Harm reduction works

Actionable evidence that comprehensive harm reduction programs substantially reduce new HIV and viral hepatitis C and B infections among people who inject drugs.
Harm reduction programs can prevent HIV and viral hepatitis infections in people who inject drugs.

The best approach is to combine needle/syringe programs & opioid agonist therapy. Together, they are even more effective to stop the spread of HIV and viral hepatitis.

Combined harm reduction programs reduce the risk of infection by:

- **41%** for HIV
- **76%** for hepatitis C
- **72%** for hepatitis B

These life-threatening chronic diseases are preventable.

Political will is lacking in many countries, and there is limited evidence showing how effective comprehensive harm reduction programs are, which may deter funding for its implementation.

There is no one-size-fits-all approach to implementing these programs but evidence points to key considerations and recommendations.

- **Provide political will and consistent funding**
- **involve and center the community**
- **Use data for tracking and evaluation**
- **Approach drug use pragmatically and person-centered, not moralistically**

Harm reduction programs are often non-existent or difficult to access. Together, they are even more effective to stop the spread of HIV and viral hepatitis.

Our rigorous international research in the Netherlands, Australia and Canada shows that these programs work.

14.8 million people inject drugs worldwide

- **2.3 million** of these people are living with HIV
- **5.8 million** of these people are living with hepatitis C

Recommendations

- Make both opioid agonist therapy and needle and syringe programs accessible
- Implement a one-stop shop prevention and care model with minimal entry requirements
- Provide holistic care and support
- Provide harm reduction to underserved populations via outreach services


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Harm reduction works:
programs can avert outbreaks of infectious diseases related to injection drug use

Do harm reduction programs prevent HIV and viral hepatitis infections? To find out, we conducted research with an emulated experimental design using high-quality data from three countries.

This was demonstrated by international collaborative research from the Public Health Service of Amsterdam (GGD Amsterdam), the Netherlands, using data from three long-standing cohort studies involving people who inject drugs from Amsterdam, the Netherlands, Vancouver, Canada, and Melbourne, Australia.

The results showed that people who inject drugs can greatly reduce their risk of HIV and hepatitis C and B infection by fully engaging in harm reduction programs, defined as dual opioid agonist therapy and needle and syringe programs engagement.

Harm reduction works, but it needs political support

Injection drug use has increased or remains high in some countries. Exacerbated by limited access to sterile needles and syringes and drug treatment, this has led to ongoing infectious disease outbreaks. Some examples include HIV outbreaks among people who inject drugs in Athens, Greece in 2011–2013, Glasgow, Scotland in 2015 and West Virginia, USA in 2019–2021.

The best way to prevent these outbreaks and related morbidity and mortality is by providing person-centered harm reduction programs, as shown by previous research and the international emulated trial described in this policy brief. However, a lack of political support often undermines the implementation of highly effective harm reduction programs for people who inject drugs.

This policy brief highlights compelling evidence for the effectiveness of harm reduction programs in preventing new cases of HIV and viral hepatitis. It also offers insights from early adopters of harm reduction programs, namely Canada, Australia, and the Netherlands, which can serve as models when establishing or expanding these programs.
Injection drug use and the convergence of three global epidemics

The burden of disease related to drug use worldwide can be largely attributed to non-medical opioid use. Opioid use for non-medical purposes has been shown to be associated with a range of drug-related harm that has implications for healthcare systems and broader communities, including substance use disorders, opioid overdoses, and drug-related medical conditions caused by sharing contaminated injecting equipment, such as blood-borne viral infections (e.g., viral hepatitis, HIV) and injection related injuries.

This has compelled some global leaders to take action. For example, the United States and Canada have declared their opioid crises ‘public health emergencies’ in order to allocate resources to tackle them.

Non-medical opioid use is associated with injecting drugs and the transition to injecting drugs. Injecting non-medical opioids increases people’s risk of acquiring hepatitis C, hepatitis B and HIV. In 2020, 14.8 million people worldwide injected drugs; about one in seven of these people were living with HIV, and four in ten were living with hepatitis C virus.

The United Nations Sustainable Development Goals (SDGs) aim to end the AIDS epidemic and combat viral hepatitis worldwide. In line with these goals, the World Health Organization (WHO) and the United Nations Program on HIV and AIDS (UNAIDS) have set targets for the elimination of HIV and viral hepatitis: a 90% reduction in the rate of new cases by 2030, compared to 2010 and 2015 levels, respectively. The WHO has set specific targets for people who inject drugs: no more than two new cases of hepatitis C virus (HCV) for every 100 people who inject drugs per year by 2030. If a country meets these targets, the WHO will validate that the HCV epidemic has been eliminated.

As was the case since the beginning of the HIV epidemic in the 1980s, major strides have been made in curbing the burgeoning epidemics mentioned earlier thanks to the tireless work of committed researchers, policymakers, healthcare practitioners, people who inject drugs, and advocates. However, political will is often lacking, which prevents access to essential, evidence-based services. The result is that there is still a high burden of preventable morbidity related to injection drug use and many people continue to lose their lives unnecessarily.

To achieve the SDGs and address crises linked to injection drug use, it is crucial to substantially expand and implement services for people who inject drugs – known as harm reduction programs – globally. This will only be possible with significant political support.
Needle and syringe programs

NSP provide sterile needles and syringes to people who inject drugs via an exchange (exchanging used equipment for new/sterile equipment) or distribution service (access to new/sterile equipment without the need to exchange). This aims to prevent harms of unsafe injection practices, such as abscesses and nerve damage or infection with HIV and other blood-borne viruses including hepatitis C and B.

Opioid agonist therapy

OAT involves providing prescription opioids such as methadone, buprenorphine or buprenorphine-naloxone as a treatment for managing opioid dependence (e.g., heroin, prescription pain medication). It works by reducing cravings and preventing withdrawal symptoms that occur if a dependent individual stops taking opioids. The documented effectiveness of OAT is so substantive that the WHO considers these treatments essential medicines.

What is harm reduction?

"Harm reduction refers to policies, programmes and practices that aim to minimise negative health, social and legal impacts associated with drug use, drug policies and drug laws."

Harm reduction is grounded in justice and human rights. It focuses on positive change and on working with people without judgement, coercion, discrimination, or requiring that people stop using drugs as a precondition of support.”

Two core components of the programs, including the two this brief focuses on, are needle and syringe programs (NSP) and opioid agonist therapy (OAT).

* According to the NGO Harm Reduction International

Harm reduction programs often also provide access to additional relevant services, such as:
- Screening, care and treatment for HIV, viral hepatitis, and sexually transmitted diseases
- Vaccinations
- Education on safer sex and injection practices
- Primary healthcare
- Mental health services
- Legal advice
- Other medical treatments
- Referrals to other harm reduction and social services (e.g. housing)

Other harm reduction programs include:
- Drug consumption rooms or supervised injecting facilities
- Drug-checking services
- Second-line treatments such as injectable OAT (e.g. heroin-assisted treatment)
- Take-home naloxone
- Distribution of drug use equipment
Harm reduction programs reduce the risks associated with injection drug use

Many studies have demonstrated the effectiveness of both NSP and OAT individually in reducing the harms associated with drug use. However, we need a stronger evidence base, particularly to show the effectiveness of NSP on various outcomes to inform guidelines.

OAT is considered the ‘gold standard’ approach for treating opioid use disorder; it has been shown to help reduce injection drug use, all-cause mortality, and fatal and non-fatal overdoses, increase engagement with care, and lead to reduced criminal activity.

NSPs have been found to reduce needle sharing and other risky injection behaviors, and life-threatening bacterial and fungal infections, increase the safe disposal of used syringes and improve linkage to substance use disorder treatment. Moreover, research has shown that NSP and OAT prevent new HIV and HCV infections.

Importantly, in terms of value for money, no single harm reduction approach alone is sufficient. Evidence suggests that comprehensive strategies are more effective when combined together and can be cost-saving in the long term.

Lack of studies undermines the potential of dual engagement with OAT and NSP programs

Some countries offer no harm reduction services, or only provide NSP or OAT, due to lack of funds, political will or knowledge. There is limited evidence of the combined effect of these harm reduction programs on HIV and HCV infection rates. This lack of evidence may be limiting access to NSP and OAT, thereby hindering the achievement of WHO and UNAIDS’ HIV and viral hepatitis elimination targets.

In an ideal scenario, we would conduct a randomized controlled trial – the gold standard of scientific research – to establish a clear cause-and-effect link. However, the benefits of these interventions in improving overall health outcomes of people who inject drugs, such as reducing opioid cravings, are widely recognized, including by organizations like the WHO, making it unethical to include an intervention group without access to these programs.
Strengthening the quality of evidence by emulating a target trial

With robust data from three countries at our disposal, we set out to strengthen the evidence base for the combined effect of these harm reduction programs on HIV and HCV acquisition. To do this, we carried out a novel emulated trial, which is a more affordable and ethical alternative to a randomized controlled trial. Our rigorous study design enabled us to better understand the potential benefits of harm reduction programs.

Using data from early adopters of harm reduction programs: The Netherlands, Australia and Canada

Amsterdam, Melbourne and Vancouver are cities in high-income countries where universal healthcare is available. They are also considered some of the earliest adopters of harm reduction programs for people who inject drugs. This has resulted in these programs having good coverage rates, based on 2017 estimates: the OAT and NSP coverage rates are high in Australia and the Netherlands and moderate in Canada (though arguably high in Vancouver).

We chose these cities for the study based on three key factors: diverging HIV and HCV epidemics, high-quality longitudinal data, and adequate access and coverage of harm reduction programs. While we aimed to include data from Eastern Europe or Asia, we could not find the required data to conduct similar analyses.

Although Amsterdam, Melbourne and Vancouver were early adopters of harm reduction programs, the cities diverged in their approaches to drug use and the related HIV and HCV epidemics. In this section, we briefly look at the historical context of each city, as well as the similarities and differences in their approaches to harm reduction and the HIV and viral hepatitis epidemics among people who inject drugs.
Amsterdam, The Netherlands

There has been a population who inject drugs in Amsterdam since heroin was introduced in the early 1970s. In conjunction with rising heroin use, sexually transmitted infections and crime also increased. To manage these crises and minimize the harm from drug use, Amsterdam adopted a harm reduction approach in the 1970s, which included providing methadone as OAT.

Over the next couple of years, these services expanded to include a mobile clinic known as ‘the methadone bus’ in 1979, the world’s first needle/syringe exchange service program in 1984, and drug consumption rooms in 1998, among other services.

While drugs are not decriminalized in the Netherlands, the Opium Law means individuals are not prosecuted if they are caught with small amounts of certain illegal drugs, for example, one ecstasy pill.

Multiple agencies have provided free harm reduction programs since their inception in different locations, including prisons. There are no restrictions to accessing these programs, other than testing positive for opioids or methadone for access to OAT.

Since the start, the Dutch harm reduction approach has been characterized by universal access (hence all costs are covered by the Dutch government). This universal access has been made possible by the legality of the program, which means participants do not risk prosecution.

Harm reduction funding in the Netherlands has not been dependent on the ruling party and may therefore be less threatened by a lack of political will. In addition, harm reduction services in Amsterdam are provided within an integrated care model, offering OAT, NSP, legal advice, mental health, sexual health, infection-related and primary healthcare, and referral to other social services such as housing in one facility.

The implementation of these client-centered, low-threshold harm reduction services early on in the era of injection drug use has served as a model for other countries. The pragmatic and person-centered approach to the heroin crisis taken by the Dutch government and health services, in close collaboration with the local police, is in stark contrast with the ‘war on drugs’ approach implemented in other settings, which is often linked to more arrests and imprisonments.

In Amsterdam, injection drug use and overdose deaths have dramatically decreased over the past three decades, and HIV and hepatitis C transmission among people who inject drugs has largely stopped. The current population of individuals who ever injected drugs is ageing, and few in Amsterdam are known to initiate injection drug use today.
NSPs are widely available across Australia and coverage is high, with no restrictions or fees for people who inject drugs to access NSPs.

Melbourne, Australia

In the 1960s and 1970s, the recreational and dependent use of opioids grew in Australia. Methadone treatment first became available in Australia in the late 1960s, and by the early 1970s all states were using methadone treatment.

During those decades, the Australian government implemented a deterrent-based drug control strategy centered in law enforcement. Then in the mid-1980s, in response to the HIV epidemic, they implemented a harm reduction approach to drug use. This can be partly credited to the political will at the time to combat HIV and help people who injected drugs. In the 1980s and 90s, the available NSPs were small and not well funded.

Today, these programs are widely available across Australia, particularly in urban areas. Coverage is high, exceeding the UNAIDS cut-off definition of high needle/syringe coverage (i.e., >200 needles/syringes per person who inject drugs per year), although the implementation and coverage of NSP programs has differed by jurisdiction over time. There are currently no restrictions or fees for people who inject drugs to access NSPs.

Although OAT has been available since the 1960s, it was not widely accessible until the mid-1990s. The availability of heroin increased rapidly during the 1990s, with a concomitant increase in overdose deaths; NSP and OAT were scaled up in response, including mobile clinics. This heroin ‘glut’ ended abruptly at the end of 2000/early 2001; supply has been variable since then, though it has been increasing in recent years.

Coverage of OAT is currently high in the state of Victoria (capital: Melbourne), but it seems to have plateaued at around 15,000 people in treatment. Moreover, individuals are only able to access their OAT daily through pharmacies after physician prescriptions – within a relatively narrow and diminishing prescribing base – and this means people incur dispensing costs. For some individuals this fee may act as a barrier to accessing treatment.

The number of new HIV cases among people who inject drugs in Victoria and in Australia has been low and stable (less than 2% prevalence in people who inject drugs) since the start of the HIV epidemic. While there is some evidence of a decline in the number of new HCV cases among people who inject drugs, transmission is ongoing.

Overdose mortality in Australia has continued to increase in the past decade and has been linked to prescription opioids and stimulant use. The population who inject drugs in Australia is ageing, but people are still starting to use injection drugs, albeit relatively few.
Harm reduction was introduced in Vancouver to save lives and prevent HIV infection.

**Vancouver, Canada**

Similar to the Netherlands and Australia, opioid use in Canada rose in the 1960s and 70s. Canada’s initial response involved a prohibitionist approach towards drugs, criminalizing their use in line with the United States’ policies on the war against drugs. Despite this, methadone was introduced in the 1960s as OAT.

In response to the HIV epidemic and rising overdose deaths among people who inject drugs, Canada pioneered a harm reduction approach in the late 1980s. Further, North America’s first Supervised Injection Site opened in Vancouver in 2003.

However, similar to Australia, Canada’s drug policy and harm reduction approach have often been contentious, influenced by the political party in power in each province influencing the legality and funding of harm reduction programs. This clearly demonstrates the importance of political will.

The current drug policy landscape recently changed in the province of British Columbia. In 2023, a three-year trial period started, during which small amounts of certain illegal drugs for personal use have been decriminalized to address drug use as a health issue rather than a criminal one.

The first Canadian needle and syringe exchange program was introduced in Vancouver in 1988. Initially, the NSP in Vancouver was centralized with limited opening hours and a one-to-one exchange service. After 2000, the infrastructure for harm reduction services was expanded considerably, and the NSP was decentralized in Vancouver.

The NSP also changed from being an exchange to a distribution service, which facilitated access and led to a significant decrease in needle/syringe sharing. People expected this to result in fewer needles/syringes being returned to NSPs, but the number did not change, despite return no longer being obligatory. Furthermore, similar to Melbourne, needle/syringe disposal containers were placed in many locations frequented by people who inject drugs, and the number of needles/syringes found on the streets decreased significantly.

Currently, NSP coverage is high across Vancouver, and it is provided by multiple agencies and outreach services. OAT is essentially free for those on welfare and there are some fees for others. In the past, methadone dispensation was only available through pharmacies, but now access is more flexible and often integrated with other health and harm reduction services, such as outreach mobile clinics, although a prescription is still required.

The estimated number of people who inject drugs in British Columbia increased by 30% between 2011 and 2016. Since 2012, deaths from drug toxicity have increased significantly due to the unregulated supply of potent illicit synthetic opioids like fentanyl.

New HIV and HCV cases have decreased significantly in British Columbia, although the rate of new HCV cases specifically among people who inject drugs is currently unknown.

**Needle/syringe disposal container at Dunlevy and Gore back alley**

**Insite, supervised injection facility. Photo credit: Vancouver Coastal Health Authority**
What do we know about injection drug use and HIV and hepatitis C infections in Amsterdam, Melbourne and Vancouver?

**Amsterdam**
- **Inhabitants**: 882,633 in 2022
- **People who currently inject drugs**: No recent data
- **People with a history of injection drug use**: No recent data

**Melbourne**
- **Inhabitants**: 5,151,000 in 2022
- **People who currently inject drugs**: 22,000 in 2014, in Victoria
- **People with a history of injection drug use**: No recent data

**Vancouver**
- **Inhabitants**: 2,842,720 in 2022
- **People who currently inject drugs**: No recent data
- **People with a history of injection drug use**: 12,900 in 2015

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Population and incidence

*People who currently inject drugs = those reporting at least one episode of injection drug use in the past 12 months

**Recent data = from the past decade, since 2012**
Timeline of harm reduction programs

1960: Introduction of opioid agonist therapy program

1970: Introduction of needle & syringe program

1980: Access to heroin-assisted treatment

1990: Official introduction of drug consumption rooms

2000: Introduction of take-home naloxone

2010: Proposed after feasibility study in 1996 but vetoed by prime minister

2020: Included in the injectable OAT guidelines in 2017 but has not been widely accessible

Not introduced because of limited overdoses and thus limited demand

- Amsterdam
- Melbourne
- Vancouver
What is comprehensive engagement?

Comprehensive engagement is defined as 100% coverage of NSP and current OAT among people who inject drugs reporting recent injection drug use, or current OAT only when reporting no current injection drug use.

Risk of virus acquisition

- **HIV**: 41% lower
  - Based on data from Amsterdam and Vancouver

- **HCV**: 76% lower
  - Based on data from Amsterdam, Vancouver and Melbourne

- **HBV**: 72% lower
  - Based on data from Amsterdam only

What is no or partial engagement?

No or partial engagement is defined as no participation or suboptimal utilization of harm reduction programs (defined as <100% NSP coverage and/or no current OAT) among people who inject drugs reporting recent injection drug use.

Dual engagement with OAT and NSP has the biggest impact on the HIV and viral hepatitis epidemics

We collated data on individuals who injected drugs from three longstanding cohort studies: Amsterdam (between 1985 and 2014), in Vancouver (between 1996 and 2009), and Melbourne (between 2010 and 2021). We selected individuals who were at risk of infection with HIV, hepatitis C or hepatitis B (the lattermost for Amsterdam data only). We then split the participants into two groups based on how much they engaged in harm reduction programs.

The first group engaged comprehensively in harm reduction programs – ‘comprehensive engagement’ – while the second group engaged little or not at all – ‘no or partial engagement’. When compared with no or partial engagement in these programs, those who engaged fully experienced notable benefits.

Read the full articles:
- Van Santen et al. Addiction 2021
- Van Santen et al. Addiction 2023
Infection and overdose trends

Over the last two decades, new HIV cases have decreased in these three cities among people who inject drugs, and HCV continues to decline in Melbourne and Amsterdam. The decreasing HIV and viral hepatitis infections over time in cities that pioneered the harm reduction approach can be attributed to their early implementation and high coverage of harm reduction services, as evidenced by the study described in the previous section.

However, there is still cause for concern. Overdose death rates vary across the cities:

- In Vancouver and Melbourne, overdose rates have been increasing over the past decade.

Future studies using an emulated trial design could address important questions to inform policy and practice where gaps in knowledge remain. For example, what is the effect of other harm reduction programs, such as drug consumptions room, on infection risk? And what is the effect of comprehensive OAT and NSP engagement on preventing deaths?
The way forward: emphasizing access to comprehensive NSP and OAT rather than each component separately

This is the first study of its kind to use methodology that gets us as close as possible to a randomized trial evaluating the dual impact of NSP and OAT on infection outcomes.

By conducting this research across three diverse contexts, we now have the knowledge and tools to prevent potential outbreaks associated with injection drug use and the lack of harm reduction services.

When we combine our findings with the established evidence base for the outcomes of NSPs and OAT (as illustrated in the Venn diagram on the right), it is clear that these programs play an essential role in any public health response.

Given that most countries lack access to comprehensive NSP/OAT, and it is unlikely that HCV and HIV will be eliminated globally by 2030, increased coverage of both key interventions worldwide will be vital to prevent new infections and outbreaks.

Increased coverage of NSP and OAT worldwide will be vital to prevent new infections and outbreaks.

Opioid agonist therapy (OAT)
- Reduce criminal activity
- Increase engagement in HIV care
- Reduce frequency of injecting
- Reduce deaths, including overdose and non-fatal overdose
- Improve social inclusion

Combined NSP + OAT
- Reduce injection risk behaviour such as needle sharing
- Increase engagement in care
- Reduce new HIV, HCV and HBV infections
- Save costs in the long term

Needle and syringe programs (NSP)
- Increase safe disposal of syringes
To understand, track, combat and prevent epidemics such as HIV and HCV, it is essential to monitor the number of new cases of infectious diseases in the population over time by collecting quality data through studies and surveillance systems. This enables practitioners, policy makers and leaders to define the problem and provide targeted, evidence-based solutions. Including data on the intervention of interest allows stakeholders to assess the effectiveness of interventions. In many of the low- and middle-income countries most affected by these infectious disease epidemics, such data is lacking. We were therefore not able to include these countries in our study and provide evidence for their settings.

However, our research highlighted in this policy brief provides a blueprint for evaluating the effectiveness of harm reduction programs in different settings without having to implement an expensive and time-consuming randomized controlled trial. Regardless of the location, collecting high-quality longitudinal data on core indicators, such as HIV and hepatitis test results, will enhance understanding of the population you are trying to serve and help to target interventions where the need is greatest and where they are most likely to make a positive impact.
Implement a one-stop shop prevention and care model with minimal entry requirements

An integrated healthcare model is ideal for providing the range of care people who inject drugs often need. An example is the integrated care facility in Amsterdam that provides harm reduction services as well as mental, sexual, infection-related and general healthcare for people who inject drugs, all in one facility. This is often referred to as a one-stop-shop prevention and care model. However, access is key: neglecting to implement low-threshold access plans negates the benefits of providing the programs in the first place.

Barriers to access, such as waiting lists, compulsory urine screening and non-bundled testing or treatment services, make people less likely to seek and remain in care. The universal access harm reduction programs instituted in Amsterdam are a great example.

Another example is the switch from an exchange to distribution needle/syringe model in Vancouver in the early 2000s, which resulted in similar exchange rates while decreasing needle/syringe sharing and reducing the risk of blood-borne infection. A low-threshold integrated prevention and care model increases the uptake and coverage of these services.

Meet the many needs of people who inject drugs: provide holistic care and support

Provide holistic support to people who inject drugs. Holistic support equates to comprehensive harm reduction programs that meet the many needs of people who inject drugs. At the very least, such programs include OAT and NSP, and they can also include drug consumption rooms, drug testing and heroin-assisted treatment.

With programs like this, countries can meet the needs of people who inject drugs by connecting them to essential healthcare, including preventive measures for sexually transmitted infections, such as condoms and HIV pre-exposure prophylaxis (PrEP), housing, and other services.

Meet people where they are: provide harm reduction to undeserved key populations via outreach services

An essential principle to harm reduction is “meeting people where they are.” Gaps in care act as severe barriers to the maintenance of these lifesaving treatments and prevention strategies. Wherever they are provided – in shelters, including those specifically for undocumented migrants, unhoused people’s encampments, jails, prisons – outreach services such as mobile clinics with OAT and NSPs bridge the gap in access that many individuals who inject drugs face.

By meeting people where they are, it is possible to reach those who are medically underserved and would otherwise not access regular healthcare. This makes it possible to provide tools and skills to prevent HIV and other infectious diseases in their community and beyond.

Ensure ready access to both OAT and NSP

Harm reduction services must be provided as a package rather than as separate interventions. This means providing them in the same location or ensuring both services are accessible. We have robust evidence that the biggest impact on reducing the risk of HIV and hepatitis C and B among people who inject drugs comes from people engaging with both NSP and OAT.

This supports the WHO recommendation that, in addition to NSP and OAT, key components of a comprehensive harm reduction program include prevention, diagnosis and treatment of HIV, tuberculosis and viral hepatitis by facilitating testing and counselling, provision of condoms, and hepatitis B vaccination.

Key recommendations for implementing harm reduction programs


45. The Centre for Global Public Health University of Manitoba. Estimation of Key Population Size of People who Use Injection Drugs (PWID), Men who Have Sex with Men (MSM) and Sex Workers (SW) who are At Risk of Acquiring HIV and Hepatitis C in the Five Health Regions of the Province of British Columbia, 2018.
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