When an individual contracts either HIV or HCV, their progress through stages of medical care can be tracked on a continuum of care (64, 65), where fulfillment of each stage results in optimal health outcomes (65). Though HIV and HCV require different treatment plans, the first stage in the continuum of care for each virus is infection, followed by diagnosis (64, 66), a necessary step in the pathway to treatment (67). The Centers for Disease Control and Prevention (CDC) recommend that people who inject drugs test for HIV at least once a year (68); for HCV, “[r]outine periodic testing for persons with ongoing risk factors”, which includes those who inject drugs and share drug equipment, is recommended (69). Similarly, the Public Health Agency of Canada (PHAC) recommends that “[i]ndividuals involved in high risk practices should be screened for HIV at least annually”, where those who share drug use equipment are classified as higher risk (70). For HCV screening, Public Health Ontario (PHO) recommends that public health units should make special efforts to facilitate HCV testing among people who inject drugs or use drug inhalation equipment, and should encourage annual testing for HCV as a part of counselling and support to reduce risk behaviours (71).

A 2018 modelling study determined the testing frequencies necessary for people who inject drugs to achieve the WHO’s HCV elimination target, which is a 90% reduction in incidence and 80% treated by

11. Daniel Moore J, Galbraith J, Humphries R, Havens JR. Prevalence of hepatitis C virus infection identified from nontargeted screening among adult visitors in an academic Appalachian regional emergency department. *Open Forum Infectious Diseases*. 2021;8(8):ofab374.
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16. Duong M, Delcher C, Freeman PR, Young AM, Cooper HLF. Attitudes toward pharmacy-based HCV/HIV testing among people who use drugs in rural Kentucky. *Journal of Rural Health*. 2022;38(1):93–9.

2030 (67, 72). The modelling study describes high-prevalence as a scenario where 75% of people who inject drugs had HCV antibodies (67); this number is similar to estimates from a 2011 systematic review which suggested 64.0% of people who inject drugs in Canada and 73.4% of people who inject drugs in the U.S. have HCV antibodies (45). This modelling study found that testing people who inject drugs for HCV as frequently as once every three months would still not achieve the reduction target set by the WHO (67). Conversely, a modelling study from 2021 based on data from New Hampshire (a U.S. state with a large number of people who inject drugs and limited HCV treatment infrastructure) examined six potential policy scenarios through 2045 and found that scenarios that improved both testing (at least once a year) and treatment may achieve the targets set by WHO (73). There is also some real-world evidence that the WHO's HCV reduction targets are achievable, as demonstrated by an intensive testing and treatment scale-up initiative among people who use drugs in Tayside, a region in East Scotland (74, 75).

In Canada, blood samples are tested for HIV using fourth-generation screening tests to detect the presence of HIV antibodies and the HIV p24 antigen (76). A reactive or positive result means the individual is living with HIV; confirmatory testing is then carried out to ensure correct diagnosis (76). The PHO website states that the turnaround time for non-reactive tests is three days, and for reactive tests, six days (77). Rapid HIV tests kits are also licensed for use in Canada (78, 79), and are used at point-of-care or for self-testing, where blood from a finger prick provides results in minutes (76). However, rapid tests only detect HIV antibodies, and results are considered preliminary; confirmation via standard testing is needed (76). Nonetheless, rapid HIV tests have been described as necessary and valuable in settings where individuals are likely to follow-up but not otherwise being tested due to phlebotomy- and stigma-related barriers (such as in drop-in harm reduction services) (80). One study found that rapid testing for HIV and HCV, compared to laboratory-based testing, was associated with higher receipt of results in drug detoxification centres (81).

A systematic review from 2018, which solely included studies from high-income settings, deemed annual HIV screening of high-risk groups (including injection drug users) as cost-effective, noting that evidence regarding the benefits of using rapid HIV tests was emerging (82). Another systematic review (2016) examined the cost-effectiveness of testing people for HIV who inject drugs at 3- and 6-month intervals in the U.S. and concluded that testing people who inject drugs using fourth-generation screening every six months, compared to annually, was moderately cost-effective over 12 months, whereas testing with rapid point-of-care tests was not cost-effective (83).

To confirm a current HCV infection, two blood tests—a screening test and a confirmatory test—are usually required (84). The screening test (i.e. antibody test) determines if an individual has ever been exposed

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to HCV; a non-reactive or negative result indicates the individual does not have HCV antibodies and therefore has never been infected, while a reactive or positive result indicates that the individual has HCV antibodies and therefore has been infected at some point in their life (84). A reactive test result requires confirmatory testing, which is either a ribonucleic acid test (HCV-RNA test), also known as a nucleic acid amplification test (85), to detect the presence of HCV genetic material, or a core antigen test (HCV-cAg) which detects the presence of HCV proteins (84). Of note, core antigen tests are not available in all provinces across Canada (86). Compared to the HCV-RNA test, the HCV-cAg test is low-cost, timesaving, and easier to operate (87). Standard testing typically requires provision of one blood sample for the screening test, and if the result is positive, a second blood sample for confirmatory test; this necessitates two or three visits to a healthcare provider (84). Reflex testing—where screening and confirmatory testing are completed with the same blood sample—has been found to improve diagnostic outcomes among people who inject drugs (88), as it reduces the risk of being lost to follow-up (84, 88). HCV screening can also be done as a rapid test, where a finger prick is done on-site and results are available in 20–40 minutes, though further confirmatory testing is required (84). Additionally, one study found that some people who inject drugs find point-of-care rapid testing to be a stressful experience, but that education was protective against this (89). Conversely, other studies have noted that testing via venepuncture is a barrier to people who inject drugs as they have poor venous access, and fingerprick testing is preferred (90–92). A 2022 meta-analysis examining interventions to improve HCV antibody testing and HCV-RNA testing (among all population groups, not specific to people who inject drugs) found that “[i]nterventions that simplified HCV testing, including dried blood spot testing, point-of-care antibody testing, reflex RNA testing, and opt-out screening, significantly improved testing outcomes” (90).

There has been considerable discussion surrounding the cost-effectiveness of HCV screening: two systematic reviews found that HCV screening plus DAA treatment was generally cost-effective (93, 94). Additionally, a 2016 systematic review of economic evaluations found that screening people who use drugs would be cost-effective if the amount of GBP 30,000 per quality-adjusted-life-year was considered “good value for money” (95). Recent studies (not included in the two aforementioned systematic reviews) reflect these findings. A study in the U.S. found that for people who inject drugs, HCV screening may be a cost-effective intervention (96); another study in the UK described screening for HCV at needle exchange services as a “highly cost-effective strategy for reaching undiagnosed HCV patients” (97). Finally, a Canadian study from 2021 found that implementing HCV point-of-care screening in Canada for people who inject drugs was likely cost-saving (98), while a 2020 study from the UK suggested that introducing HCV nurse facilitators in drug treatments centres was cost-effective (99).

23. Furukawa NW, Blau EF, Reau Z, Carlson D, Raney ZD, Johnson TK, et al. Missed opportunities for human immunodeficiency virus (HIV) testing during injection drug use-related healthcare encounters among a cohort of persons who inject drugs with HIV diagnosed during an outbreak—Cincinnati/Northern Kentucky, 2017–2018. *Clinical Infectious Diseases*. 2021;72(11):1961–7.
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Factors associated with HIV and/or HCV testing have also been explored in the literature. A meta-analysis from 2020 by Bayani *et al.* across 16 studies (with the majority of participants being from North America) examined factors associated with HIV testing among people who inject drugs, and found that having tested for HIV in the past 12 months was associated with having: visited a primary care professional, more than six years of education, a history of imprisonment, and access to needle and syringe programs (100). Similarly, a second meta-analysis investigated factors that contribute to uptake of HCV testing among people who inject drugs (101). Similar to Bayani *et al.*, Karimi *et al.* included 16 studies with the majority of participants being from North America (101). Having tested for HCV in the past 12 months was associated with being greater than 30 years, female, having attempted HCV treatment in the past, and reporting previous HCV testing (101).

In sum, there are several considerations when examining strategies to increase HIV and/or HCV testing among people who use drugs, including the test setting, frequency of testing, type of test (rapid or standard), factors associated with testing, and cost-effectiveness. This review explores best practices to increase the uptake of HIV and/or HCV testing among people who use drugs in high-income settings.

What We Found

The literature examining HIV and/or HCV screening among people who use drugs is vast, with the majority of studies focusing on HCV. Because of this abundance of literature, only studies from Canada, the U.S., Australia, and the UK are discussed. However, systematic reviews and meta-analyses that include studies outside of these countries are mentioned as well.

A systematic review from 2017 by Bajis *et al.* examined the stages of the HCV care cascade among people who inject drugs in high-income settings, with all studies conducted in the interferon treatment era (102). Fourteen studies with comparator groups were included, all published between 2006–2017; interventions to enhance HCV testing included on-site testing with pre-test counselling and education and dried blood spot testing (102). Authors also discussed other strategies among 27 non-comparator studies to enhance HCV testing among people who inject drugs such as peer-delivered outreach, HCV testing and counselling, prison-based outreach testing and counselling, patient referral contact tracing programme with monetary incentive for testing, rapid HCV antibody testing at community pop-up/mobile clinics or low threshold settings, and integrated on-site testing, counselling, and education (102).

Similarly, a 2021 systematic review examined health programs and services in Canada and found three studies that addressed HIV or HCV testing (41). Of these, two were published in the past five years

28. Coupland H, White B, Bates A, Park JN, Iversen J, Maher L. Engaging people who inject drugs in hepatitis C virus testing and prevention through community-based outreach, in Sydney, Australia. *Drug & Alcohol Review*. 2019;38(2):177–84.
29. Falade-Nwulia O, Ward KM, McCormick S, Mehta SH, Pitts SR, Katz S, et al. Network-based recruitment of people who inject drugs for hepatitis C testing and linkage to care. *Journal of Viral Hepatitis*. 2020;27(7):663–70.
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(26, 103): one study from Ottawa describes peer-administered point-of-care testing for HIV (26), and a study from Vancouver describes a “seek and treat” initiative which used a combination of several elements (103). Both of these studies are described in more detail later in this review. The current Rapid Response found that all of the above listed strategies, to different extents, continue to be used to increase testing uptake among people who use drugs.

It should be noted that the overwhelming majority of studies examined HIV and/or HCV screening in urban settings; this is reflective of a systematic review from 2018 in the U.S. which found that HIV and/or HCV testing and related services for people who inject drugs in rural areas was limited (104). However, the rural studies we did identify were primarily conducted in the geographic area of Appalachia in the U.S., where there is currently an injection opioid epidemic (36). One study found that in this particular area, eliminating stigmatization of drug use in addition to offering HIV testing at multiple venues would be beneficial, and that drug treatment programs were an important venue for accessing testing (105).

A recently published study states that “[a] growing body of data supports delivery of HIV screening and prevention care where PWID [people who inject drugs] already spend time and access services, including non-clinical settings such as syringe service programs, mobile vans, street outreach, and pop-up harm reduction sites” (80). Additionally, a 2019 systematic review found that HCV testing approaches targeting groups at higher risk in a variety of settings (e.g. primary health care, hospitals, pharmacies, drug treatment services) yielded higher coverage rates (106).

This review describes HIV and HCV testing interventions in various community and clinical settings as discussed in the literature.

Outpatient drug treatment centres, harm reduction centres (including needle exchange programs), and other community-based settings

The effectiveness and feasibility of implementing HIV testing in substance use programs was evaluated in a 2017 systematic review by Simeone *et al.* (21). Authors included 17 studies which examined these different testing methods: rapid point-of-care testing, routinized testing (where protocol is to offer all clients testing with the option to decline), and streamlined testing (a brief statement about the test is offered with the option to decline) (21). Simeone *et al.* concluded that all three testing strategies (rapid, routine, and streamlined HIV testing) were supported by strong evidence, but noted the review was limited by heterogeneity of outcome measures and lack of rigorous methods (21).

The following studies were all published after the Simeone *et al.* systematic review, and thus provide more recent examples of

33. Hochstatter KR, Gustafson DH, Sr., Landucci G, Pe-Romashko K, Cody O, Maus A, et al. Effect of an mHealth intervention on hepatitis C testing uptake among people with opioid use disorder: Randomized controlled trial. *JMIR MHealth and UHealth*. 2021;9(2):e23080.
34. Hashim A, O’Sullivan M, Williams H, Verma S. Developing a community HCV service: Project ITTREAT (Integrated Community-based Test-Stage-TREAT) service for people who inject drugs. *Primary Health Care Research & Development*. 2018;19(2):110–20.
35. Perkins M, Slevin A, Strand MA, Freisner D. Screening at a federally qualified health center in the Midwest for hepatitis C among people who inject drugs, 2019–2020. *Preventing Chronic Disease*. 2021;18:E69.
36. Burrell CN, Sharon MJ, Davis S, Feinberg J, Wojcik EM, Nist J, et al. Using the electronic medical record to increase testing for HIV and hepatitis C virus in an Appalachian emergency department. *BMC Health Services Research*. 2021;21(1):524.
37. BC Centre for Disease Control. Bloodborne diseases. 2022. Available from: <http://www.bccdc.ca/health-info/disease-types/bloodborne-diseases> Accessed February 24, 2022.
38. CATIE. HIV basics. Available from: <https://www.catie.ca/sites/default/files/2021-10/hiv-basics-en-2021.pdf> Accessed February 24, 2022.

screening strategies (for both HIV and HCV) that occur in outpatient drug treatment programs and other community-based settings. Similar to the Simeone *et al.* review, the outcome measures across studies examining testing varied considerably: one study assessed the uptake of confirmatory HCV RNA testing (107), others reported uptake of the screening service (3, 4), while one study specifically assessed whether or not the individual received their test results (1). However, it appears that, in general, pairing (“bundling”) HIV and HCV testing together when an individual presents for care, typically at services frequented by people who inject drugs, is likely to have promising results (1).

Of note, some services not only offered HIV and HCV testing, but also offered linkage to care supports and treatment. While essential to HIV and HCV care, examining these subsequent stages of the care continuum for both HIV and HCV is beyond the scope of this review. We did identify one systematic review from 2019 that found HCV testing and DAA-based treatment services in community-based settings to be feasible, with the potential to deliver increased uptake of treatment (108). This finding has been corroborated elsewhere: a 2021 meta-analysis on HCV task-shifting and decentralization found that testing and treatment integrated at harm reduction sites increased linkage to care and HCV treatment (included studies were both interferon- and DAA-based) (109). This is of particular importance, as some research has shown that while HCV testing rates are high among people who inject drugs, treatment uptake may be low (110).

Below is a brief description of HIV and/or HCV screening programs occurring in community-based settings which include outpatient drug treatment clinics, mobile clinics, and harm reduction services.

- A randomized control trial from 2020 in New York City assessed if bundling rapid HIV and HCV testing among individuals receiving treatment for substance use disorder increased receipt of test results (1). Individuals in the treatment arm (n=65) were offered rapid screening, while individuals in the control arm (n=69) received referrals for laboratory testing (either on-site or off-site) (1). Authors found that those who received bundled rapid testing were four times more likely to report having received their tests results compared to the control arm (1).
- A prospective study assessed the effectiveness of a community-based opt-out HCV screening and linkage-to-care program in Alabama, a state where Medicaid provision for HCV prevention among people who inject drugs is lacking (107). In year one, opt-out point-of-care HCV antibody testing was carried out by partnering organizations (shelters, health fairs, outreach events) using a screening questionnaire, where those who had never tested or were unaware of their status were offered a free

39. CATIE. How hepatitis C transmission happens. 2019. Available from: <https://www.catie.ca/hepatitis-c-an-in-depth-guide/how-hepatitis-c-transmission-happens> Accessed February 24, 2022.
40. Ball LJ, Puka K, Speechley M, Wong R, Hallam B, Wiener JC, et al. Sharing of injection drug preparation equipment is associated with HIV infection: A cross-sectional study. *Journal of Acquired Immune Deficiency Syndromes*. 2019;81(4):e99.
41. Bouzanis K, Joshi S, Lokker C, Pavalagantharajah S, Qiu Y, Sidhu H, et al. Health programmes and services addressing the prevention and management of infectious diseases in people who inject drugs in Canada: A systematic integrative review. *BMJ Open*. 2021;11(9):e047511.
42. Jacka B, Larney S, Degenhardt L, Janjua N, Høj S, Krajden M, et al. Prevalence of injecting drug use and coverage of interventions to prevent HIV and hepatitis C virus infection among people who inject drugs in Canada. *American Journal of Public Health*. 2020;110(1):45–50.
43. Degenhardt L, Whiteford HA, Ferrari AJ, Baxter AJ, Charlson FJ, Hall WD, et al. Global burden of disease attributable to illicit drug use and dependence: Findings from the Global Burden of Disease Study 2010. *The Lancet*. 2013;382(9904):1564–74.

rapid test; follow-up appointments for reactive results were arranged (107). In year two, opt-out HCV screening was implemented at drug treatment centres and community-based outpatient clinics via electronic medical record (EMR) testing: a single sample of blood was drawn and sent to a lab for HCV antibody serology followed by confirmatory testing in seropositive samples (107). Authors observed that confirmatory RNA testing was higher among those who underwent EMR-based screening (107).

- An opioid treatment program in Colorado developed a comprehensive intervention for testing and linkage to care where all clients are screened for viral hepatitis and HIV upon intake and annually; those with positive results are provided with navigation supports (2). As all laboratory orders are integrated into a standardized order intake set in the EMR, the EMR can be queried to identify previously diagnosed, untreated infections (2). During a 12-month period between 2018 and 2019, 532 clients were screened for HCV; 34% tested positive for HCV antibodies (n=180) and 20% (n=108) tested positive for HCV RNA (2). During the same period, 508 clients were screened for HIV; four tested positive, but they were aware of their diagnosis and engaged in care (2). Through EMR query, two individuals living with HIV, not engaged in care, were identified (2). Authors concluded this screening program enabled considerable gains in the identification and treatment of viral hepatitis (2).
- Healthcare on the Spot is a mobile drug treatment clinic in Baltimore that offers low threshold buprenorphine services integrated with other healthcare services, such as testing for HIV, HCV, STIs, wound care, PrEP, and naloxone distribution (6). Evidence from earlier mobile van services in Baltimore found that this may be an effective strategy for identifying HIV in high-risk populations (111). From September 2018 to November 2019, services were provided to 569 individuals; of these, 403 (70.8%) underwent rapid HIV testing, and three (0.5%) were diagnosed with HIV (6); 81 (14.2%) took an HCV RNA test, and 58 (10.2%) were HCV RNA positive (6). Authors concluded that this low-threshold care model could be an effective tool for addressing some of the impacts associated with drug use (6).
- Project ITTREAT (2013–2021) was a comprehensive HCV service run at a large drug and alcohol treatment centre in England by a hepatitis nurse that offered bloodborne virus testing using the finger prick dried blood spot test (3, 34). The full study period was from December 2013 to March 2018: 573 individuals were invited for screening, of which 558 accepted testing; 259 had a positive HCV RNA test with a high prevalence of current/past injection drug use (92%)

44. World Health Organization. Global HIV, hepatitis and STIs programmes: People who inject drugs. 2022. Available from: <https://www.who.int/teams/global-hiv-hepatitis-and-stis-programmes/populations/people-who-inject-drugs#:~:text=Injecting%20drug%20use%20accounts%20for,attributable%20to%20injecting%20drug%20use.> Accessed February 28, 2022.
45. Nelson P, Mathers B, Cowie B, Hagan H, Des Jarlais D, Horyniak D, et al. The epidemiology of viral hepatitis among people who inject drugs: Results of global systematic reviews. *The Lancet*. 2011;378(9791):571.
46. Tarasuk J, Zhang J, Lemyre A, Cholette F, Bryson M, Paquette D. National findings from the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019. *Canada Communicable Disease Report*. 2020;46(5):138–48.
47. Hashim A, Macken L, Jones A, McGeer M, Aithal G, Verma S. Community-based assessment and treatment of hepatitis C virus-related liver disease, injecting drug and alcohol use amongst people who are homeless: A systematic review and meta-analysis. *International Journal of Drug Policy*. 2021;96:103342.

(3). Authors noted excellent uptake of the service that was achieved at a modest cost (3).

- Results from the HepCATT intervention (England) observed an increase in HCV testing and engagement in care among clients at drug and alcohol clinics (4); the intervention involved a hepatitis nurse working part-time at this service training key workers, interacting with clients, streamlining hepatology care, and introducing dried blood-spot testing (4).
- An HIV rapid testing pilot project, Actuel sur Rue, opened in July of 2012 on a busy street in Montreal's gay village with the intention of providing walk-in testing appointments in a non-medical environment to individuals vulnerable to HIV infection (112). Three groups of individuals were analyzed for a total of 1,568 clients: men who have sex with men (86.5%; n=1,357), heterosexual men (9.4%; n=147), and heterosexual women (4.1%; n=64) (112). Data collection tools (i.e. the initial risk assessment and intake survey) collected information on current drug use: 30% of men who have sex with men reported use of inhaled drugs, 2% of men who have sex with men reported opiate use, and 3% of heterosexual men reported opiate use (112). Twenty-eight individuals had a reactive rapid HIV test, all who identified as men who have sex with men; of these, 66.7% inhaled drugs (poppers), 31.6% used marijuana, and 21.4% reported stimulant use (112).
- A community mental health service in Australia (co-located with an alcohol and other drug service) referred clients with current or past injection drug use to on-site appointments for HCV testing and care, with drop-in capacity added later on (5). Testing and care for HCV was held once every two weeks by a hepatitis C nurse consultant (5). Of the 130 individuals referred, 110 underwent HCV testing of which 84 (76%) had confirmed chronic HCV infection (5). Of these 84, 70 began treatment (83%), and 48 were cured (i.e. a sustained virological response 12 weeks after treatment) (5). Authors concluded that a nurse-led model achieved a high level of engagement in HCV care among individuals with severe mental illness (5).
- One study at a federally qualified health centre in the U.S. undertook a quality improvement initiative to increase the number of HCV screening tests ordered for people who inject drugs (35). The healthcare team underwent educational sessions and workflow changes (e.g. addition of EMR alerts, updating patient visit forms) were implemented to alert providers (35). Post-intervention, screening for patients increased from 59.6% to 65.1% (35). Authors noted that while this was a modest increase, the proportion of people who use drugs screened prior to the intervention

48. Public Health Agency of Canada. Estimates of HIV incidence, prevalence and Canada's progress on meeting the 90-90-90 HIV targets, 2018. 2020. Available from: <https://www.canada.ca/content/dam/hc-sc/documents/services/publications/diseases-conditions/summary-estimates-hiv-incidence-prevalence-canadas-progress-90-90-90-national-hiv-estimates-report-2018-en.pdf> Accessed March 2022.
49. Zibbell JE, Asher AK, Patel RC, Kupronis B, Iqbal K, Ward JW, et al. Increases in acute hepatitis C virus infection related to a growing opioid epidemic and associated injection drug use, United States, 2004 to 2014. *American Journal of Public Health*. 2018;108(2):175-81.
50. Moqueet N, Grewal R, Mazzulli T, Cooper C, Gardner SL, Salit IE, et al. Hepatitis C virus testing in a clinical HIV cohort in Ontario, Canada, 2000 to 2015. *Health Science Reports*. 2021;4(3):e358.
51. Choi S, Healy S, Shapoval L, Forthal S, Neighbors CJ. Hepatitis C virus screening among Medicaid-insured individuals with opioid use disorder across substance use disorder treatment settings. *Substance Use & Misuse*. 2021;56(2):258-63.
52. Government of Canada. HIV and AIDS: Symptoms and treatment. 2020. Available from: <https://www.canada.ca/en/public-health/services/diseases/hiv-aids.html> Accessed February 24, 2022.

was considerably higher than the proportion found in other studies (35).

Generally, community services for people who inject drugs include needle and syringe programs that incorporate rapid testing for HCV and/or HIV appear to be feasible (113) and acceptable (92, 113, 114).

- In the spring of 2020, a syringe service program in Connecticut began to offer a bundled screening, evaluation, testing, and monitoring strategy for HCV, HIV, and opioid use disorder, with a focus on HCV treatment (115). This was in response to COVID-19, which reduced testing and treatment access (115). Sixty-six actively injecting individuals with opioid use disorder participated in bundled screening; 35 were diagnosed with chronic HCV and 31 initiated treatment (115). Of these 31, six were also living with HIV with two participants having detectable viral loads; 12 weeks after the completion of HCV treatment, all six individuals living with HIV achieved viral suppression (115).
- In 2018, a syringe service program in Florida began to offer bundled rapid testing for HIV and HCV at enrollment, where participants were informed that HIV and HCV testing was part of routine care at the program, and they could opt-out if they wished (7). Prior to this, participants could request HIV and HCV testing alongside other services at the program, including wound care and naloxone (7). After implementation of the opt-out bundled testing protocol, authors observed an increase in uptake of HIV and HCV testing by 42.4% (7).

Emergency departments, hospital stays, and inpatient rehabilitation programs

Emergency departments (EDs) have been identified as a setting where missed opportunities for HIV and/or HCV screening occur (22–24). A U.S. study examining seven years of health insurance claims in a national database found that 90% of presumed people who inject drugs missed opportunities for HIV or HCV testing during general clinic visits, emergency or urgent care centres, hospitals, and other clinic types (including inpatient rehabilitation programs and sexually transmitted disease clinics) (22). A second study from the U.S. using data from an ambulatory medical care survey had similar results: HIV testing in the ED was rare, and only slightly more common among individuals reporting substance use disorder (24). Another study among a cohort of people who inject drugs in the U.S. echoed this, noting that half of all healthcare encounters (the majority being in EDs) were missed opportunities for HIV testing (23).

53. Centers for Disease Control and Prevention. HIV treatment. 2021. Available from: <https://www.cdc.gov/hiv/basics/livingwithhiv/treatment.html> Accessed February 28, 2022.
54. National Institute of Allergy and Infectious Diseases. HIV Undetectable=Untransmittable (U=U), or treatment as prevention. 2021. Available from: <https://www.niaid.nih.gov/diseases-conditions/treatment-prevention#:~:text=U%3DU%20means%20that%20people,quiver%20of%20HIV%20prevention%20tools>. Accessed February 28, 2022.
55. Grebely J, Prins M, Hellard M, Cox AL, Osburn WO, Lauer G, et al. Hepatitis C virus clearance, reinfection, and persistence, with insights from studies of injecting drug users: Towards a vaccine. *The Lancet Infectious Diseases*. 2012;12(5):408–14.
56. Smith DJ, Jordan AE, Frank M, Hagan H. Spontaneous viral clearance of hepatitis C virus (HCV) infection among people who inject drugs (PWID) and HIV-positive men who have sex with men (HIV+ MSM): A systematic review and meta-analysis. *BMC Infectious Diseases*. 2016;16(1):1–13.
57. CATIE. The epidemiology of hepatitis C in Canada. 2019. Available from: <https://www.catie.ca/sites/default/files/2021-07/fs%20epi%20hep%20c%20EN%202019%2008%2030.pdf> Accessed February 24, 2022.

HCV screening in EDs is one strategy that has increased HIV and/or HCV testing among people who inject drugs. The following studies demonstrate uptake of HIV and HCV screening among drug users entering EDs:

- A three-month observational pilot study in an ED in Calgary, Alberta sought to implement point-of-care testing and estimate the prevalence of individuals living with undiagnosed chronic HCV infection in 2018 (14). Those who self-reported one or more high-risk factors (e.g. history of injection drug use, born/travelled/resided in an HCV endemic country) and who did not report an HCV test in the previous year were offered a rapid test (n=247); 58.3% (n=144) agreed to testing (14). Six individuals were positive using the point of care test, with samples indicating antibody positive in confirmatory testing; four were HCV RNA positive (14). The strongest risk factor for a new HCV diagnosis was history of injection drug use (14).
- Similarly, a Melbourne study offered rapid tests to patients presenting to the ED for HCV risk factors between June–August 2017 (15). Of the 378 patients that reported at least one risk factor, 368 (97%) underwent a rapid test with 50 (14%) having a reactive result; injection drug use was a risk factor for 88% (n=44) of seropositive participants (15); 45 of the 50 HCV antibody-positive participants had blood tested, and 67% (n=30) were positive for HCV RNA antibodies for a prevalence rate of 2.7% (15). Authors note a single question regarding injection drug use identified 88% of individuals with HCV antibodies in the sample (15).
- A systematic, non-targeted opt-out screening program for HCV in an academic ED in the Appalachian area of Kentucky found that 50.3% (n=1,601) of the 3,665 individuals who had reactive HIV antibody tests were HCV RNA positive, with the majority reporting a history of injection drug use (11). The highest prevalence was among younger (i.e. born after 1965) White males (11). Authors concluded that this ED screening program was able to successfully identify previously unrecognized HCV infection (11).
- One ED in West Virginia implemented an EMR algorithm, based on the CDC’s HIV and HCV testing recommendations, that would trigger a “Best Practice Alert”, prompting providers to order screening using a one-click option (36). Between June 2017–May 2018, this resulted in an overall testing increase of 2269% for HIV and 1065% for HCV compared to the previous 12 months (36). However, between June–October of 2018, the screening model for HCV changed: instead of offering risk-based screening, a universal screening strategy was adopted which screened anyone in the ED over the age of 18 years who had not

58. Raymond M. Understanding cirrhosis of the liver: First steps for the newly diagnosed. 2019. Available from: https://www.catie.ca/sites/default/files/Catie_Cirrhosis_brochure-EN_Jan17_2019.pdf Accessed February 28, 2022.
59. CATIE. Hepatitis C treatment. 2020. Available from: <https://www.catie.ca/hepatitis-c-an-in-depth-guide/hepatitis-c-treatment> Accessed February 28, 2022.
60. CATIE. CATIE statement on hepatitis C treatment efficacy among people who use drugs. 2021. Available from: <https://www.catie.ca/sites/default/files/2021-11/catie-statement-hcv-efficacy-en.pdf> Accessed March 21, 2022.
61. Grebely J, Bruneau J, Bruggmann P, Harris M, Hickman M, Rhodes T, et al. Elimination of hepatitis C virus infection among PWID: The beginning of a new era of interferon-free DAA therapy. *The International Journal on Drug Policy*. 2017;47:26–33.
62. Yazdani K, Dolguikh K, Zhang W, Shayegi-Nik S, Ly J, Cooper S, et al. Knowledge of hepatitis C and awareness of reinfection risk among people who successfully completed direct acting antiviral therapy. *PloS One*. 2022;17(3):e0265811.
63. Yousafzai MT, Bajis S, Alavi M, Grebely J, Dore GJ, Hajarizadeh B. Global cascade of care for chronic hepatitis C virus infection: A systematic review and meta-analysis. *Journal of Viral Hepatitis*. 2021;28(10):1340–54.

been screened in the previous year, unless they opted out or the physician deemed testing was “not clinically appropriate” (116). Between January–May of 2018, 4% were positive for HCV antibodies; between June–October of 2018 (when universal screening was implemented), this number increased to 6% (116).

- An ED in California (Highland Hospital–Alameda Health System) that primarily serves adult patients of racial and ethnic minorities offered targeted HCV screening for those born between 1945–1965, or if having ever used injection drugs was reported (12). In 2014, screening was integrated into the nurse-led triage process, based on EMR prompts (12). Of the individuals who completed screening during the six-month study period (2,581 of 26,639; 9.7%), HCV antibody prevalence was 10.3% (n=267) (12). Of these, 67% (n=180) had HCV RNA testing performed, and 70% (n=126) of them were positive (12). Interestingly, a follow-up survey among nursing staff and the patients found that nurses frequently misperceived how patients experienced ED-based HIV/HCV screening and these misconceptions were skewed toward the negative (117).
- A second initiative at Highland Hospital ED in California, HIT IDU (High-Impact Testing for Injection Drug Users), was a three-month pilot project in 2015 that encouraged physicians to integrate targeted HCV testing into care, with a focus on screening those who inject drugs (13). Of the 14,253 individuals who were evaluated, 155 were tested for HCV antibodies; 73 of these 155 were people who inject drugs (13), 34 of which were HCV antibody positive, and 17 were HCV-RNA positive (13).
- A safety-net hospital in New England implemented HCV ED testing in 2016 for all individuals over the age of 13 who had blood drawn for clinical purposes (118). Three-month analysis of the program saw an increase in HCV antibody testing of 6,950%; of the 3,808 antibody tests that were performed, 504 (13.2%) were positive with 318 (63.1%) reporting past or current injection drug use (118). Of these 504, 97.8% (n=493) had a follow-up RNA test performed; 292 had an active infection, for a positivity rate of 7.7% (118). Note that this study did not report the number of people who inject drugs with positive HCV RNA result (118).
- In 2018, Hamilton County in Ohio (Cincinnati area) has experienced the highest rates of new HIV diagnoses since 2014 (25). A screening program in a Hamilton County ED had four active approaches to HIV screening: non-targeted opt-out screening of all persons younger than 65 driven by the EMR system, risk-targeted screening operated by adjunct health providers, walk-in clients who seek HIV

64. Medland NA, McMahon JH, Chow EP, Elliott JH, Hoy JF, Fairley CK. The HIV care cascade: A systematic review of data sources, methodology and comparability. *Journal of the International AIDS Society*. 2015;18(1):20634.
65. Yehia BR, Schranz AJ, Umscheid CA, Lo Re III V. The treatment cascade for chronic hepatitis C virus infection in the United States: A systematic review and meta-analysis. *PloS One*. 2014;9(7):e101554.
66. Jordan AE, Perlman DC, Reed J, Smith DJ, Hagan H. Patterns and gaps identified in a systematic review of the hepatitis C virus care continuum in studies among people who use drugs. *Frontiers in Public Health*. 2017;5:348.
67. Scott N, Sacks-Davis R, Pedrana A, Doyle J, Thompson A, Hellard M. Eliminating hepatitis C: The importance of frequent testing of people who inject drugs in high-prevalence settings. *Journal of Viral Hepatitis*. 2018;25(12):1472–80.
68. Centers for Disease Control and Prevention. HIV infection risk, prevention, and testing behaviours among persons who inject drugs—National HIV behavioral surveillance injection drug use—23 U.S. cities, 2018. 2020. Available from: <https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-special-report-number-24.pdf> Accessed March 1, 2022.

testing, and targeted testing for patients presenting with clinical signs of HIV or HIV risk acquisition (25). Between 2014–2018, this particular ED contributed to 18% of the state’s HIV diagnoses and 22% of diagnoses among people who inject drugs (25).

- One study examined the efficacy of a video-based intervention designed to increase uptake of HIV testing in a New York City ED among those who initially declined testing (119). Authors hypothesized that “demographic concordance”—that is, if participants resembled people who appeared onscreen—would increase the likelihood of testing acceptance (119). This was found not to be a predictor; rather, testing uptake was influenced by participants who reported problematic substance use (119).
- A 2022 study from New York describes the impact of an intervention that provided individualized feedback on HIV and HCV screening rates to clinical staff working in an ED (120). Though the study did not collect information on patient risk behaviours and was thus unable to draw conclusions regarding uptake among people who use drugs, this study did increase HIV and HCV testing uptake and case detection in the ED (120). Briefly, the 30-week intervention phase consisted of individualized feedback sent to all ED clinical staff that noted their past screening rates, and described the target goal: increasing the overall ED screening rate by 70% (120). Compared to the pre-intervention period, the incidence rate ratio of weekly HIV testing was 1.94 times higher, and the incidence rate ratio of weekly HCV testing was 1.38 times higher during the intervention period (120).

In addition to numerous studies and programs described above that have examined HIV and/or HCV screening in EDs, we also identified a few studies examining screening strategies in other traditional healthcare settings, such as visits to a general practitioner/clinic, hospitals, and residential drug treatment programs. One systematic review from 2022 found that integrated HCV testing and treatment into mental health and drug treatment services can potentially address barriers at different levels (90).

- A study in Australia examined utilization of general practitioners’ services for HCV testing by people who inject drugs, compared to other settings (9). A national sample of people who had injected drugs regularly in the past six months (n=888) were interviewed about HCV testing, post-test discussions, and settings where each took place (9). In the sample, 735 reported HCV antibody testing, with 435 reporting a positive result; of these, 54% (n=236) identified their regular practitioner as the setting where their most recent HCV antibody test was conducted (9). Of those

69. Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB. CDC recommendations for hepatitis C screening among adults—United States, 2020. *MMWR Recommendations and Reports*. 2020;69(2):1.
70. Public Health Agency of Canada. HIV factsheet: Screening and testing. 2019. Available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/hiv-factsheet/hiv-factsheet-screening-testing.pdf> Accessed March 2, 2022.
71. Public Health Ontario. Recommendations for the public health response to hepatitis C in Ontario. 2014. Available from: <https://www.publichealthontario.ca/-/media/documents/R/2014/recommendations-hepc-response.pdf> Accessed March 2022.
72. World Health Organization. Global health sector strategy on viral hepatitis 2016–2021: Towards ending viral hepatitis. 2016. Available from: <https://apps.who.int/iris/bitstream/handle/10665/246177/WHO-HIV-2016.06-eng.pdf;jsessionid=C71F833C638FF054B8A84DCD961FCAA5?sequence=1> Accessed March 18, 2022.
73. Blake A, Smith JE. Modeling hepatitis C elimination among people who inject drugs in New Hampshire. *JAMA Network Open*. 2021;4(8):e2119092.
74. Byrne CJ, Beer L, Inglis SK, Robinson E, Radley A, Goldberg DJ, et al. Real-world outcomes of rapid regional hepatitis c virus treatment scale-up among people who inject drugs in Tayside, Scotland. *Alimentary Pharmacology & Therapeutics*. 2021;08:08.

who reported HCV RNA testing, the most common setting reported was their regular general practitioner (9).

- An urban clinic in New Jersey utilized Audio-CASI (audio-computer-assisted survey interviews) in private kiosks where individuals completed a short survey on demographic and hepatitis risk-related factors, which would then recommend HCV and hepatitis B virus (HBV) testing to doctors based on patient responses (121). Commencing in the middle of 2016, the kiosks were used twice weekly over the course of two years: 2,005 surveys were initiated with 1,932 completions, and 29% of patients (n=574) acknowledged having “any” risk factor (121). Of these, 254 (44%) underwent initial screening, and 24 (9%) were HCV antibody positive (121). Within one year (2016), average monthly HCV antibody testing increased from 245 (January–June average) to 1,187 (July–December average) (121).
- Three hospitals in Missouri (two rural, one urban) implemented an intervention in 2020–2021 where infectious disease consultants received a standardized set of recommendations for inpatients with serious injection-related infections (10). This included a checklist to encourage packaged STI and viral hepatitis testing integrated into the EMR, as well as email reminders of recommended screenings tests (10). The cohort included 123 patients pre-intervention, and 271 post-intervention (10). An increase in the number of HCV and HIV tests post-intervention was observed: HCV testing increased from 87.8% (n=108/123) to 92.9% (n=252/271), while HIV testing increased from 86.2% (n=106/123) to 91.9% (n=249/271) (10).
- A residential substance use disorder treatment program in Mississippi, providing treatment exclusively for veterans, integrated a comprehensive HCV screening, education, referral, and treatment program in December of 2014 (HIV testing is also offered) (8). HCV antibody tests are conducted, with positive results confirmed by HCV RNA; results, whether positive or negative, are given as individualized feedback by a provider within the program (8). Those with a positive result are referred to the infectious disease clinic, located on a separate floor in the same hospital (8). In addition to this, a weekly HCV/HIV education group for all inpatients was introduced (8). From December 2014 to April 2018, 97.49% (n=582) of admissions were screened for HCV; 12.71% (n=74) had a detectable HCV RNA viral load, with 14 of these (18.92%) being newly recognized infections (8). No new HIV infections were identified (8).

75. Hickman M, Dillon JF, Elliott L, De Angelis D, Vickerman P, Foster G, et al. Evaluating the population impact of hepatitis C direct acting antiviral treatment as prevention for people who inject drugs (EPIToPe)—A natural experiment (protocol). *BMJ Open*. 2019;9(9):e029538.
76. Public Health Agency of Canada. Approach to HIV screening: Types of HIV tests. 2020. Available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/hiv-factsheet/hiv-factsheet-types-hiv-screening-tests.pdf> Accessed March 2, 2022.
77. Public Health Ontario. HIV—Diagnostic serology. 2021. Available from: <https://www.publichealthontario.ca/en/laboratory-services/test-information-index/hiv-diagnostic-serology> Accessed March 3, 2022.
78. CATIE. Health Canada licenses HIV self-testing. 2020. Available from: <https://www.catie.ca/catie-news/health-canada-licenses-hiv-self-testing#:~:text=The%20first%20HIV%20self%2Dtesting,Canada%20on%20November%202%2C%202020>. Accessed March 4, 2022.
79. bioLytical Laboratories. INSTI now available for expanded point-of-care use in Canada. 2019. Available from: <https://www.insti.com/insti-in-canada/> Accessed March 4, 2022.
80. Alves J, Stewart J, Ruiz-Mercado G, Taylor JL. When perfect is the enemy of tested: A call to scale rapid HIV testing for people who inject drugs. *Journal of General Internal Medicine*. 2022:1–2.

Pharmacies

Pharmacy-based interventions to improve uptake of HCV testing among people who use drugs have been examined in a few studies. Such interventions appear to be acceptable. For example, one study in five Appalachian counties found that 75% of participants would be “very likely” to participate in free, pharmacy-based HIV testing, and 80% for HCV testing (16). The following studies describe interventions in pharmacies to increase testing among people who use drugs.

- A community pharmacy in San Francisco rolled out rapid point-of-care HCV testing pilot project in collaboration with the local public health department to determine feasibility, acceptance, and success of community pharmacists to perform screening and linkage to care (17). Between April-June 2016, 83 HCV tests were performed, with one positive result (17). Risk factors for being positive included injection drug use and being part of the Baby Boomer cohort (17). Generally, pharmacists found the intervention feasible, though one barrier to implementation was the time required to review test results alongside the pharmacy’s standard workflow (17). A second barrier was the ability to attract non-pharmacy customers into the pharmacy for the testing service (17). Positive feedback was received among patients who engaged in the services, and pharmacists supported promotion of the service in pharmacies (17).
- In New York City, three pharmacies in low-income, minority neighbourhoods adopted an HIV testing intervention with three arms from 2010-2012: the comprehensive arm including HIV testing, chronic disease screening, and a video that normalized testing and destigmatized HIV (n=255); the video arm which included HIV testing and the video (n=193); and the control arm which was HIV testing only (n=240) (122). Participants included injection drug users and under- or un-insured pharmacy customers (122). Compared to the HIV testing-only arm, authors found that those in the comprehensive arm and the video arm were more likely to receive a test in the pharmacy (122).
- A community pharmacy affiliated with a detox and rehabilitation centre in Kentucky launched a medication-assisted therapy (MAT) opioid use disorder (OUD) protocol where those enrolled would be screened for HCV (30). Of 77 patients enrolled in the MAT OUD, 36 consented to HCV screening: 10 (28%) were positive, with six reporting a history of injection drug use (30). As a result of the study, the MAT OUD protocol patient intake forms were updated to ensure that all received hepatitis vaccinations, HCV screening, and HIV screening (30).

81. Assoumou SA, Paniagua SM, Linas BP, Wang J, Samet JH, Hall J, et al. Rapid versus laboratory-based testing for HIV and hepatitis C at a drug detoxification treatment center: A randomized trial. *Journal of Infectious Diseases*. 2020;222(Suppl 5):S376–S83.
82. Bert F, Gualano MR, Biancone P, Brescia V, Camussi E, Martorana M, et al. Cost-effectiveness of HIV screening in high-income countries: A systematic review. *Health Policy*. 2018;122(5):533–47.
83. Hutchinson AB, Farnham PG, Sansom SL, Yaylali E, Mermin JH. Cost-effectiveness of frequent HIV testing of high-risk populations in the United States. *Journal of Acquired Immune Deficiency Syndromes*. 2016;71(3):323–30.
84. CATIE. How hepatitis C testing works: Diagnostic tests. 2021. Available from: <https://www.catie.ca/hepatitis-c-an-in-depth-guide/how-hepatitis-c-testing-works-diagnostic-tests> Accessed March 2, 2022.
85. Centers for Disease Control and Prevention. Hepatitis C testing: What to expect when getting tested. 2020. Available from: <https://www.cdc.gov/hepatitis/hcv/pdfs/hepcgettingtested.pdf> Accessed March 28, 2022.
86. Elliot S. Simplifying the road to hepatitis C diagnosis: Reflex testing in Canada. 2021. Available from: <https://www.catie.ca/prevention-in-focus/simplifying-the-road-to-hepatitis-c-diagnosis-reflex-testing-in-canada> Accessed April 13, 2022.

Community outreach, social networks, peers

There is some evidence that peers may be useful in recruiting people who use drugs for HIV and/or HCV testing within their networks and the broader community (i.e. street outreach). The following studies describe interventions that incorporated peers into testing recruitment.

- A study in Baltimore examined the feasibility of a social-network based approach whereby people who inject drugs (“primary indexes”), recruited from community-based research organizations and a clinical cohort, were briefly educated on HCV and encouraged to recruit network members for HCV testing and linkage to care (29). Of the 36 primary indexes, 17 individuals recruited 64 network members who then became secondary indexes (29). To be eligible, indexes had to have a history of injection drug use and be HCV antibody positive (rapid tested at time of enrollment); blood samples were collected for HCV RNA testing (29). For each network member that presented for evaluation, indexes were remunerated USD 10 (29). Authors found that successful recruitment of at least one network member was positively associated with a higher number of network members, at least daily injection drug use, and prior HCV treatment (29). Additionally, a later study found that participants were willing to support their network members with HCV-related information and emotional support (123).
- In 2013, a study in Ottawa (PROUD) developed a model for community-based peer-administered point-of-care HIV testing based on street outreach (26). Over seven months, 593 individuals who reported injection drug use or crack cocaine use were enrolled; a quantitative survey and a point-of-care test were offered to those who did not self-report as living with HIV by either a trained peer or medical student researcher (i.e. non-peer) (26). Of the 593 participants, 550 were offered a point-of-care HIV test; 458 (83.3%) consented to testing, including 74 (16.2%) who had never tested for HIV previously (26). Thus, testing uptake was high, and further analysis revealed that uptake did not differ if offered by a peer or non-peer (26). One reactive HIV result was identified (26).
- A randomized controlled trial conducted in Toronto examined if point-of-care HCV antibody testing delivered by peer outreach workers would improve engagement in care for individuals with a history of injection drug use compared to referral to community-based HCV program for testing (27). Recruitment occurred between November 2018 and February 2019 within the peer’s social networks, or among strangers/acquaintances in non-health care

87. Wang Y, Jie W, Ling J, Yuanshuai H. HCV core antigen plays an important role in the fight against HCV as an alternative to HCV RNA detection. *Journal of Clinical Laboratory Analysis*. 2021;35(6):e23755.
88. Blackburn NA, Patel RC, Zibbell JE. Improving screening methods for hepatitis C among people who inject drugs: Findings from the HepTLC Initiative, 2012–2014. *Public Health Reports*. 2016;131 Suppl 2:91–7.
89. Reynolds GL, Fisher DG, Brocato J, van Otterloo L, Khahlil K, Huckabay L. Stressful point-of-care rapid testing for human immunodeficiency virus, hepatitis C virus, and syphilis. *International Journal of STD & AIDS*. 2017;28(10):975–84.
90. Cunningham EB, Wheeler A, Hajarizadeh B, French CE, Roche R, Marshall AD, et al. Interventions to enhance testing, linkage to care, and treatment initiation for hepatitis C virus infection: A systematic review and meta-analysis. *The Lancet Gastroenterology & Hepatology*. 2022;7(5):426–445.
91. Marshall AD, Grebely J, Dore GJ, Treloar C. Barriers and facilitators to engaging in hepatitis C management and DAA therapy among general practitioners and drug and alcohol specialists—The practitioner experience. *Drug & Alcohol Dependence*. 2020;206:107705.

settings (e.g. public places, private homes) (27). Of the 380 study participants, 195 received point-of-care testing, HCV antibody results, and post-test counselling, and 185 were referred to testing with the program nurse (27). Prior to the study, 72% of participants were unknown to the peer outreach workers, while 61% percent had no known history of HCV testing (27). Of those who received a point-of-care antibody test, 39% (n=77) had HCV antibodies, with 3% (n=6) having at least one visit with the HCV treatment nurse (27). Of those who were referred to testing with the program nurse, 3% (n=5) had one visit where three tested positive for HCV antibodies (27). Within six months of study enrollment, there was no significant difference between those who presented for follow-up care between the two groups (27). Authors concluded that peers were able to efficiently reach a marginalized group of individuals with low rates of previous HCV testing (27).

- A qualitative study in Australia examined the impact of a community-based outreach model to engage people who inject drugs in testing as an entry point to the HCV care cascade (28). The outreach team included five individuals who had a background in harm reduction and one peer (28). To determine acceptability of the model, 25 participants who engaged in testing via the outreach model completed interviews at baseline (28). Narratives suggested that the model allowed the outreach team to build rapport with clients in informal settings prior to being tested to allow for HCV testing and treatment literacy (28). Authors determined this was an effective strategy to target people who inject drugs in HCV testing and education, especially those who were new to injecting (28).

HIV and/or HCV testing as part of larger programs

The following studies examined outcomes of testing initiatives that had broad implementation at a variety of sites that focused on various aspects of the HIV and/or HCV care cascades. Programs lasted for between two and four years, and focused on one or more steps of the HIV and/or HCV care cascades. Additionally, these programs were broad in scope, focusing on services within entire cities or multiple sites across several jurisdictions.

- The Seek and Treat for Optimal Prevention of HIV/AIDS (STOP) Project was a three-year pilot program in Vancouver from 2010 to 2013 with the aim of expanding HIV testing, treatment, and care to reduce HIV transmission (i.e. treatment as prevention) (124). The primary strategy of the STOP Project was to build on the city's existing service infrastructure by expanding the capacity of effective programs, implementing new ways of offering services to clients, and enhancing linkage within the system (124).

92. Bajis S, Maher L, Treloar C, Hajarizadeh B, Lamoury FMJ, Mowat Y, et al. Acceptability and preferences of point-of-care finger-stick whole-blood and venepuncture hepatitis C virus testing among people who inject drugs in Australia. *International Journal of Drug Policy*. 2018;61:23-30.
93. Ledesma F, Buti M, Dominguez-Hernandez R, Casado MA, Esteban R. Is the universal population hepatitis C virus screening a cost-effective strategy? A systematic review of the economic evidence. *Revista Espanola de Quimioterapia*. 2020;33(4):240-8.
94. Cortesi PA, Barca R, Giudicatti G, Mossini S, Ciaccio A, Iannazzo S, et al. Systematic review: Economic evaluations of HCV screening in the direct-acting antivirals era. *Alimentary Pharmacology & Therapeutics*. 2019;49(9):1126-33.
95. Coward S, Leggett L, Kaplan GG, Clement F. Cost-effectiveness of screening for hepatitis C virus: A systematic review of economic evaluations. *BMJ Open*. 2016;6(9):e011821.
96. Tatar M, Keeshin SW, Mailliard M, Wilson FA. Cost-effectiveness of universal and targeted hepatitis C virus screening in the United States. *JAMA Network Open*. 2020;3(9):e2015756.
97. Manca F, Robinson E, Dillon JF, Boyd KA. Eradicating hepatitis C: Are novel screening strategies for people who inject drugs cost-effective? *International Journal of Drug Policy*. 2020;82:102811.

To mobilize HIV testing, the HIV testing strategy was refocused from risk-based testing to routine-based testing paired with risk-based: routine-based testing was offered in family and acute care, and risk-based testing in high-prevalence populations (124). This community-wide scale up is briefly mentioned in a study published in 2016, which aimed to identify rates, causes, and predictors of mortality among a cohort of people who use illicit drugs living with HIV in Vancouver from 1996–2014; authors found significant declines in HIV-related all-cause mortality, coincident with the campaign (103). A 2020 study found that between 2011–2016, there was an 11-fold increase in HIV tests following implementation of routine testing; 96.9% of patients agreed to have an HIV test when offered (125). After adjusting for risk factors, authors found that people who inject drugs were significantly more likely to be diagnosed with HIV in the hospital compared to being diagnosed in the community (125).

- The Expanded Testing and Linkage to Care (X-TLC) program was an initiative aimed to expand HIV testing to high-prevalence communities (e.g. men who have sex with men, people who inject drugs) between 2011–2013 on the South Side of Chicago, and was a part of Chicago’s HIV prevention programming (126). Using standard laboratory testing or rapid laboratory-based testing with point-of-care results notification, the program aimed to expand routinized HIV testing to high-prevalence communities; testing sites included clinics, emergency departments, and inpatient hospitals (126). Testing uptake increased each year, from 11,839 tests in 2011 to 36,241 tests in 2013 without an increase in incremental funding (126). Of the 176 patients diagnosed with HIV, 133 reported risk factors for HIV; of these 133, nine (6.8%) reported injection drug use as a risk factor (126).
- The CDC’s Hepatitis Testing and Linkage to Care (HepTLC) initiative prompted screening, posttest counselling, and linkage to care for HBV and HCV in over 30 U.S. cities between 2012–2014 for a total of 84 sites that targeted people who inject drugs who had not been previously tested (88). Sites included syringe service programs, sexually transmitted disease clinics, community organizations, and health departments (88). A total of 15,274 individuals received an HCV antibody test, of which 51% (n=7,789) reported injection drug use in the past 12 months (88). From the total sample, 23% (n=3,495) tested positive for HCV antibodies (88). Of these, 1,630 tested for HCV RNA, and 76% (n=1,244) were HCV RNA positive (88). Interestingly, when examining data for individuals who received reflex testing (i.e. tested for HCV antibodies on the same day as HCV RNA testing), they found that of those who were HCV RNA

98. Koo V, Tian F, Wong WWL. Cost-effectiveness analysis of hepatitis C virus (HCV) point-of-care assay for HCV screening. *Liver International*. 2021;30:30.
99. Ward Z, Reynolds R, Campbell L, Martin NK, Harrison G, Irving W, et al. Cost-effectiveness of the HepCATT intervention in specialist drug clinics to improve case-finding and engagement with HCV treatment for people who inject drugs in England. *Addiction*. 2020;115(8):1509–21.
100. Bayani A, Ghiasvand H, Rezaei O, Fattah Moghaddam L, Noroozi A, Ahounbar E, et al. Factors associated with HIV testing among people who inject drugs: A meta-analysis. *Journal of Addictive Diseases*. 2020;38(3):361–74.
101. Karimi SE, Bayani A, Higgs P, Bayat AH, Hemmat M, Ahounbar E, et al. Prevalence and high risk behaviours associated with HCV testing among people who inject drugs: A systematic review and meta-analysis. *Substance Abuse Treatment, Prevention, & Policy*. 2020;15(1):64.
102. Bajis S, Dore GJ, Hajarizadeh B, Cunningham EB, Maher L, Grebely J. Interventions to enhance testing, linkage to care and treatment uptake for hepatitis C virus infection among people who inject drugs: A systematic review. *International Journal of Drug Policy*. 2017;47:34–46.
103. Hayashi K, Dong H, Kerr T, Dobrer S, Guillemi S, Barrios R, et al. 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. *The Journal of Infectious Diseases*. 2018;217(1):64–8.

positive, 12.1% attended their first medical appointment; among those who did not receive reflex testing, 3.0% attended their first medical appointment (88).

- HepCare is a three-year, European Union-funded HCV initiative involving collaboration with four sites in the UK, Ireland, Spain, and Romania (127). The purpose is to improve identification and treatment of HCV, with a focus on vulnerable populations recognizing that peers are able to uniquely connect with underserved populations (127). Two components of HepCare are HepCheck and HepFriend, which involve active case finding and peer support to navigate the testing and treatment pathways (128). Based on data from the UK in 2017–2018, 400 individuals had been screened by the service, of which 43.8% (n=175) had chronic HCV infection (127). A 2019 UK study examining costs found that the intervention was likely to be highly cost-effective (128).

Tablet- or mobile-based interventions

A few studies have recognized the resource constraints placed on needle exchange programs and other community services in delivering a full package of prevention services to clients. Some studies found that mobile- or tablet-based interventions, delivered alongside other programming, could potentially enhance testing uptake.

- The Mobile Intervention Kit (MIK) is a tablet-based intervention with three separate modules designed to facilitate HIV testing, HCV testing, and overdose prevention/response training in community settings (e.g. syringe exchange programs) (31). The MIK involves a knowledge pretest, a short educational video, and a knowledge post-test for each module (31). In 2016, MIK was piloted at street outreach syringe exchange program in New York to determine feasibility, acceptability, and efficacy (31). Participants found the program to be feasible and highly acceptable; all those who participated in the HCV module (n=10) accepted HCV screening at the end, and ten of the 11 in the HIV module accepted HIV screening (31). Five out of ten agreed to additional naloxone training (31). Post-tests demonstrated an increase in HIV testing procedures, asymptomatic HCV infection, and knowledge of overdose prevention (31).
- One study assessed the impact of a computer-based behavioural intervention on HCV testing, safe injection practices, substance use reduction, and overdose prevention at two syringe service programs in Wisconsin (32). From 2014 to 2015, 235 clients were randomly assigned to receive the Hep-Net intervention after completing

104. Paquette CE, Pollini RA. Injection drug use, HIV/HCV, and related services in nonurban areas of the United States: A systematic review. *Drug & Alcohol Dependence*. 2018;188:239–50.

105. Allen ST, Grieb SM, White RH, O'Rourke A, Kilkenny ME, Jones CM, et al. Human immunodeficiency virus testing among people who inject drugs in rural West Virginia. *Journal of Infectious Diseases*. 2020;222(Suppl 5):S346–S53.

106. Mason LMK, Veldhuijzen IK, Duffell E, van Ahee A, Bunge EM, Amato-Gauci AJ, et al. Hepatitis B and C testing strategies in healthcare and community settings in the EU/EEA: A systematic review. *Journal of Viral Hepatitis*. 2019;26(12):1431–53.

107. Lee AB, Karumberia S, Gilmore A, Williams E, Bruner N, Overton ET, et al. Hepatitis C among high-risk Alabamians: Disease burden and screening effectiveness. *Journal of Infectious Diseases*. 2020;222(Suppl 5):S365–S75.

108. Radley A, Robinson E, Aspinall EJ, Angus K, Tan L, Dillon JF. A systematic review and meta-analysis of community and primary-care-based hepatitis C testing and treatment services that employ direct acting antiviral drug treatments. *BMC Health Services Research*. 2019;19(1):765.

109. Oru E, Trickey A, Shirali R, Kanters S, Easterbrook P. Decentralisation, integration, and task-shifting in hepatitis C virus infection testing and treatment: A global systematic review and meta-analysis. *The Lancet Global Health*. 2021;9(4):e431–e45.

a baseline survey (32). Of these, 151 (64.3%) individuals completed a follow-up survey 3–6 months after enrollment (32). Compared to the control group, those who received Hep-Net were more likely to undergo HCV testing, receive Narcan© training, and share injection equipment less frequently (32).

- An mHealth intervention integrated HCV-related content into a smartphone app, Addiction-Comprehensive Health Enhancement Support System (A-CHESS), for individuals diagnosed with OUD on MAT with the purpose of improve HCV screening (33). Between 2016–2018, 416 individuals with OUD were enrolled in the study: 207 were randomized to the control arm and 209 to the A-CHESS experimental arm (33). Of the individuals engaged in injection drug use (n=63, intervention arm; n=46, control arm), a trend towards increased uptake of HCV testing was observed in the A-CHESS group (33). Furthermore, those who shared injection drug use equipment in the A-CHESS arm (n=23 in intervention arm; n=9 in control arm) were nearly three times more likely to test compared to the control arm (33).

Take-home kits for self-collection or self-testing

Some studies described the option of offering specimen self-collection or self-test kits to people who use drugs as another way to increase screening.

- One study in Appalachian Kentucky explored the acceptability and uptake of free at-home HIV test kits among young people who use drugs, aged 18–35 (18). Participants were recruited in 2017–2018 to complete an online survey via web-based referral and targeted outreach at community events (18). The survey included questions on injection drug use, needle-sharing, and sexual risk behaviours; additionally, a description of the HIV self-collection kit and procedure was provided, and participants were asked if they would be willing to use one of these kits, noting that 40 individuals would be randomly sent a kit (18). Survey completion was incentivized, as was completing at-home self-collection (as per random selection) (18). The number of eligible surveys completed was 151; 63.6% were somewhat or very likely to hypothetically use a self-collection kit, with 66.9% consenting to self-collection if randomly selected (18). A self-collection kit was received by 37 participants, with 37.8% (n=14) sending in their completed blood spot to the testing company; 64.3% (n=9) of these individuals called in to receive their results (18). Authors concluded that while young rural adults may be willing to take a self-collected sample for HIV testing, there may be other barriers that inhibit completion of the process (18).

110. Boucher LM, Bayoumi AM, Mark AE, Cooper C, Martin A, Marshall Z, et al. Hepatitis C testing, status and treatment among marginalized people who use drugs in an inner city setting: An observational cohort study. *Substance Use & Misuse*. 2019;54(1):18–30.
111. Puryear S, Burnett P, Page KR, Muvva R, Chaulk P, Ghanem KG, et al. HIV seroconversion among Baltimore City residents tested at a mobile van programme. *Sexually Transmitted Infections*. 2018;94(1):37–9.
112. Engler K, Rollet K, Lessard D, Thomas R, Lebouche B. Ability of a rapid HIV testing site to attract and test vulnerable populations: A cross-sectional study on Actuel sur Rue. *International Journal of STD & AIDS*. 2016;27(11):973–7.
113. Williams B, Howell J, Doyle J, Thompson AJ, Draper B, Layton C, et al. Point-of-care hepatitis C testing from needle and syringe programs: An Australian feasibility study. *International Journal of Drug Policy*. 2019;72:91–8.
114. Latham NH, Pedrana A, Doyle JS, Howell J, Williams B, Higgs P, et al. Community-based, point-of-care hepatitis C testing: perspectives and preferences of people who inject drugs. *Journal of Viral Hepatitis*. 2019;26(7):919–22.

- A study from 2021, conducted among people who use drugs in Louisville, Kentucky, engaged 230 individuals from May to June 2021 to evaluate the acceptability of an HIV self-testing program (129). Participants found the HIV self-test kits to be acceptable and easy to use, with approximately 77% reporting that self-testing made it easier to keep track of their HIV status compared to standard testing methods (129).
- A qualitative study from 2018 examined if remote HCV self-sampling and self-testing was acceptable among people who use drugs in the UK (19). Three focus groups were held with individuals who were currently or formerly engaged in drug use (n=22) (19). Some participants valued the autonomy and privacy these options offered, though the immediate results of the self-testing kits was preferred; however, there were concerns over managing a positive result in isolation (19). Furthermore, individuals described the need to ensure remote testing was embedded within a supportive care pathway (19).

Other HIV and/or HCV testing models

The following studies describe HCV testing interventions in other settings, such as prisons, and testing campaigns.

- One study in Canada examined the population-level impact of prison-based interventions on HCV transmission among people who inject drugs in Montreal using a dynamic HCV transmission model (130). Developed and calibrated to community and prison bio-behavioural surveys, the relative impact of prison-based testing and treatment was estimated from 2018 to 2030, if testing coverage was 90% and treatment coverage was 75% (130). Authors estimated that prison test-and-treat strategies could potentially lead to a large decline in incidence of HCV (48%) over the 12-year period, and prevent 22% of new chronic infections (130).
- An Australian study describes a pilot HCV testing and awareness campaign offering financial incentives designed to engage or re-engage clients in primary healthcare services with high caseloads of people who inject drugs (20). Implemented in July and August of 2019 (to coincide with World Hepatitis Day on July 28), the campaign was an event-based model, comprising of promotional materials and financial incentives for HCV testing; participating services included community organizations, needle and syringe programs, and a general practice with a high caseload of opioid substitution therapy (20). Testing was actively promoted by staff, while a nurse provided on-site support including consultation, counselling, education, and

115. Sivakumar A, Madden L, DiDomizio E, Eller A, Villanueva M, Altice FL. Treatment of hepatitis C virus among people who inject drugs at a syringe service program during the COVID-19 response: The potential role of telehealth, medications for opioid use disorder and minimal demands on patients. *International Journal of Drug Policy*. 2021;101:103570.
116. Wojcik EM, Sharon MJ, Davis SM, Lander OM, Burrell CN. Centers for Disease Control and Prevention recommendations for hepatitis C testing: The need to adopt universal screening in an Appalachian emergency department. *Academic Emergency Medicine*. 2020;27(9):844–52.
117. White DA, Anderson ES, Pfeil SK, Graffman SE, Trivedi TK. Differences between emergency nurse perception and patient reported experience with an ED HIV and hepatitis C virus screening program. *Journal of Emergency Nursing*. 2016;42(2):139–45.
118. Schechter-Perkins EM, Miller NS, Hall J, Hartman JJ, Dorfman DH, Andry C, et al. Implementation and preliminary results of an emergency department nontargeted, opt-out hepatitis C virus screening program. *Academic Emergency Medicine*. 2018;25(11):1216–26.
119. Aronson ID, Cleland CM, Rajan S, Marsch LA, Bania TC. Substance use reporting as a predictor of HIV test rates among emergency department patients. *AIDS & Behavior*. 2020;24(2):475–83.

blood collection (20). The incentivized structure for testing was determined by the service according to the client population (20). Acceptability and health promotion data was collected through surveys which asked participants general questions about the event (20). Running for 1-3 days at each service for a total of nine campaign testing days, 91 participants not actively engaged in care received an incentivized test; 73% (n=66) had never been treated for HCV (20). Of the 91 participants, 26% (n=24) tested positive for HCV RNA (20). Authors concluded that an event-style campaign with financial incentives was able to effectively engage clients in HCV testing (20).

- Another study examined awareness-raising HCV testing campaigns to promote testing by general practitioners in Scotland (131). The Action Plan included a letter from the Chief Medical Officer, an information website for professionals, advertisements in the medical press, and an information pack, plus a professional development course on HCV (131). In 2007 (pre-campaign), 84% of general practitioners responded always/almost always/usually when asked if testing was offered to people who inject drugs; this number increased to 87% in 2013 (131).

Factors That May Impact Local Applicability

Due to the vast amount of literature examining HIV and/or HCV testing among people who use drugs, studies had considerable heterogeneity; outcome measures varied across studies, and not all articles described testing algorithms in detail. Additionally, not all of the services described are available in the different settings; for example, syringe exchange services are illegal in some parts of the U.S. (107), and the availability of self-collection kits and self-testing kits varies by jurisdiction (79). Furthermore, though the majority of studies did take place in urban centres, those that did not were mainly focused in rural Appalachia, an area of the U.S. that is not only remote, but has overarching socioeconomic problems compared to the rest of the U.S. (132). Thus, results from rural Appalachia might not be generalizable to other rural areas.

Finally, our search strategy included studies published since 2016, which meant that some studies included patients treated with interferon-based regimens, while other studies were conducted after DAA regimens for HCV treatment became available.

120. Zucker J, Purpura L, Sani F, Huang S, Schluger A, Ruperto K, et al. Individualized provider feedback increased HIV and HCV screening and identification in a New York City emergency department. *AIDS Patient Care and STDs*. 2022;36(3):106–14.

121. de la Torre AN, Castaneda I, Ahmad M, Ekholly N, Tham N, Herrera IB, et al. Audio-computer-assisted survey interview and patient navigation to increase chronic viral hepatitis diagnosis and linkage to care in urban health clinics. *Journal of Viral Hepatitis*. 2017;24(12):1184–91.

122. Crawford ND, Dean T, Rivera AV, Guffey T, Amesty S, Rudolph A, et al. Pharmacy intervention to improve HIV testing uptake using a comprehensive health screening approach. *Public Health Reports*. 2016;131 Suppl 1:139–46.

123. Ward KM, McCormick SD, Sulkowski M, Latkin C, Chander G, Falade-Nwulia O. Perceptions of network based recruitment for hepatitis C testing and treatment among persons who inject drugs: A qualitative exploration. *International Journal of Drug Policy*. 2021;88:103019.

124. CATIE. Shifting the paradigm: The history of the Vancouver STOP HIV/AIDS Project. 2013. Available from: https://www.catie.ca/sites/default/files/stop_EN_2013_10_07.pdf Accessed March 21, 2022.

125. Gustafson R, Demlow SE, Nathoo A, McKee G, MacDonald LE, Chu T, et al. Routine HIV testing in acute care hospitals: Changing practice to curb a local HIV epidemic in Vancouver, BC. *Preventive Medicine*. 2020;137:106132.



What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE®) using a combination of terms (HIV or hepatitis C or HCV) in titles or abstracts AND terms (testing or screening) in titles or abstracts AND (text terms [use* adj2 drug* or drug use* or Injecting drug use* or Injection drug use* or who inject drugs or IDU* or intravenous drug use* or who use* drugs] or MeSH terms [exp Substance-Related Disorders/ or exp Substance Abuse, Intravenous/]). Searches were conducted on February 7, 2022 and results limited to English articles published from 2016 to present. Studies from low- and middle-income countries were excluded. Reference lists of identified articles were also searched. Google (grey literature) searches using different combinations of these terms were also conducted. The searches yielded 1,355 references from which 132 were included.

126. Bares S, Eavou R, Bertozzi-Villa C, Taylor M, Hyland H, McFadden R, et al. Expanded HIV testing and linkage to care: Conventional vs. point-of-care testing and assignment of patient notification and linkage to care to an HIV care program. *Public Health Reports*. 2016;131 Suppl 1:107-20.
127. Surey J, Menezes D, Story A, Sanchez JM, Cristiana OA, Vickerman P, et al. Community interventions and peer support for active case finding and treatment support for underserved populations with hepatitis C in the UK, Ireland, Romania and Spain as part of the HEP CARE programme. *Journal of Hepatology*. 2018;68:S181-2.
128. Ward Z, Campbell L, Surey J, Platts S, Glass R, Hickman M, et al. The cost-effectiveness of an HCV outreach intervention for at-risk populations in London, UK. *Journal of Antimicrobial Chemotherapy*. 2019;74(Suppl 5):v5-v16.
129. Rose M, Guy L, Shamblen S, Guest G, Gilbertson A, Peiper N, editors. LB11. Preliminary findings from a HIV self-testing program among people who use drugs. *Open Forum Infectious Diseases*; 2021.
130. Godin A, Kronfli N, Cox J, Alary M, Maheu-Giroux M. The role of prison-based interventions for hepatitis C virus (HCV) micro-elimination among people who inject drugs in Montreal, Canada. *International Journal of Drug Policy*. 2021;88:102738.
131. McLeod A, Cullen BL, Hutchinson SJ, Roy KM, Dillon JF, Stewart EA, et al. Limited impact of awareness-raising campaigns on hepatitis C testing practices among general practitioners. *Journal of Viral Hepatitis*. 2017;24(11):944-54.
132. Smith E. Human rights in Appalachia: Socioeconomic and health disparities in Appalachia. 2021. Available from: <https://sites.uab.edu/humanrights/2021/01/06/human-rights-in-appalachia-socioeconomic-and-health-disparities-in-appalachia/> Accessed March 18, 2021.