September 2023

Expedited Evidence *in* Context

Health evidence attuned for use in Newfoundland and Labrador by the Contextualized Health Research Synthesis Program

Preventing Infections Associated with Opioid Use

Sarah Mackey, Sarah Mallay, Richard Audas

Newfoundland & Labrador Centre for
APPLIED
HEALTH
RESEARCH
www.nlcahr.mun.ca

Find CHRSP Reports Online

All reports of the Contextualized Health Research Synthesis program are available online:
www.nlcahr.mun.ca/chrsp/

For further information please contact: nlcahr@mun.ca

Cite as: Mackey, S., Mallay, S., Audas, R. (2023). Preventing Infections Associated with Opioid Use. St. John's, NL: Newfoundland & Labrador Centre for Applied Health Research, Memorial University

ISBN: 978-0-88901-510-4

Contents

About This Report

About NLCAHR

The Newfoundland and Labrador Centre for Applied Health Research, established in 1999, contributes to the effectiveness of the health and community services system of the province and the physical, social, and psychological well-being of the population. NLCAHR accomplishes this mandate by building capacity in applied health research, supporting high quality research, and fostering more effective use of research evidence by decision makers and policy makers in provincial health and community systems.

About the Contextualized Health Research Synthesis Program

In 2007, NLCAHR launched the Contextualized Health Research Synthesis Program (CHRSP) to provide research evidence that would help guide decision makers in the provincial health system on issues of pressing interest to Newfoundland and Labrador. Instead of conducting original research, CHRSP analyzes findings from high level research already conducted in the subject area, such as systematic reviews, meta-analyses, and health technology assessments. Findings are then synthesized and subjected to a systematic process of contextualization: they are analyzed in terms of their applicability to the conditions and capacities of the unique context of Newfoundland and Labrador.

For special cases, the CHRSP Team at NLCAHR has developed alternative approaches to addressing decision makers' needs for decision support on topics of pressing interest. One alternative approach is this study—an *Expedited Evidence in Context Report*. This expedited report differs from a standard CHRSP *Evidence in Context* report in that the end-product is based on the synthesized evidence from a single systematic review of systematic reviews; it did not require CHRSP researchers to synthesize the body of evidence. The synthesis findings from a single overview or umbrella review were summarized and subjected to a systematic process of 'contextualization' through which they were analyzed in terms of their applicability to the unique context of Newfoundland and Labrador.

Our contextual analysis includes assessing the specific forms an issue may take in this province as well as the applicability of any proposed solutions and methods to locally available resources, infrastructure, human resources, cultural conditions, and financial capacities. CHRSP uses a combination of external experts and local networks to carry out and contextualize the evidence and to facilitate the uptake of the results by research users.

Who Should Read This Report?

This report is intended to support decision makers working in Newfoundland and Labrador's health and community services system, including partners in community, NL Health Services, the Department of Health and Community Services, and the Department of Children, Seniors and Social Development. The findings of this *Expedited Evidence in Context* Report are based on a systematic review of systematic reviews titled "The effectiveness of interventions for the prevention of common infections among opioid users" by Puzhko et al (1). We have interpreted these findings specifically for the context of Newfoundland and Labrador and they may also be applicable to other jurisdictions in Canada and elsewhere. The report includes explanations of research terms and technical language so that there is no need to have a specialized medical or health background in order to understand its content.

The Research Team

Preventing Infections Associated with Opioid Use

Report Authors:

Richard Audas, Ph.D.
Director
NL Centre for Applied Health Research
(CHRSP Program Director)

Sarah Mackey, MPH
CHRSP Research Officer & CHRSP Patient Engagement Coordinator
NL Centre for Applied Health Research
(CHRSP Project Coordinator)

Sarah Mallay, MPH
CHRSP Research Officer
NL Centre for Applied Health Research
(former CHRSP Research Officer)

CHRSP Special Context Advisors

Jane Henderson B.A., B.Ed., M.A
Provincial Harm Reduction Consultant
NL Centre on Substance Use
Mental Health and Addictions Prevention and Promotion Services (NL Health Services - Eastern Region)

Wayne Bishop
Program Manager
NL Centre on Substance Use
Mental Health and Addictions Prevention and Promotion Services (NL Health Services - Eastern Region)

Peter Daley MD, M.Sc., FRCPC, DTM+H
Associate Professor of Medicine, Memorial University
Infectious Diseases Physician, Newfoundland and Labrador Health Services

Advisors & Consultants

- Debbie Curtis, Mental Health and Addictions Consultant, Department of Health and Community Services, Government of Newfoundland and Labrador
- Focus Group of the NLCAHR Research Exchange Group on Harm Reduction

Acronyms

CHRSP	Contextualized Health Research Synthesis Program
HIV	Human Immunodeficiency Virus
HCV	Hepatitis C Virus
IE	Infective Endocarditis
NL	Newfoundland & Labrador
NLCAHR	Newfoundland and Labrador Centre for Applied Health Research
OAT	Opioid Agonist Therapy
ODT	Opioid Dependence Treatment
OUAIs	Opioid Use-Associated Infections
OUD	Opioid Use Disorder
NSDP	Needle and Syringe Distribution Programs
PICOS	Population, Intervention, Comparator, Outcome, Setting
PWID	People Who Inject Drugs
PWIO	People Who Inject Opioids
SR	Systematic Review
SR of SRs	Systematic Review of Systematic Reviews
STBBI	Sexually Transmitted and Blood-Borne Infection
SWAP	The Safe Works Access Program (SWAP) provided though the AIDS Committee of Newfoundland and Labrador.

Glossary

Behavioral Interventions	Educational sessions for needle users on skin and needle hygiene (1).
Hepatitis C	A viral infection that causes liver inflammation, primarily spread through exposure to blood containing the hepatitis C virus (e.g., by sharing or reusing needles and syringes contaminated with the virus.)
Human Immunodeficiency Virus	A virus that attacks the body's immune system that is passed on through specific contact with certain bodily fluids. HIV can be spread through sexual contact, contact with infected blood, sharing needles, syringes, or other drug injection equipment, or from mother to infant.
Infective Endocarditis	Infection of the inner lining of the heart and its valves, caused by bacteria or fungi entering the bloodstream through mucous membranes such as the mouth, open wounds, or needles. Medical procedures that involve cutting through infected skin may also cause this infection to occur.
Needle/Syringe Distribution Programs	Programs that provide new needles and injection equipment for people who inject drugs to reduce the risks of acquiring and/or transmitting blood-borne infections.
Opioid Agonist Therapy	A treatment for substance use disorder for opioid drugs such as heroin, oxycodone, hydromorphone (Dilaudid), fentanyl and Percocet. The therapy involves taking the opioid agonists methadone (Methadose) or buprenorphine (Suboxone) and may also involve prescriptions for pain management. These medications work to prevent withdrawal and reduce cravings for opioid drugs. Individuals with Opioid Use Disorder can take OAT to help stabilize their lives and to reduce the harms related to their drug use. The therapy is usually most effective when combined with counselling and other mental health/behavioural supports.
Systematic Review	A literature review, focused on a specific and explicit research question that applies a systematic methodology to identify, appraise, select, and synthesize published and unpublished research evidence relevant to that question.
Systematic Review of Systematic Reviews	A type of study methodology that reviews systematic reviews or meta-analyses as the main study type. It is a comprehensive review of the highest level evidence that has been synthesized by systematic reviews.

The CHRSP Approach to Health Evidence

What is Health Evidence? Health evidence comes in a variety of forms that depend on the methodology of the research and other factors. Researchers may use quantitative (collecting, analyzing and interpreting numerical data), qualitative (collecting, analyzing, and interpreting non-numerical data) or mixed-methods approaches (a combination of quantitative and qualitative methods). The methodological rigour of a given study will have an impact on the reliability and generalizability of the results.

The most reliable form of health evidence to inform healthcare decision making is the systematic review. A systematic review uses systematic and reproducible methods to identify, select and critically appraise numerous primary studies on a given topic. The authors collect and analyze data from the studies that are included in the review to answer a focused research question. CHRSP focuses on this high-level category of health evidence, taking the results from multiple systematic reviews into consideration.

Locating, Assessing, and Synthesizing Evidence: CHRSP researchers, working with a health sciences librarian, devise an appropriate search strategy and conduct rigorous electronic and hand searches of periodical indices and databases to locate relevant health evidence which will include high-level research (systematic reviews, meta-analyses, and health technology assessments) and high-quality primary studies that were published too recently to have been included in the review literature. Evidence may also include relevant unpublished literature, government documents, etc. known as "grey literature."

For this *Expedited Evidence in Context Report*, CHRSP is reporting findings from a single overview, which is a review of systematic reviews, or “umbrella review” for which the authors have located and synthesized the systematic review literature on the topic. Having found work that duplicates the CHRSP approach to evidence synthesis, CHRSP was able to expedite the report by relying on a single publication. The methodology for the subject umbrella review is described in this report.

Setting the Evidence in Context: Once we have assessed what the evidence has to say about “what works,” CHRSP asks a further question: “Would that work *here*?” recognizing that local contextual variables must also be considered when making decisions in healthcare. Contextual factors may increase or decrease the positive health impacts or cost-effectiveness of an intervention that was reported in the research literature. These variations in effectiveness result from differences between the research settings and local conditions in Newfoundland and Labrador. For instance, interventions that work well in urban centres with a large number of specialists and adequate health human resources may not translate well into a rural Newfoundland setting where access to specialized care is limited. The CHRSP Project Team therefore tailors its syntheses to the local context at every stage of its projects. Key contextual considerations may include: patient populations, sites of service and/or the service design, health human resources, organization and delivery of services, health economics, and politics.

Interpreting the Evidence: Once the literature has been located, assessed, synthesized, and contextualized, the CHRSP Project Team will then develop a summary of considerations for decision makers to think about when applying the evidence for use in Newfoundland & Labrador. CHRSP recognizes that the research evidence is one of several factors that health system decision makers need to consider when they make decisions; therefore, our reports present key issues for decision makers to *consider* as opposed to making any assertions about which options they should *choose*.

Research Objective: *Expedited* Evidence in Context

This research project seeks to identify and contextualize evidence for interventions that will prevent infections associated with opioid use among people who inject opioids or other substances in Newfoundland and Labrador. In their initial search for evidence on this topic, CHRSP researchers located a knowledge synthesis that replicated the CHRSP approach to evidence gathering (i.e., a systematic review of systematic reviews, sometimes referred to as an "umbrella review"). This report aims to summarize the evidence from this high-level umbrella review: "*The Effectiveness of Interventions for the Prevention of Common Infections Among Opioid Users*"(1) and to place that evidence in context for decision makers in Newfoundland and Labrador. Key messages from this synthesis formed the basis for a contextualization exercise to uncover local factors that may affect the feasibility, acceptability, and issues of equity when employing recommended interventions.

Key Findings from the Evidence

DEFINING THE INTERVENTIONS:

- **Opioid Agonist Therapy (OAT)** is a treatment for substance use disorder associated with opioid drugs such as heroin, oxycodone, hydromorphone (Dilaudid), fentanyl and Percocet. OAT is a safe and effective medication-based treatment that involves taking the opioid agonist medications such as methadone (Methadose) or buprenorphine (Suboxone) and may also involve prescriptions for pain management. These medications are aimed to prevent withdrawal and reduce cravings for opioid drugs. The therapy is generally most effective when combined with counselling (2).

- **Needle and Syringe Distribution Programs (NSDP)** provide new needles and injection equipment for people who inject drugs to reduce the risks of acquiring and/or transmitting blood-borne infections.

WHAT THE RESEARCH SAYS:

After a thorough examination of available systematic review evidence in 2022, authors of the Puzhko study concluded the following key findings from the evidence for the effectiveness of interventions to prevent common infections associated with opioid use:

- There is sufficient[1] evidence for the effectiveness of opioid agonist therapy to prevent human immunodeficiency virus (HIV).

- There is sufficient evidence for the effectiveness of opioid agonist therapy combined with needle and syringe distribution programs to prevent hepatitis C virus (HCV).

[1] Puzhko et al. identified 'sufficient', 'tentative', 'insufficient' or 'no' Systematic Review (SR) evidence based on a number of factors such as clarity of evidence, consistency of evidence, quality of evidence, and whether evidence came from a high-quality core SR or a lower quality supplementary SR. For more details on how the authors assessed and categorized the quality of the evidence, please see Appendix 5 in Puzhko et al (1,3,4).

- There is tentative evidence for the effectiveness of opioid agonist therapy to prevent HCV.
- There is tentative evidence for the effectiveness of needle and syringe distribution programs to prevent HIV.
- There is a lack of evidence regarding interventions to prevent infections other than HCV and HIV (e.g., such as skin infections [soft tissue abscesses, cellulitis], bone infections [osteomyelitis], or fungal infections in persons who inject opioids).
- There is a lack of evidence regarding interventions that target users of pharmaceutical opioids in legal and mixed opioid contexts (e.g., individuals with chronic pain conditions/populations with multiple comorbidities) (1).

Placing the Evidence in Context

A series of key informant interviews and focus groups uncovered the following key contextual factors for decision makers to consider when applying the evidence for use here in Newfoundland and Labrador.

- Our contextual advisers told us that opioid use-associated infections are a growing problem in NL and that these infections are very expensive to treat. Preventing infections associated with opioid use is therefore an important consideration in this province in terms of both its human and economic costs.

- Consultants agreed that opioid agonist therapy, needle and syringe distribution or the two in combination would work to prevent HIV and HCV infection associated with opioid use in NL. They noted that, although these evidence-based interventions are available in the province from a variety of service providers in healthcare, community, and pharmacy settings, they are not applied widely enough in NL.

- Even with the availability of evidence-supported interventions, our consultants reported seeing increased harms related to needle use, including associated infections.

- Our consultants identified service gaps in opioid agonist therapy, noting that hospitalized inpatients, patients presenting in Emergency Departments, incarcerated individuals, and those in remote or rural areas may face challenges accessing OAT or NSDP. Consultants suggested that adjusting or advancing harm reduction policies at these sites could help improve the uptake of OAT and NSDP in NL, and reduce opioid use-associated infections.

- Decision makers may wish to consider opportunities for improving service quality and delivery for people who use drugs by:
    - developing and increasing Harm Reduction education, competency development, policy, and practice guidelines for physicians, nurse practitioners, pharmacists, and other healthcare professionals which would include the provision of OAT in their practice settings;
    - ensuring better continuity of care for people who use drugs across the health and community services continuum (including settings such as the ER/hospital and corrections);

  - building on the success of the AIDS Committee of NL Safe Works Access Program (SWAP) including support for SWAP satellite sites, mailbox supplies, and Brown Bag Programs, with sustained funding for SWAP to continue its work and to expand its programming to further increase rural access to safer supplies as well as providing anonymous supplies;
  - providing confidential, easy access to HIV and HCV testing services to support uptake of testing and other related preventive services.

- Decision makers, government, health system, and community partners working in this area are urged to consult regularly with people with lived experience and their caregivers to gain a more accurate understanding of ways to improve service organization and care delivery across the province.

- Improved quality, collection, and availability of provincial data about patient populations and injection-associated infections is necessary for planning appropriate interventions to prevent infections among people who use drugs. In particular, expanding the collection of data beyond the scope of opioid use would help capture more specific information about people who inject substances. This information could help inform improvements in opioid agonist therapy as well as needle and syringe distribution programs to prevent infections. These types of improvements in data collection and management noted by consultants align strongly with current health system reforms to create a more responsive Learning Health and Social System through improved collection and analysis of patient data to support decision-making.

- According to consultants, many common misconceptions persist among people who use drugs and their care providers when it comes to hepatitis C prevention, testing, and treatment. Of particular concern are the undiagnosed cases of HCV among those who inject drugs. A recent survey of people who inject drugs in NL showed approximately 50.0% of people who inject drugs were HCV positive and among those that were HCV positive, 70.2 % of participants were not aware of their current HCV positive status (5). The implication of these findings further supports the case for needle and syringe distribution programs to prevent HCV.

- There is a widespread need for increased awareness and education on the risks of injection drug use, on ways to prevent infections, and on how to access testing for sexually transmitted and blood-borne infections (STBBIs). This need for education extends not only to people who use drugs but also to healthcare providers and community organizations. Examples of recommended awareness and education campaigns include a focus on:
  - risks associated with injection drug use;
  - preventing and treating infections;
  - decreasing/challenging stigma; and
  - improving understanding of, and access to, available supports and services.

How to Navigate this Report

Background: describes the rationale for conducting this study and the research approach.

Part 1: The Evidence: includes a summary of evidence from a systematic review of systematic reviews on the effectiveness of interventions for the prevention of human immunodeficiency virus (HIV), hepatitis C (HCV) and other infections among opioid users by Puzhko et al (1).

Part 2: The NL Context: involves interpreting and attuning the main findings from this high-level knowledge synthesis to uncover the local contextual factors that may affect the feasibility, acceptability, and issues of equity when employing interventions for the prevention of opioid use-associated infections (OUAIs) among people who inject drugs in Newfoundland and Labrador.

Background

An increasing number of people inject drugs in Canada. High-risk practices associated with injection drug use, such as the reuse and sharing of injection equipment, place these individuals at risk of acquiring viral infections such as hepatitis C virus (HCV), and human immunodeficiency virus (HIV), as well as increasing the risk of acquiring bacterial infections such as infective endocarditis (6). From 2017 to 2019, the Public Health Agency of Canada Tracks Survey of people who inject drugs collected data in 14 sentinel sites across Canada in an effort to describe the prevalence of HIV and HCV and associated risk behaviours, and to examine trends over time. National findings reported that 10.3% of survey participants were HIV positive. Testing for hepatitis C antibodies revealed that 64.2% of participants were testing positive for hepatitis C antibodies (measure of lifetime exposure of HCV) and 36.9% showed indication of current HCV infection (7). People who inject drugs (PWID) have been shown to be a priority population disproportionately impacted by HCV. Further national HCV estimates published in 2022 show that, when compared to the general population and other priority populations,[2] PWID have the highest HCV prevalence, the highest prevalence rate of chronic HCV infection and second highest proportion of those who were undiagnosed/unaware of being HCV positive (8). As well, a recent retrospective cohort study from New Brunswick

An increasing number of people inject drugs in Canada. High-risk practices associated with injection drug use, such as the reuse and sharing of injection equipment, place these individuals at risk of acquiring viral infections such as hepatitis C virus (HCV), and human immunodeficiency virus (HIV), as well as increasing the risk of acquiring bacterial infections such as infective endocarditis.

[2] The other priority populations for national HCV estimates include: People who inject drugs (PWID), adults in the 1945–1975 birth cohort, immigrant populations, Indigenous peoples (First Nations, Inuit and Métis), gay, bisexual and other men who have sex with men (gbMSM) and people who are incarcerated (PWAI) in federal and provincial prisons (8).

examined patients admitted to a tertiary care centre and found that infective endocarditis associated with injection drug use was common, was associated with high mortality, and may be increasing over time (9).

In 2022, recognizing the high risk of infection associated with injection drug use, CHRSP's partners in the provincial healthcare system prioritized the prevention of infections associated with opioid use among adults who inject opioids as a topic of study. When initiating this project, CHRSP researchers searched the published literature to locate high-level research studies that addressed this topic. The results of this search found several directly relevant and high-quality knowledge syntheses. One study in particular, by Puzhko et al., was of high relevance and also synthesized a number of systematic reviews (1).

In 2022, recognizing the high risk of infection associated with injection drug use, CHRSP's partners in the provincial healthcare system prioritized the prevention of infections associated with opioid use among adults who inject opioids as a topic of study.

Research Approach: An *Expedited Evidence in Context* Report

When the CHRSP team consulted with health system partners and local expert advisers about the approach for this study, we agreed on the *Expedited Evidence in Context* approach. Whereas a typical CHRSP *Evidence in Context* study would be based on our own synthesis of multiple systematic reviews and recent primary research studies, this expedited approach is based on contextualizing an existing evidence synthesis— a systematic review of systematic reviews or umbrella review— selected in consultation with our health system partners.

For this project, findings from a comprehensive evidence synthesis "The Effectiveness of Interventions for the Prevention of Common Infections Among Opioid Users" by Puzhko et al. formed the basis for a contextualization project that explored factors that might have an impact on potential equity, feasibility, and acceptability of interventions for the prevention of opioid use-associated infections among people who inject drugs in Newfoundland and Labrador (1).

PART 1: THE EVIDENCE

Summary of the Knowledge Synthesis

The following is a summary of the research methods and synthesis findings from "The Effectiveness of Interventions for the Prevention of Common Infections among Opioid Users" by Puzhko et al (1). For more detail on the research methods used in this synthesis, please refer to Appendices 1, 2 and 4 of this report.

Research methods

What type of study did Puzko et al. conduct?

Given the availability of systematic reviews (SR) on the topic, the researchers opted to conduct a systematic review of systematic reviews that allowed them to examine an existing body of high-level research evidence (10).

What research question did Puzhko et al. examine?

Puzhko et al. (1) used the following research question to guide their synthesis:

> *What is the SR-level evidence on the scope and effectiveness of interventions to prevent opioid use-associated infections in adults who use legal/illegal opioids as compared to those not participating in an intervention or as compared to the time prior to the intervention implementation?*

What evidence did study authors look for?

The authors used key parameters to systematically search for, identify, and select relevant systematic reviews.[3] They selected SRs that focused on:

- Adults who use pharmacological or non-pharmacological opioids (licit or illicitly) by any route of use;
- Population based-interventions that aim to prevent acquisition and/or transmission of opioid use-associated infection (OUAI) and coinfection; and
- Outcomes demonstrating the effectiveness of interventions to prevent OUAI, e.g., infection transmission (of HIV, HCV, other), or intervention participation, or identification of knowledge gaps (1).

Research findings

What evidence did the authors find?

Ultimately, Puzhko et al. found twelve eligible systematic reviews through their searching process. These SRs examined 84 primary studies in total.

[3]Publications were considered SRs if they: 1) described methods, including a systematic search strategy and inclusion/exclusion criteria; 2) performed a comprehensive search (using all relevant databases and an exhaustive search strategy); and 3) conducted a formal quality assessment of included studies using a validated tool (10).

What are the main characteristics of the evidence included in Puzhko et al.?

The authors found that available evidence mostly focused on the effectiveness of preventive interventions against human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infections in users of non-pharmaceutical opioids (most commonly heroin) rather than on prevention of other opioid use-associated infections (OUAIs). The authors reported that "all included SRs targeted persons who inject drugs, recruited in different settings (1)."

Out of twelve SRs, eleven targeted opioid agonist therapy (OAT) and needle and syringe distribution programs (NSDP) to prevent HCV and/or HIV along with other interventions. One SR targeted interventions to prevent infective endocarditis (1).

How did the authors assess and categorize the quality of the evidence?

Puzhko et al. (1) used a systematic approach to assess and categorize systematic reviews included in their overview. This stepped approach is very similar to the CHRSP methodology for assessing the quality of SRs. Appendix 3 provides a description of CHRSP critical appraisal methods.

What are the main synthesis findings from Puzhko et al.?

After a thorough examination of systematic review evidence, Puzhko et al. (1) concluded, on the basis of their careful appraisal, that the strongest evidence[4] for the effectiveness of interventions to prevent opioid use-associated infections includes:

- sufficient evidence for the effectiveness of opioid agonist therapy to prevent HIV;
- tentative evidence for the effectiveness of opioid agonist therapy to prevent HCV;
- tentative evidence for the effectiveness of needle and syringe distribution programs to prevent HIV; and
- sufficient evidence for the effectiveness of opioid agonist therapy combined with needle and syringe distribution programs to prevent HCV.

The authors of the knowledge synthesis found insufficient evidence or a lack of evidence for all other interventions studied to support or discount their effectiveness of preventing common infections among people who inject drugs.[5] This includes insufficient evidence on the prevention of recurrent infective endocarditis for persons who inject drugs.

The authors also identified the following key knowledge gaps in the research evidence:

- There is a lack of SR level evidence regarding interventions to prevent infections other than HCV and HIV (e.g., such as skin infections [soft tissue abscesses, cellulitis], bone infections [osteomyelitis], or fungal infections in persons who inject opioids.
- There is a lack of SR level evidence regarding interventions that target users of pharmaceutical opioids in legal and mixed opioid use contexts (e.g., individuals with chronic pain conditions or populations with multiple comorbidities) (1).

[4] Puzhko et al. identified 'sufficient', 'tentative', 'insufficient' or 'no' SR-level evidence based on a number of factors such as clarity of evidence, consistency of evidence, quality of evidence, and whether evidence came from a high-quality core SR or a lower quality supplementary SR. For more details on how the authors assessed and categorized the quality of the evidence they reviewed please see Appendix 5 in Puzhko et al. (1,3,11).

[5] The authors categorized systematic review-level evidence on the effectiveness of interventions to prevent opioid use-associated infections (OUAIs) as insufficient when there was: no evidence available, insufficient evidence to support or discount the effectiveness of certain interventions, inconsistent evidence, or weak evidence (1).

PART 2: THE NL CONTEXT

The CHRSP Contextualization Process

Over the course of two focus group sessions, CHRSP researchers consulted with members of the NLCAHR Research Exchange Group on Harm Reduction, which includes provincial decision makers from healthcare and government, front-line clinicians from multiple disciplines (physicians, nurses, social workers, psychologists, etc.), people with lived experience, and representatives from various community organizations whose work and lives intersect with people who use drugs. We discussed contextual factors in Newfoundland and Labrador that could impact measures used to prevent opioid use-associated infections (OUAIs) in people who inject drugs (PWID). We also sought to gain a clearer understanding of the service landscape, the populations who avail of services within this context, and the people who may be missing out on available services and interventions.

Overall, our consultants agreed that opioid agonist therapy (OAT), and needle and syringe distribution programs (NSDP) are effective strategies to prevent OUAIs in NL. Discussions often centered on making interventions accessible to more individuals and to reducing existing barriers for PWID. Most consultants were knowledgeable of how one or both of these strategies are offered as a part of the NL service landscape. However, our consultants advised that despite the availability of these interventions, they are still seeing a worsening of the consequence of needle use in NL. Consultants conveyed the importance of increasing access to these preventive interventions in order to help reduce infection rates in this province.

In the following sections of this report, we will first review the service landscape for opioid agonist therapy, needle and syringe distribution programs, and the HIV and HCV Testing Services that are offered in NL.

We will then provide a summary of what we heard from our consultants about the local factors that impact the provision and uptake of OAT and NSDP for the prevention of infections associated with opioid use in NL.

The Service Landscape for Recommended Interventions and Testing

Opioid Agonist Therapy in Newfoundland and Labrador

Initiating Opioid Agonist Therapy for Patients in Newfoundland and Labrador

Discussions about Opioid Agonist Therapy services in this province primarily focused on the first time a patient receives treatment, commonly referred to as the initiation of OAT. In initiating this treatment, prescribers must work closely with patients to ensure that their dosage is adjusted to an optimal level. In the provision of this service in NL, our consultants conveyed the importance of accessing providers who have sufficient time to provide the initial dose and the appropriate adjustments as being critical to the success of this intervention.

The Newfoundland and Labrador Centre for Substance Use: A Provincial Hub and Spoke Model

As a part of the provincial approach to Opioid Dependence Treatment (ODT), rapid access to OAT is available through a provincial Hub and Spoke Model. Implementation of this model began with the establishment of the NL Centre for Substance Use (NLCSU), formerly known as the Opioid Dependence Treatment Centre of Excellence in 2018-2019. The Centre was initially situated in Eastern Health but is

provincial in scope with Regional Hubs that provide front-line services. NLCSU supports the implementation of the Hub and Spoke model as well as supporting other relevant areas such as:

- The implementation of evidence-informed Opioid Dependence Treatment (ODT) practices,
- Strengthening ODT performance monitoring and evaluation,
- Increasing opportunities for stakeholder collaboration,
- Enhancing harm reduction education, program, policy, and practice development, and
- Increasing opportunities for knowledge exchange and care provider development.

The Regional Hubs initiate OAT and offer virtual care and other services such as peer support, counselling and links to related services. Regional Hubs can support community-based physicians, nurse practitioners, nurses, pharmacists and counsellors upon request. Hub locations include: St. John's, Gander, Grand Falls Winsor, Corner Brook, Stephenville, and Happy Valley-Goose Bay. It is important to note that although Hubs are situated in one physical location there may be a Nurse Practitioner located elsewhere providing care throughout the region.

Consultants advised us that the Spokes of the ODT Model are still being developed throughout the province. Spoke services include physicians and Nurse Practitioners that can prescribe Suboxone or Methadone throughout the province as well as the Bell Island Opioid Treatment Clinic that opened in 2019. Data reported from the NL Pharmacy Network shows that 100 physicians and 15 Nurse Practitioners prescribed OAT in 2022. We were told that the number of patients for each prescriber varies greatly depending on the practice area. Over half of the prescribers prescribe to fewer than 5 patients (12).

Pharmacy Care

A number of pharmacists across the province are responsible for dispensing OAT. According to data collected by the NL Pharmacy Network and reported to the Department of Health and Community Services in 2022, OAT (Methadone, Suboxone, Buprenorphine) was dispensed to 3,703 people in NL. Approximately 500 of these people were treated at the regional ODT Hubs in St John's, Gander, Grand Falls, Corner Brook, Stephenville, and Happy Valley-Goose Bay. Virtual care is provided at all of the Hubs so some people may be in other locations (12).

Centers and Clinics

Our consultants advised that in addition to the Hub and Spoke model, opioid agonist therapy is available through the Harm Reduction Nursing Clinic in Eastern Health which includes a Nurse Practitioner who can prescribe OAT. Inpatient Mental Health and substance use disorder facilities also have the ability to maintain / continue OAT therapy after the initial dose has been prescribed. Initiation of the therapy is available in collaboration with Regional ODT HUB. For example, the following centers have capacity to maintain or initiate OAT for adults:

- Humberwood Treatment Centre in Western Health can maintain OAT;
- The Grace Centre in Eastern Health can maintain OAT; and
- The Recovery Centre in Eastern Health has initiation available with referral to Regional ODT Hub next door for follow-up.

Needle and Syringe Distribution Programs in Newfoundland and Labrador

Safe Works Access Program

The AIDS Committee of Newfoundland and Labrador (ACNL) offers a needle distribution service called the Safe Works Access Program (SWAP). SWAP is a health promotion and education service for people who use drugs and is the main service that consultants discussed for needle and syringe distribution in the province. SWAP provides access to the following types of supplies:

- injection (e.g., syringes, sterile water, cookers, alcohol swaps, ties, cotton filters, cooker cottons, vitamin C, and sharps bins and disposal),
- safer sex (e.g., condoms, lube, internal condoms, dental dams, pregnancy tests),
- smoking (e.g., glass pipes, foil, push sticks, plastic tubing/mouthpieces, brass screens), and
- safer use (e.g., snorting kits, injectable naloxone kits and training, drug test strips, resources and information).

Supplies are available through SWAP's main offices in St. John's and Corner Brook as well as through their mail order service. Individuals can request supplies from SWAP and have them delivered anywhere in the province at no charge (13).

As well, SWAP has partnerships with Satellite Site Organizations (i.e., sites where SWAP makes supplies available) including the Harm Reduction Nursing Clinic in Eastern Health, some of the ODT Clinics and various community organizations. Hours of operation for these sites are based on operating hours of the satellite organizations.

In addition, SWAP has partnerships with certain pharmacies for what they call a Brown Bag Program that provides pre-made supply kits (injection supplies). These are available for pick-up through participating pharmacies across the province.

SWAP also offers an Outreach Van for delivery in St. John's and Corner Brook and provides supplies for some partner mobile services such as the Rural Initiative Outreach Team in the Clarenville-Bonavista area and Good Hands RV Peer Volunteer RV needle distribution on Bell Island. A few Outdoor Mailboxes are also filled with SWAP supplies at certain locations in St. John's. Please see Appendix 5 for a recent list of Satellite Organizations, Pharmacies and Mobile Delivery locations available in the province through SWAP.

Consultants also highlighted that friends, family, those with lived experience, and peers utilized supplies from SWAP sites to distribute them to friends, family or peers, as needed.

As well, safe supplies are available at Mental Health and Substance Use Disorder Service locations and ODT Hubs sites.

According to a Needs Assessment Conducted in 2020:

> *[In the] 2017-2018 fiscal year, SWAP distributed 747,074 needles across the province. This number was a jump from years prior, with numbers ranging around 540,000-640,000 needles out. In the 2018-2019 fiscal year, this number grew slightly to 773,080. That same fiscal year, there was a 37% increase noted in the number of inhalant drug use supplies distributed by SWAP. In the latest fiscal year, ending on March 31, 2020, SWAP distributed 884,749 needles, again noting a large increase from years prior* (14).

This report also noted that an average of 250,000 used needles were collected back for the last four fiscal years from the SWAP program. Discussions amongst our consultants reiterated that the demand for supplies in the province is growing over time (14).

Opioid Agonist Therapy offered in Combination with Needle and Syringe Distribution Programs in Newfoundland and Labrador

Some consultants were unclear about how OAT is offered in combination with NSDP in the province. Officially, most Regional ODT Hubs should be able to provide access to supplies, while some primary healthcare providers would provide OAT services and refer patients to SWAP for supplies. However, some consultants commented that, in practice, the approach of offering the two interventions in combination may be inconsistent across sites depending on factors such as the location of services or the availability of new supplies. Some consultants raised concern that those availing of OAT may have to request safe supplies at the site of service rather than having the option doing this anonymously or confidentially.

HIV and HCV Testing Services in Newfoundland and Labrador

According to Regional Health Authority websites and ACNL, the main testing options for HIV and HCV or related sexually transmitted and blood-borne infections include services offered through:

- Eastern Health Sexual Health Clinic, Mount Pearl (by appointment),
- Planned Parenthood NL Sexual Health Clinic, St. John's (by appointment),
- From a healthcare provider (family doctor or nurse practitioner),
- Harm Reduction Nurses (Clinic in St. John's),
- Visit to a walk-in clinic,
- Visit to an emergency department, and
- SWAP.

ACNL also provides a list of community services and resources on its website for HIV and HCV testing and treatment locations and providers. Self-test kits are also available from ACNL for HIV screen testing within communities (15,16).

In addition, a three-year research project called the APPROACH study is offering HIV, HCV and syphilis rapid testing in some pharmacies across Newfoundland as part of a research study called: Adaptation of Point of Care Testing for Pharmacies to Reduce risk and Optimize Access to Care in HIV, Hepatitis C, and Syphilis. Participating pharmacies are located in Metro St. John's, Central and Western regions of the province. Participants are eligible to take part in this study if they are over 18 years of age, have a valid health card, and speak English (17).

Consultants mentioned that testing also occurs at correctional facilities on admission if requested by the individual.

Advisers from Central Health noted that before the pandemic, non-nominal confidential testing was offered in partnership with Public Health as a way to overcome barriers related to testing in this region of the province.

Contextual Factors in Newfoundland and Labrador

After reviewing the service landscape with our contextual consultants, we then asked them to consider how local contextual factors might affect the uptake and success of opioid agonist therapy (OAT), needle and syringe distribution programs (NSDP), and the two in combination in preventing OUAIs in the province.

By 'contextual factors' we refer to any local conditions, capacities or qualities that could have an impact on the reported effects of research evidence included in this report—such factors have the potential to enhance or to reduce the likely effectiveness, feasibility or acceptability of an intervention in the Newfoundland and Labrador context.

We asked our consultants how the following contextual factors might impact the success of OAT and NSDP to prevent OUAIs in the province:

- organization of preventive health service factors: gaps and opportunities,
- health information factors,
- site or design of service factors,
- human resources factors,
- patient/client factors,
- political factors, and
- economic factors.

Organization of Health Services: Gaps and Opportunities

The following is a summary of consultant feedback about the gaps and opportunities to coordinate or integrate opioid agonist therapy, needle and syringe distribution programs, or the two in combination as well as testing and treatment for infections associated with opioid use in Newfoundland and Labrador.

Opioid agonist therapy

We learned from consultants that the Hub and Spoke model was designed for the Hub site to provide rapid access to opioid agonist therapy as well as providing support for more complex initiations. Post-initiation, patients who are prescribed methadone or suboxone should be able to return to their primary care provider for the maintenance of their individualized opioid agonist therapy and prescriptions.

Since the implementation of the Hub and Spoke model, some challenges have emerged in the coordination of care, especially in cases where patients:

- don't have family physician to maintain their care outside of the Hub site and/or,
- are attended by a primary care physician who does not prescribe OAT.

In these cases, the Spoke part of the Hub and Spoke model (i.e. patients are initiated at the Hub and then supported locally by care providers at the Spoke) cannot work as envisioned. As this is developed, it will be important to address these challenges so that the full spectrum of care that the Hub and Spoke model was designed to offer is available to anyone seeking OAT services and supports.

Other consultants noted the need for a more standardized response to those using substances and a need for education, support and mentoring of health care providers to increase the number of providers who can initiate OAT in their own practices. Consultants conveyed that ultimately, it is important to

think about how services can be organized for people who use drugs to best suit their individualized health needs.

Needle and syringe distribution programs

Consultants consistently spoke of the importance of SWAP services in NL for the prevention of infections associated with inappropriate needle and syringe use but pointed out that it is hard for SWAP to keep up with the demand for new supplies. The program is experiencing consistent and exponential growth (i.e., new program users, new towns serviced, etc.) without the corresponding funding increases to sustain this growth in the long(er) term. When the demand for new supplies out-paces availability, this can mean individuals that rely on these supplies find themselves without a prevention strategy (e.g., in cases where their regular NSDP location runs out of supplies). Ideally, SWAP would have the capacity to restock supplies at busier locations to help maintain engagement with the people already in the habit of using NSDP services.

Other consultants suggested that partnerships with additional satellite sites and pharmacies would increase access to supplies while also providing the option for anonymous access.

Crucially, SWAP's mail delivery service improves rural/remote access to new supplies; however, there are still concerns about gaps in immediate access to supplies in rural and remote areas of the province. Some consultants highlighted how volunteers in smaller communities across the province have been a key source of access for new supplies. Consultants also highlighted the importance of developing trusting relationships with the people availing of needle and syringe distribution services so that they feel comfortable both requesting and accessing the supplies they need. In this way, services can become more centered around the person with lived experience and responsive to any changes in supply needs that may occur over time.

Opioid agonist therapy in combination with needle and syringe distribution programs

Our consultants described how the provision of OAT in combination with NSDP throughout the province is inconsistent. Consultants noted that those accessing OAT at the Opioid Dependence Treatment Hubs and in other primary healthcare settings should have access to safe works at these sites. However, from a primary healthcare perspective, there are inconsistencies among OAT primary care providers in terms of also providing patients with needles and syringes. Reasons for this inconsistency among care providers included issues of supply, access, confidentiality, and our consultants suggested there is a need for more education and awareness to decrease the stigma associated with using these interventions in combination as an infection-prevention strategy. Furthermore, consultants noted that in an ideal situation, individuals accessing OAT would have anonymous/confidential access to new supplies, rather than having to request them formally from care providers. Our consultants told us that when access to new needles/syringes is not anonymous/confidential, it can inhibit people who inject drugs from requesting new supplies. Individuals who continue to inject substances while accessing OAT may fear the consequences of their actions on their access to care or prescriptions if providers were to find out about their injection practices.

Some consultants expressed doubts about the practicality of combining the two interventions and wondered whether underpinning philosophies of OAT and NSDP were at odds. On the one hand, as a harm reduction approach, needle and syringe distribution programs recognize the continued use of substances; on the other hand, opioid agonist therapy is, for some, primarily seen as a means to help

reduce injection drug use. Several consultants noted that, in the spirit of harm reduction generally, and infection prevention particularly, there is a need to build bridges between these approaches, given that the use of new needles is a key to reducing infection risk.

Testing services and treatment for HIV/HCV

In our discussions, consultants identified a number of potential opportunities to improve access to HIV and HCV testing and treatment in the province.

Consultants first suggested increasing the provision of point of care tests for HIV and HCV as a way to improve access to testing. This is in line with a recommendation made by Smith et al. 2020. Based on survey data from the Tracks Phase 4 study survey of people who inject drugs in NL, the authors suggested:

> *In order to promote higher rates of HIV and/or HCV testing among PWID, the province of NL is urged to implement rapid, point-of-care (P.O.C.) and anonymous testing services* (5).

Another consultant added that it will then also be critical to ensure that people know what to do next and where to find resources, support, or follow-up for treatment after receiving a positive result.

As mentioned previously, a new opportunity for increased testing exists through the APPROACH study. This research project offers HIV, HCV and syphilis rapid testing in participating pharmacies across NL. The results of this study have the potential to inform POC in pharmacies and access to care for HIV, HCV and Syphilis (17).

Others mentioned that partnership with Public Health prior to the pandemic helped to provide confidential testing in the Central Health region. They noted that a return to this approach may be helpful or could be considered in other regions.

Consultants also strongly agreed on the need for education about infections associated with opioid use so that care reflects the most currently available treatment options, with particular attention needed to address misconceptions about Hepatitis C infection. Consultants identified the following common misconceptions regarding Hepatitis C testing and treatment that should be addressed through education of patients, providers, and those involved with organizations that serve people who inject drugs:

Misconception	Reality
It is necessary to quit injection drug use before someone can gain access to HCV treatment.	People who are using needles are at greatest risk of transmitting HCV to others and so HCV treatment for people who inject substances is important.
Notion that only one course of HCV treatment is available to individuals.	It is possible to treat re-infection. There is no impediment to a second course of therapy. It is expensive, but it *is* available.
An individual has to have cirrhosis before they are able to access care for HCV.	In Newfoundland and Labrador, this policy has been changed. Physicians can now treat HCV before cirrhosis occurs.
HCV treatment should be reserved for chronic HCV infection.	Acute HCV infection should be treated to reduce HCV transmission, even though approximately 30% of acute HCV infection will resolve without treatment.

Our consultants pointed out that one way to improve and update knowledge on current preventive practices, testing and treatment options for infections associated with opioid use will be to draw upon the existing resources provided by ACNL and the NL Centre for Substance Use to educate people on HIV or HCV prevention, testing, and treatment. Considering possible on-site HCV education and treatment teams as a standard aspect of ODT service delivery may also provide an additional avenue to reach people who inject drugs (5).

Local researchers in the province who recently completed a retrospective observational study on sexually transmitted and blood-borne infections in Newfoundland and Labrador correctional facilities, have suggested another opportunity to improve testing for HCV in NL. Their study found that NL's testing for high-risk populations, such as those who are incarcerated, remains low when compared to the practice in other Canadian provinces. The researchers advocate for increased testing to help improve the identification and treatment of all positive cases for all populations, but especially for those at high risk (18). Correctional facilities in NL do offer testing by request upon entry to a facility; however, one consultant suggested that providing testing for all with an opt-out option would be the better strategy to increase testing in this setting rather than leaving it up to inmates to request testing upon entry at the corrections facility. This approach is corroborated by a recent Canadian survey study of provincial prisons that concluded that "adopting opt-out screening and removing eligibility restrictions may be important initial strategies" to advance HCV care amid variable HCV screening and care practices in prisons across the country (19).

Continuity of Care

Fragmentation | Consultants raised concern that current system of care for people with opioid use disorder is fragmented. They suggested the use of more integrated care pathways. The recently implemented Hub and Spoke model has laid out the essential framework to connect patients and providers with OAT services and to supports, linkages with other community supports, and education; however, we heard that more providers are needed in the community to support patients once they leave the Hub so that continuity of care is maintained. To address this need for improved continuity of care, consultants suggested increasing the capacity for the provision and support of OAT outside the Hubs through education and training for providers and those working with people who use drugs in their communities.

Care for Rural Communities | Consultants told us that volunteer and peer support networks in rural communities can often be the critical link between people who use drugs and the service providers or support services they need to improve the continuity of their care. Consultants identified the need to build on and/or work with existing community support networks as a potentially effective way to help ensure individuals can navigate and utilize services that will support them through different stages of care. An exemplar of this approach that was suggested by our consultants is the Bell Island Sobriety, Housing and Employment Group situated on Bell Island that integrates volunteer peer support and people with lived experience into a model of community-based and community-led care. Exploring a similar approach in other regions of the province (particularly rural regions) has the potential to help build capacity and support to improve the continuity of care for those without the same access to services as people living in larger urban centres.

Harm Reduction Site Needs Assessment

Findings from a St. John's Harm Reduction Site Needs Assessment and Feasibility Study revealed that 64% of survey respondents with lived/living experience would use a supervised injection/consumption site, or overdose prevention site, if made available. Survey respondents advised their preferences for a number of specific services they would like to see offered at Harm Reduction Sites, many of which would help to prevent infections, including needle and safe works distribution, HIV and HCV testing, connection to opioid dependency treatment and counseling, access to social workers, and harm reduction education. In addition, 94% of surveyed key informants working with people who use drugs agreed that a Harm Reduction Site would be beneficial for this population and had a high degree of agreement on the list of supportive services preferred by people with lived experience (14).

Health Information Factors

Population-level data

Ideally, those responsible for organizing services would have reliable and up-to-date data on HIV, HCV, and infective endocarditis rates among people who inject drugs; however, we heard from consultants that the availability of current population-level data on infections associated with opioid use/ related to injection drug use in NL is limited. Consultants identified a need for the regular collection of data to inform decision-making regarding the needs and services for people who inject drugs in the province. One consultant suggested that improving how baseline data is established/recorded when new programs or services are initiated would be helpful to facilitate program evaluation and strengthen existing services. Regular information on the demographic characteristics of people who inject drugs and their injection behaviors could also help inform improvements to the current provision of OAT and NSDP.

Current sources of data that can be drawn upon include data collected by the Pharmacy Network and the Department of Health and Community Services. The Pharmacy Network collects data on OAT prescriptions from the province's pharmacies; however, information about how opioids are being used once they are dispensed is not collected as a part of this process.

The Department of Health and Community Services' Communicable Disease Control System collects data on blood-borne infections in NL including HIV and HCV. Some data is also available pertaining to infections and injection drug use (although we were advised that the completeness of this data is a consideration). We include this data in the discussion of patient-related factors that follows. As well, we were told that the Department has plans to work more closely with Dr. Brian Rush, a Research Scientist with the Centre for Addiction and Mental Health who has developed a needs-based planning model to estimate the required capacity for a substance use treatment system. The model draws "upon population health data and stepped-care modelling of service delivery to estimate the required capacity of services across the full range of wellness and problem severity" (20,21).

The Newfoundland and Labrador Centre for Health Information is working in partnership with other provincial organizations to create an Opioid Surveillance System. However, this system focuses on data related to mortality, hospitalizations and OAT rather than opioid use-associated infections specific to injection drug use. Examples of potential data that will be captured are listed in the following website description and include:

- Emergency Medical Service (EMS) – Provincial Medical Oversight office records from province directive to record/report all opioid related overdoses; captures demographics, naloxone administration, outcomes (baseline, ER visit, fatality, etc.)
- RCMP/RNC – Drugs seized and tested, types of drugs, drug compositions, locations and quantity.
- THN-K – Naloxone use in NL; survival rates.
- Medical Examiner Data – Toxicology & autopsy results of opioid-related deaths in NL based on case definition; captures demographics, intent, drug type(s).
- Mental Health – Demographic data on patients receiving treatment for opioid dependency, duration of treatment and context (22).

Other consultants suggested that in rural areas, those working with people who use drugs often have a good understanding of who is using opioids but not necessarily those misusing opioids. Consultants agreed that more up-to-date provincial-level data on who injects opioids in NL, and the prevalence of opioid-use associated infections across the province would be informative for organizing infection prevention services among people who inject drugs.

The current health system transformation underway in NL may provide opportunity to improve data collection specific to people who inject drugs where current gaps exist as efforts are made to create a Learning Health and Social System. Improving the collection of data beyond opioid use to more specific information about patient populations could help inform improvements of OAT and NSDP in NL and further prevent infections associated with opioid use in this population.

Local Research

Consultants relayed that there has been local research that helps fill in some information gaps regarding people who use drugs. For example, two recent survey-based studies capture specific information on the characteristics and behaviors of these populations in NL:

1) The Tracks survey of people who inject drugs (PWID) in Canada Phase 4 (2017-2019) Final Report: Newfoundland and Labrador (NL) conducted in 2018 by Smith and colleagues examines the prevalence of HIV and hepatitis C as well as the associated risk behaviours among PWID in NL (5).
2) The St. John's Harm Reduction Site Needs Assessment and Feasibility Study, conducted in partnership between the Provincial Opioid Dependence Treatment Center of Excellence and the AIDS Committee of Newfoundland and Labrador in 2020. As a part of this study people who use drugs in NL were surveyed about a number of areas including demographic information, drug use and methods, frequency of injection drug use, location of drug use, injection practices, types of drugs injected and general use, stigma & substance use disorder treatment and the demand for supervised injection services (14).

In the absence of regularly collected population-level data, these surveys provide much-needed insight into the behaviors and characteristics of patient populations. Creating more opportunities to collect feedback from services users through the use of surveys or other feedback mechanisms at sites of service may provide an alternative way to gain direct insight into the needs of this population. For

example, one consultant identified potential to collect data on people who use drugs from existing sites like Bell Island where a great degree of trust has been built between volunteers, community members, and services. This trust allows people with lived experience to bring integrity to the data that is collected and has the potential to contribute to important decision making around their care.

Consultants also pointed to additional local Hepatitis C research now underway. Dr. Peter Daley and Dr. Cindy Whitten are studying the Hepatitis C care cascade model in NL, including: the number of positive cases, how many individuals are getting proper testing, how many individuals are accessing therapy, and how many individuals are cured. Results from this study will help to inform the NL HCV Elimination Plan. Dr. Daley is also working with other researchers on a study that will describe patterns of opioid prescription and opioid prescription use. [6]

Design or Site of Service Factors

Barriers and Enablers to OAT and NSDP Access

Consultants mentioned several design or site of services factors that act as barriers and enablers for OAT and NSDP in NL such as: the availability of transportation to the site of service or the accessibility of service location, protection of privacy / lack of anonymity, and adequate supplies.

Consultants highlighted that it can be challenging to access OAT and NSDP service sites, especially in more rural areas of the province. For example, some communities are located far from service sites, have limited access to preventive services, lack pharmacies to dispense OAT, or do not participate in SWAP's Brown Bag Program. Consultants agreed that it is important to address barriers that arise where service locations or transportation options limit access to services. One consultant encouraged the use of Telehealth as an alternative for PWUD living in rural or remote regions to increase access to preventive interventions or treatments. Another benefit of this option is that it also helps maintain confidentiality for OAT or treatment of OUAIs.

SWAP has scaled up NSDP across the province through mail-order supply services, mobile delivery services, the Brown Bag Program for pharmacies and satellite sites, and outdoor mailboxes. However, we heard that there is still an increasing demand for supplies. This might indicate the need for more of these services in more locations.

Consultants conveyed the importance of making links to trusted community volunteers and supports as a way to improve access to safe supplies and help reduce OUAIs. For example, peer-support networks, like the Good Hands RV Needle Distribution on Bell Island (a volunteer-run mobile service that distributes SWAP supplies to PWUD), provide another way that rural communities can make new supplies more accessible.

Consultants also suggested increasing the availability of anonymous access to safe supplies as a way to maintain confidentiality and privacy for PWID. This could help those that may feel stigma requesting supplies, or for those who may avoid certain locations because they would have to reveal their identity.

[6] The Hepatitis C care cascade model is used to help visualize the steps in the sequence of medical care from disease identification to treatment. Originally used to describe steps of care for HIV, it has since been adapted for HCV to describe steps of care for HCV in diverse settings and patient populations (23).

Other site of service factors mentioned by our consultants that impact accessibility of NSDP include:

- limited hours of operation at some satellite sites where safe supplies are available, and
- a lack of sharps disposal container near to sites with safe supplies.

Overall, the points raised above highlight the need to consult people with lived or living experience regarding ways to improve sites of service and ensure existing barriers are minimized.

Expanding Sites of Care

Consultants identified additional sites where OAT and or NSDP could be offered to increase access, especially in hospital/ER settings and correctional facilities.[7]

We learned there is limited OAT access in hospitals/ER settings in the province although there is some work happening in this area to address this. Support for OAT access in hospitals is endorsed by the Centre for Addiction and Mental Health Canadian guideline on Opioid Agonist Therapy from 2021 that recommends that OAT be initiated "in hospital whenever possible for patients who are diagnosed with OUD after admission" (24).

In terms of NSDP in the hospital setting, consultants told us that there is work occurring to make new supplies available to inpatients for use while they are in hospital but it is also not yet available. Consultants explained that certain sites are limited in their ability to offer preventive services like NSDP or OAT because of existing abstinence-based rules, protocols or policies. They suggested that adjusting or advancing harm reduction policies in hospital settings could help increase the availability of preventive interventions shown to reduce opioid use-associated infections and increase the provision and uptake of OAT and NSDP in NL.

All correctional facilities in the province are able to maintain OAT but only certain correctional facilities including HMP in St. John's and the West Coast Correctional Centre in Stephenville are able to initiate OAT. Our consultants identified the potential for more access to OAT if initiation services were expanded to smaller correctional facilities as well.

Although consultants supported the idea of NSDP in correctional facilities, especially for the prevention of HCV; however, they recognized that safely providing NSDP in this setting is complicated. A survey of Canadian provincial prisons published in 2021[8] found that while OAT is available in 83% of prisons, needle and syringe programs were not available anywhere (19). Recently, government officials confirmed that Correctional Services Canada is planning to expand the needle and syringe programs currently offered at nine federal prisons after delays caused by the pandemic. According to Public Safety Canada, the Prison Needle Exchange Program has been implemented in nine institutions with no safety incidents involving staff or inmates. The program provides federal inmates with access to sterile needles

[7] Note that the research literature that we reviewed did not focus on correctional facilities, but our consultants highlighted it as an important setting for the prevention of OUAIs in NL and potential area for future research investigation.

[8] All provincial prisons for adults were included in the study except for those in Ontario as the result of technical issues with approvals that occurred as a result of the COVID-19 pandemic (19).

as a way to reduce the transmission of infectious diseases such as HIV and HCV (25). As jurisdictions across Canada continue to implement and evaluate these programs, further learning on the barriers and enablers of NSDP in this setting will become available on special requirements and supports that ensure NSDP is safe for both PWID and staff in this setting.

Patient-Related Factors

In our discussions, consultants highlighted that despite the availability of preventive interventions for opioid use-associated infections for people who inject drugs in NL, they are still seeing a worsening of the consequences of needle use. Consultants expressed the need to better understand the characteristics and behaviors of people inject drugs in NL in order to improve prevention of infections associated with opioid use in this province.

In this section on patient factors, we first sought to describe the most recent information available on people who inject drugs in NL including: sociodemographic characteristics of people who inject drugs in NL, drug use and injection behaviors, rates of HIV, HCV and infective endocarditis, HIV and HCV Testing Behaviors, and the uptake of healthcare and preventive services.

Following this, we then consider the factors impacting people who inject drugs that consultants identified as important for the effectiveness of preventive interventions in NL.

The Patient Landscape: What we know about people who inject drugs in NL

Sociodemographic characteristics | The *Tracks survey of people who inject drugs in Canada Phase 4 (2017-2019): Final Report Newfoundland and Labrador,* provides a snapshot of sociodemographic information for a group of people who inject drugs in NL. The survey conducted in 2018, included 130 individuals who inject drugs from two different data collection sites in St. John's and Corner Brook, including satellite sites in Bell Island and Stephenville.

People who inject drugs reported a number of concerning characteristics related to unstable housing, previous incarceration, unemployment, education levels, and high reports of abuse. Gaining a better understanding of how these particular social determinants of health might affect the prevention of opioid use-associated infections will be an important component to improving prevention strategies in the province.

A summary of some of the sociodemographic information reported by participants of the survey can be found in the Table 1 below. Please see Smith et al. 2020 for a more detailed breakdown of these characteristics (5).

Table 1: Summary of Sociodemographic Characteristics of Participants from Tracks Survey Phase 4 NL participants[9] from Smith et al. (5)

Sociodemographic Characteristics	Information reported by participants
Self-identified sex at birth	• 68.5% male • 31.5% female
Sexual Orientation	• Mostly heterosexual
Ethnicity	• 34.9% self-identified as Indigenous
Age	• 53.0% of participants were between 30-49 years of age • 34.9% of participants were less than 30 years of age
Education	• 42.1% females completed high school • 14.6% of males completed high school
Housing	• 80.6% reported living in own space but over half reported living in multiple housing types which may indicate unstable housing
Incarceration	• 15.5% reported having been incarcerated in the 6 months prior to the interview • 53.3% had been incarcerated at some point in their lives (male participants reported this twice as much as female participants)
Employment	• 74.2% reported being unemployed • 65.1% reported receiving social assistance • 31.0% reported being employed • 22.5 % reported working full-time, • 8.5% reported working part-time
Mental Health	• 52.8% males reported good, very good or excellent mental health and 47.1% reported fair to poor mental health • 31.7% females reported good, very good or excellent mental health and 58.3% reported fair to poor mental health • 85.6% reported experiencing some form of abuse[10] • 73.6% expressed being subjected to childhood abuse or adverse childhood experiences • 70.3% reported experiencing domestic abuse or intimate partner violence

Drug use and injection behaviors of people who use drugs in NL | Two recent survey studies help describe recent drug use and injection behaviors of people who use drugs in NL. The findings reported by these studies provide evidence of the need for OAT and NSDP as infection prevention strategies. The *St. John's Harm Reduction Site Needs Assessment and Feasibility Study* (2020) surveyed 136 recent drug

[9] Interviewing and recruitment took place at two different data collection sites (St. John's and Corner Brook), as well as their respective satellite sites, Bell Island and Stephenville (5).

[10] Participants were surveyed about experiencing physical, sexual childhood, emotional or sexual partner abuse (5).

users, 34% of whom reported using drugs by injection and 24% reported that they injected drugs daily (14). The NL arm of the *Tracks survey of people who inject drugs (PWID) in Canada Phase 4* (5) exclusively surveyed individuals who inject drugs in NL with 38% reporting that they injected every day in the preceding month (out of 130 individuals surveyed).

Participants of both NL surveys similarly reported cannabis, alcohol, and cocaine as the top three common substances they used (5,14). The NL Arm of the Tracks survey (5) also looked at the types of drugs participants injected. The top four most common drugs that survey participants reported injecting were:

- cocaine (76.7% of participants),
- hydromorphone/ Dilaudid® (66.4% of participants),
- morphine (57.4% of participants), and
- methylphenidate/ Ritalin® (48.8% of participant).

The studies also asked participants questions regarding needle use, reuse or borrowing as well as borrowing or sharing other injection equipment. Participant responses from the Needs Assessment and Feasibility Study (14) showed that 40% or those surveyed who injected drugs reused personal needles and 22% reused needles used by other people. On the other hand, the Tracks survey (5) specifically asked about the use of a sterile needle and syringe at last injection and found that 84.3% used a sterile needle and syringe at last injection with 87.4% reporting that they had not injected with previously used needles and/ or syringes in last 6 months; however, 46.9% reported borrowing injection related equipment in the previous 5 months. Appendix 6 of this report includes a summary table of injection behaviors reported by Smith et al (5).

Overall infection rates: HIV, HCV, infective endocarditis in NL |Through a data request from the Communicable Disease Control System at the Department of Health and Community Services, we obtained overall HIV and HCV cases and incidence rates for NL and Canada for 2018-2022 as well as some data on cases of HIV and HCV reported as having injected non-prescription drugs. NLCHI also provided us with some data on the incidence and prevalence of acute and subacute infective endocarditis in NL. The data is described in the subsections below.

HIV Cases and Incidence Rates |Keeping in mind that data for 2022 is considered preliminary, HIV data spanning 2018-2022 from the Communicable Disease Control System (26) shows that the HIV incidence rate increased in 2022 compared to the previous four years which were relatively stable (see Figure 1).

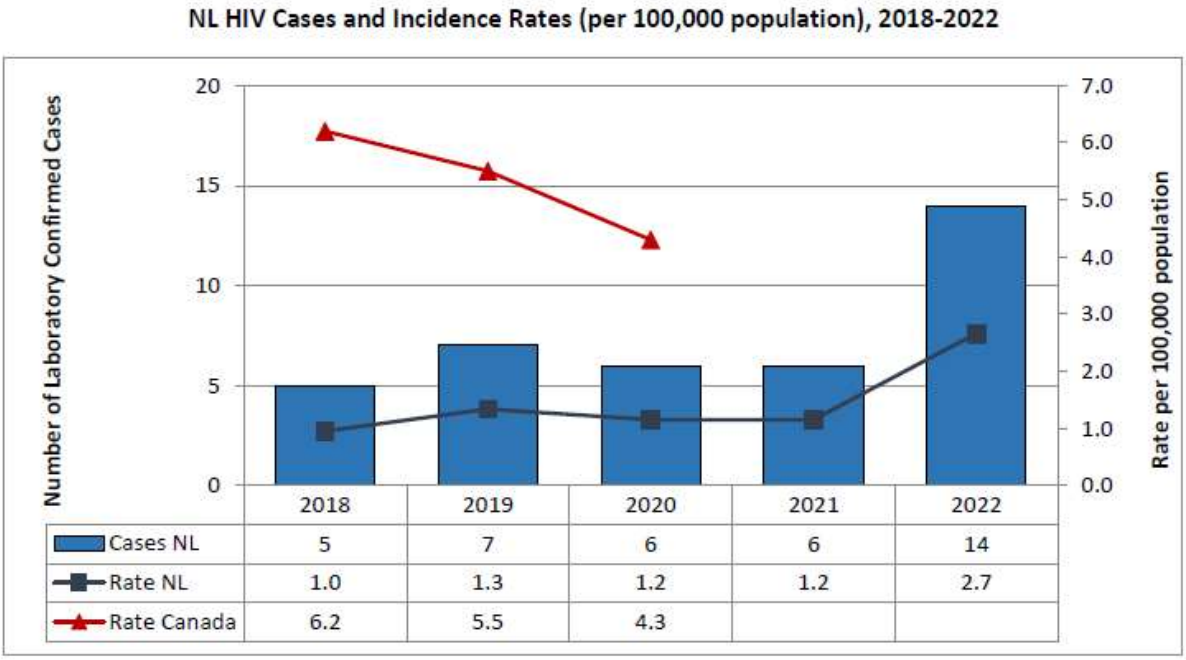

Figure 1. Reported HIV Cases and Incidence Rates for NL and Canada, 2018-2022

HCV Cases and Incidence Rates | In comparison, overall HCV incidence rates from the Communicable Disease Control System showed a slight decrease in preliminary data from 2022 compared with previous years. The HCV incidence rate dropped to 27.9 per 100 000 population in 2022 from 30.2 per 100 000 population in 2021 (26).

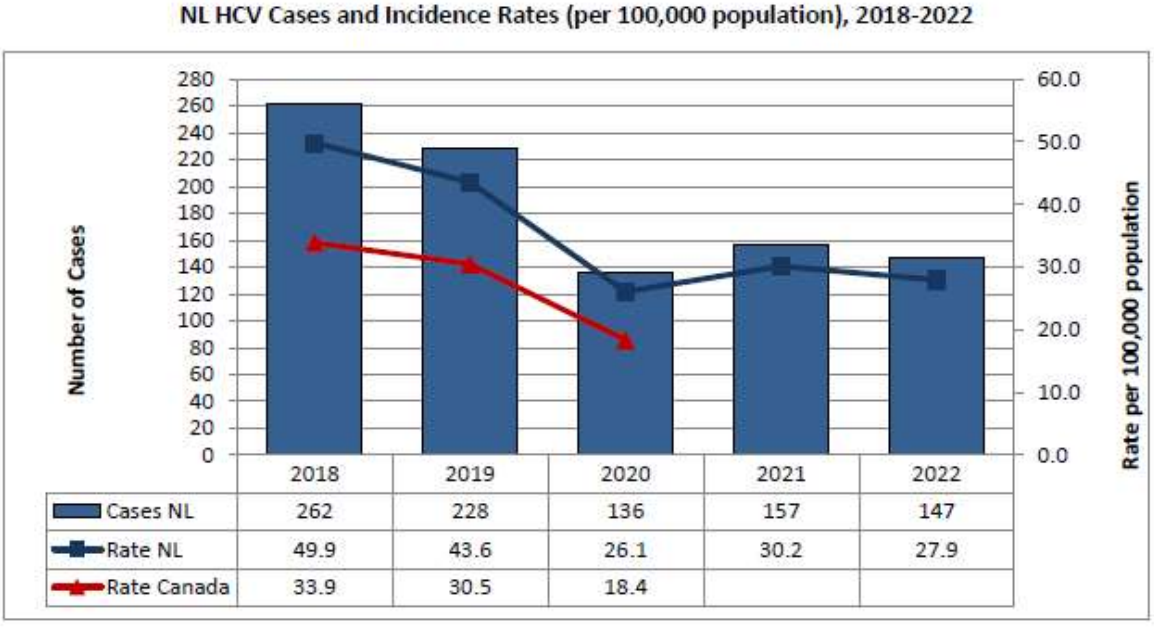

Figure 2. Reported HCV Cases and Incidence Rates for NL and Canada, 2018-2022

Breakdown of Cases of HIV and HCV reported as having injected non-prescription drugs | In addition, the Communicable Disease Control System was able to provide data on HIV and HCV cases from 2018–2020. In this data, which is listed below, it is notable that 44% of HCV cases were reported as having injected non-prescription drugs in comparison to 13% of HIV cases. However, there were a higher number of HIV cases reported as unknown (42%) as compared to HCV cases (4%) making it difficult to compare these numbers.

HIV cases reported by the Communicable Disease Control System as having injected non-prescription drugs:

- 13% of all cases from 2018-2022 (n=5) were reported to have injected non-prescription drugs;
- 21% of all cases from 2018-2022 (n=8) were reported to not have injected non-prescription drugs;
- 42% of all cases from 2018-2022 (n = 16) were reported as unknown; and
- 23% of all cases (n=9) had no information available (26).

Hepatitis C cases reported by the Communicable Disease Control System as having injected non-prescription drugs:

- 44% of all cases from 2018-2022 (n=411) were reported to have injected non-prescription drugs;
- 16% of all cases from 2018-2022 (n=152) were reported to not have injected non-prescription drugs;
- 4% of all cases from 2018-2022 (n = 35) were reported as unknown; and
- 36% of all cases (n=332) had no information available (26) (Communicable Disease Control System, 2023).

Infective Endocarditis | NLCHI provided data on the incidence and prevalence of acute and subacute infective endocarditis in NL; however, this information was not directly linked to PWID. Data on infective endocarditis was based on the number of unique clients who had either a fee-for-service physician visit or a hospitalization (or both) with a related diagnosis, NL, from 2017/18 to 2021/22. The prevalence of infective endocarditis for 2021/22 was 14.6 per 100 000 population and the incidence was 11.7 per 100 000 population (27).

Table 2: Incidence and prevalence of acute and subacute infective endocarditis based on the number of unique clients who had either a fee-for-service physician visit or a hospitalization (or both) with a related diagnosis, NL, 2017/18 to 2021/22.

Fiscal year	New cases	Prevalent cases	Population estimate	Incidence per 100,000 population	Prevalence per 100,000 population
2017/18	70	80	528,249	13.3	15.1
2018/19	68	76	525,560	12.9	14.5
2019/20	69	79	523,427	13.2	15.1
2020/21	75	85	521,359	14.4	16.3
2021/22	61	76	520,452	11.7	14.6

Source: Compiled by Data and Information Services, NL Health Services using data from Provincial Discharge Abstracts Database (PDAD), 2017/18 to 2021/22, MCP Fee-For-Service Physician Claims Database, 2017/18 to 2021/22 and Statistics Canada Population Estimates, 2001-2022 file.

Although there is no current surveillance system set up to collect data specific to injection-related infective endocarditis in NL, one of our consultants conveyed concern about seeing more cases in hospital. A suggested way to track injection-related infective endocarditis could be to report this epidemiology through a chart review.

HIV and HCV testing behavior among PWID in NL| The NL portion of the Tracks survey of people who inject drugs also provides insight into HCV and HIV testing behavior as reported by 130 participants in NL. The survey included questions on HIV and HCV Testing and Seroprevalence[11]. People surveyed answered questions about testing behaviors, HCV positive status, awareness of current HCV positive status, previous exposure to HCV and HCV testing behavior. An analysis of participant responses found several concerning statistics for Hepatitis C among people who inject drugs in NL:

- Approximately 50% were HCV positive;
- Among those that were HCV positive, 70.2% of participants were not aware of their current HCV positive status;
- 92.3% of respondents with previous exposure to HCV were unaware that they were ever HCV positive;
- 90.2% of males were HCV positive in comparison to 50.0% of females that were HCV positive even though testing behaviors and frequency of testing were similarly reported;
- Only 19.1% of those with active HCV infection were under care of HCV medical specialist with 14.3 % reported undergoing treatment and no one was currently receiving treatment (5).

These numbers indicate a high percentage of people who inject drugs in NL may not be aware of their HCV positive status and could therefore unknowingly pass the infection along to others. The implications of these findings further support the need for NSDP access in the province to prevent HCV. Based on the findings around lack of awareness of HCV-positive status among survey participants, Smith et al. (5) suggest that there is:

> *… an urgent need for an both general and targeted, population-specific aggressive education/awareness-raising and anti-stigma campaigns, both among the NL public broadly speaking, as well as in the specific context of high-risk communities such as both PWID, and inmates living in correctional institutions.*

For HIV testing on the other hand, Smith et al. (5) found that:

- 83.4% of participants had undergone lifetime HIV testing;
- 76.7% had been tested for HIV and were aware of their own HIV negative (HIV-) status;
- Only 6.2% of participants did not know their status;
- 17.1 % of participants had not been tested;
- 18.6% of NL participants were aware of pre-exposure prophylaxis (medicine to reduce your chance of getting HIV prior to exposure); and

[11] The National Institutes of Health defines seroprevalence as “the percentage of people in a population who have proteins called antibodies in their blood that show they have been exposed to a virus or other infectious agent” (28).

- 8.6% were aware of other HIV treatment and prevention modalities such as non-occupational Post Exposure Prophylaxis (medicine to prevent HIV infection after you have been exposed to the virus).

Survey responses showed that the most cited reason for avoiding testing was around the concern that health professionals would learn of a participants' drug use (Smith, 2020). The authors go on to suggest this may be interpreted to mean that the stigma related to HIV is not as concerning as the stigma surrounding substance use in NL (Smith, 2020). However, the survey showed that when participants did engage in testing, they tended to test for both HIV and HCV. In light of this pattern, the authors proposed "that the implementation of new programs and services designed to improve one viral test [for both HCV and HIV] has considerable potential to positively influence both HIV and HCV testing rates (5)."

Furthermore, the authors advocate for rapid/point-of-care and/or anonymous HIV testing as a way to increase testing rates in the province (5).

Uptake of healthcare and prevention services

Results from the Tracks Survey reported that participants used preventive services including NSDP and OAT. The top three health services that respondents reported using in the 12 months prior to interview included NSDP, OAT, and mental health counselling services. Specifically:

- 72.9% reported using NSDP;
- 45.0% reported using methadone, Suboxone, or other OAT;
- 44.5% reported using mental health counselling services; and
- 11.4% Indigenous respondents reported having access to Indigenous-specific healing or health services (5).

The St. John's Harm Reduction Site Needs Assessment and Feasibility Study found similar uptake of a Methadone or Suboxone program with 44.0% of survey respondents accessing this type of care within the last 6 months. As well, another 31.0% of participants identified the use of self-help group, or one-on-one substance use counselling services in the last 6 months (14).

Population-related Contextual Factors: barriers to infection prevention

We asked consultants to consider the barriers for people who inject drugs when accessing interventions to prevent infections. Consultants noted that several patient related factors impact access to preventive services or the prevention of OUAIs in NL such as: awareness and or/ knowledge of OUAI prevention, stigma, social networks, and access to services.

Lack of awareness and/ or knowledge of infection prevention

Some consultants expressed concern that PWID in NL lack awareness of the health risks of acquiring or transmitting infections through injection drug use, and that people lack knowledge regarding the prevention and treatment OUAIs in general (e.g., safe use of needles and other safe supplies, prevention methods and services for HIV/HCV/ infective endocarditis and other common infections, and testing and treatment options for OUAIs). Evidence from the NL arm of the Tracks Survey corroborates that PWID

surveyed for this study lacked awareness of positive HCV infections with 70.2% of participants unaware of their current HCV positive status (5).

Consultants agreed that concerted efforts should be made to provide education on infection prevention in the province to reach various groups including people who use drugs, peer networks, schools and the public to increase awareness. Along these lines, a promising new drug education program for youth called the Drug Education Centered on Youth Decision Empowerment (DECYDE) strategy was recently announced by the Memorial University School of Pharmacy. This program follows a harm reduction approach and is interactive and youth-informed. It is set to provide youth Grades 4-12, teachers, and parents/guardians with the information they need to make safe and informed choices (29). Increasing capacity in the province to educate people who use drugs, schools and the general public on issues surrounding injection drug use could help raise awareness of OUAIs and ultimately help prevent rates from increasing.

Stigma

The majority of consultants also highlighted the significant role that stigma plays in the decision to access preventive interventions and around substance use. People who use drugs may fear that disclosing information on injection drug use will have negative repercussions on relationships with health care providers, accessing other services and people in their communities (e.g., losing prescriptions, losing access to other supportive services, risks related to child protection, access to stable housing, being criminalized for drug use or recriminalized post incarceration).

Consultants advised that stigma around HCV/HIV infection was also seen as a deterrent to the uptake of testing services. The NL portion of *the Tracks Survey* (5) and the *St. John's Needs Assessment and Feasibility Study Needs Assessment* (14) corroborate what we heard from consultants, reporting that survey participants avoid healthcare because of stigma, fear or concern of judgement or discrimination from others, and fear of legal repercussions.

Other consultants highlighted the need for education for healthcare providers and organizations working with people with lived experience as a way to support people who use drugs and reduce stigma. It is important that healthcare and service providers have accurate information to convey to people who use drugs on the prevention and treatment of infections, if requested. Better educating providers on opioid use disorder (OUD) and the harm reduction approach could help reduce stigma related to drug use and OUD so patients feel more comfortable asking for the care they need to prevent infections such as HIV, HCV and infective endocarditis.

The role of social networks

Our consultants spoke about the protective effects that strong social networks can provide for PWID when made available in rural communities (an example of this being the strong volunteer base and peer support for people who use drugs or are in recovery from drug use within the Bell Island community). We also heard about how living in rural communities where strong social networks are unavailable or lacking will likely increase the risk of negative effects associated with opioid use. Findings from a Canadian study published in 2020 describe these local accounts. The study found that rurality shapes

the risk environment for opioid-related harms through environmental influences, including social networks:

> *…social networks could be both protective but also amplify risk through a lack of knowledge about treatment and risk behaviours, a lack of anonymity and stigmatisation of people who use opioids in rural areas* (30).

Accessing preventive services

Challenges with physical access to services were raised as a barrier for those wanting to avail of OAT or NSDP. When services are not located close to where people live, transportation can be an impediment to access, especially in rural and remote areas of the province (e.g., rural communities where a pharmacy does not dispense OAT). Consultants suggested an increased use of telehealth as a way to improve access to OAT in communities where it is a challenge to gain physical access to a physician, nurse practitioner or pharmacist.

The lack of preventive services in hospital/ER or corrections settings is also a factor. Offering preventive interventions in these settings could open a new window of opportunity for individuals to access OAT or NSDP.

Human Resource Factors

Our contextualization consultants identified several human resource challenges that, if addressed, could have a positive impact on the prevention of opioid use-associated infections in NL. Below we outline specific human resource factors that consultants felt were either enablers or barriers to provision of OAT, NSDP or OAT offered in combination with NSDP.

Human resource factors related to the provision of opioid agonist therapy

Discussion of human resource factors related to OAT mainly focused on three areas:

- human resource capacity;
- education and training for health professionals providing OAT; and
- provider stigma towards individuals with opioid use disorder and/or toward medications used to treat OUD.

Human resource capacity | In NL, a licensed physician or nurse practitioner is required to prescribe OAT, and pharmacists must be authorized to dispense these medications. Consultants noted that although there are some healthcare providers involved in OAT, many more could include OAT in their scope of practice. In the section below, we list the Human Resources challenges that consultants outlined for different care providers, as they relate to the provision of OAT in NL.

Physicians | Consultants identified a shortage of physicians that provide OAT as a part of their regular practice. The Hub sites within Hub-and-Spoke Model currently provide care to a small portion of the people in the province requiring OAT. In 2022, the regional ODT Hubs treated 500 out of 3,703 people who were dispensed OAT (methadone, Suboxone). Although individuals can gain rapid access to OAT at provincial Hub sites, patients may not have a physician in their community to maintain their OAT. Data

reported by the Pharmacy Network in 2022 showed that there were 100 medical doctors in the province prescribing OAT (12). The Hubs are available to support physicians through the Spoke part of the model; however, if there is no provider available in, or near where a patient lives, it becomes harder to support the patient and/or continue care in the community. Consultants suggested that the time commitment required to initiate and supervise OAT for the first few days is an impediment for some physicians. Others speculated that physicians in community might lack confidence or training in this area to include it in their practice. Consultants also highlighted that treatment could be initiated in hospital/ER but currently there are very few hospital physicians who are willing to do this.

Nurse Practitioners |According to consultants, the number of Nurse Practitioners authorized to prescribe OAT also plays a role in the province's capacity to offer OAT and help prevent OUAIs. Currently, less than 20 Nurse Practitioners (about 15 or 16 NPs) have the authority to prescribe OAT within the province among a possible 200 working NPs (12). Consultants suggested that increasing the number of NPs prescribing OAT could help prevent infections in NL.

Pharmacists | Another capacity issue raised by consultants was that not all communities have a pharmacy, or one with a pharmacist authorized to dispense OAT. If a pharmacy closes or stops its OAT services, this becomes a significant barrier to OAT access, especially in smaller more rural communities. According to one of our consultants, a little over half the Community Pharmacists within the province can provide this service, so there is room to increase capacity if more pharmacists were involved in the provision of OAT.

Developing HR capacity for physicians, nurse practitioners and pharmacists to include the provision of OAT in their practice will increase access to OAT and help the Hub and Spoke model reach its full potential.

Other factors related to human resources capacity | Consultants also suggested the system could draw upon existing community networks/supports to increase HR capacity to provide and support OAT. Volunteer and peer support networks in rural communities can help link people with service providers, or other community support services that people need to increase that continuity of care and fill current gaps. Some examples include: reminding individuals about medical appointments, providing information/resources on treatments or supports, and helping with transportation to preventive services or treatments.

Education and training in OAT

Several updates to guidance and authorization requirements for physicians, nurse practitioners, and pharmacists around the provision of OAT have occurred over the last few years. From our conversations with consultants, it is likely that newer and more updated requirements have not fully pervaded service provider knowledge in some cases. The lack of knowledge of training opportunities or a lack of knowledge around new simplified requirements is a barrier to the service provision of OAT in the

province. Education and training requirements for the provision of OAT varies by provider type. Below we elucidate recent guidelines for physicians, nurse practitioners, and pharmacists in NL.

Education and Regulation for Physicians | In 2022, the NL College of Physicians and Surgeons published new practice guidelines for physicians on *Opioid Prescribing for Opioid Use Disorder* (31). The new guidance states that physicians should prescribe medication for opioid dependence in accordance with recommendations from two evidence-based guidelines and best practice documents:

1) Opioid Agonist Therapy: A Synthesis of Canadian Guidelines for Treating Opioid Use Disorder (24),
2) A Guideline for the Clinical Management of Opioid Use Disorder (32).

The NL Practice Guideline also provides additional information/training that is highly recommended (31). Although physicians are not currently required to have specialty training, one of our consultants indicated that it is not necessarily something that most physicians know how to do. Physicians may feel that they lack the competency to initiate OAT with their patients and then do not engage in this service, suggesting the need for education among physicians. Given hesitancy in this area, the availability of training for physicians to initiate OAT and to build confidence for those newly prescribing these medications, would facilitate greater uptake. Ensuring that physicians are well connected to the Hub and Spoke model and educational opportunities may help build capacity and encourage physicians to include OAT in their scope of practice.

Education and Regulation for Nurse Practitioners | Nurse Practitioners are also authorized to prescribe Buprenorphine-Naloxone and/or Methadone for Opioid Use Disorder OAT services since 2017, in accordance with standards outlined by the College of Registered Nurses of NL (33). However, our consultant at the Department of Health and Community Services advised that only a small number of nurse practitioners are authorized to prescribe these medications. Encouraging and supporting nurse practitioners to become authorized to prescribe OAT would increase the availability of OAT to people in the province and help reduce infections.

Education and Regulation for Pharmacists | Requirements for pharmacists to dispense OAT include an authorization process from the Pharmacy Board as well as education, and continuing competency on opioid use disorder and treatment. The latest guidance for Pharmacists on the dispensing of OAT is from 2018 entitled *Standards for the Safe and Effective Provision of Opioid Agonist Maintenance Treatment*. There are also certain operational standards, general practice standards, and practice standards specific for the provision of methadone, buprenorphine/naloxone, and slow-release oral morphine set out in this guidance document (34).

The Need for Provider Awareness | Given that physicians no longer require special training for OAT and educational requirements for nurse practitioners have been streamlined, publicizing these changes has the potential to increase service provision. As well, increasing provider awareness of the opportunities available to gain training and further insight into this process could also improve healthcare provider confidence to provide this service and reduce issues of stigma around opioid use disorder. Promoting

educational opportunities made available through local channels such as the NL Centre for Substance Use, Project ECHO NL and the NL Medical Association may also encourage more providers to gain confidence and knowledge around OAT and, in providing this service to their patients.

Stigma towards individuals with opioid use disorder (OUD) and toward medications to treat OUD

Consultants also noted that stigma towards individuals with OUD, and/ or stigma towards the medications used to treat OUD act as barriers that impede some healthcare professionals from providing OAT. When providers have concerns about the misuse and diversion of medications for OUD then they may be less likely to be involved in the provision of OAT. Consultants suggested that educating providers on OUD could deepen their understanding of harm reduction approaches and reduce stigma around the strategies to prevent infections.

Human resource factors specific to needle and syringe distribution in NL

The Safe Works Access Program (SWAP) offered by the AIDS Committee of Newfoundland and Labrador (ACNL) is the main needle distribution service in the province. The greatest enabler consultants identified for NSDP is the fact that in most cases, no specific provider is required to distribute supplies. Consultants told us that anyone can be involved in the distribution of supplies but ideally, those with lived experience would be involved. Others listed as appropriate for distributing supplies included: providers that are closest to the patient, the person who is most accessible to the patient, or persons situated within social services or within educational settings.

Consultants agreed that reliable and anonymous sources for supplies in NL can make it easier to use a new needle for every injection, a key part of preventing opioid use-associated infections. SWAP has been able to develop programs to increase the accessibility of supplies that prevent infections for different sites across the province using strategies such as mail-order distribution, onsite availability of supplies, mobile distribution of supplies, supplying satellite sites and volunteers, and standalone mailboxes. However, consultants identified that a barrier in accessing supplies occurs when there is no one available to distribute or replenish the stock of needles, syringes or other supplies that help prevent infections. SWAP is challenged to keep up with demand to replenish distribution sites due to a lack of sustainable funding. Further increases in human resource capacity for SWAP, to continue to innovate and scale up distribution of supplies across the province, is a key opportunity for the provision of supplies in NL.

Trusted volunteers and peer networks provide an additional opportunity to increase human resource capacity for NSDP. For example, consultants noted how integral volunteers have been to the establishment of preventive services and treatment on Bell Island. The Volunteer Needle Distribution RV continues to play an essential role in NSDP and connecting individuals to other important preventive services in their community. In general, consultants felt that when leaders, providers and community members accept and support NSDP efforts in their communities this increases the success of these programs and the likelihood that people will access these services.

Human resource factors specific to the provision of OAT in combination with NSDP in NL

Our consultants agreed that it might be ideal to have OAT and NSDP given out in combination; but, that in practice, there might be some inherent conflict for providers in combining these approaches. Some providers may consider the provision of these interventions as separate services, with needle and syringe distribution considered to be a community-based service and OAT considered to be a prescription-based service managed by authorized, regulated providers. We heard from consultants that some providers might think that if a patient is being prescribed OAT, they should not be using other drugs. In this way, provider attitudes may serve to stigmatize people who inject drugs and prevent them from accessing new supplies.

Consultants suggested that coordination between different services might help overcome some of the barriers associated with offering OAT in combination with NSDP. They suggested that community volunteers and service providers should collaborate so that patients have better continuity of care and can access all services even if the services are not offered in combination from a single provider. For example, anonymous methods of accessing NSDP in proximity to OAT may reduce barriers related to receiving supplies directly from a provider.

Economic Factors

We heard from consultants that opioid use-associated infections are a growing problem in NL and expensive to treat. For example, the Canadian Substance Use Costs and Harms Scientific Working Group reported that in NL in 2017 opioid use cost:

- $60 million (73%) in lost productivity;
- 7 million (8%) in healthcare costs;
- 11 million (13%) in criminal justice; and
- $5 million in other direct costs in NL (35).

Consultants pointed out that treatment for HCV is particularly expensive. The infection is also easily spread and can be asymptomatic. In contrast, prevention of infections such as HIV, HCV and infective endocarditis can have huge cost savings and a high social return of investment.

In 2018, the Government of NL and the Federal Government of Canada signed a bilateral agreement under the Emergency Treatment Fund to help address substance use disorder. This resulted in “an investment of more than $4 million – $2.7 million from the province and $1.6 million from the Government of Canada in 2018-19 – to improve access to opioid dependency treatment in the province using multi-disciplinary teams, case managers, primary care providers and telemedicine” (36). This funding has given rise to the Hub and Spoke model and efforts to expand treatment to rural areas that have improved access to OAT in the province (37).

In July 2022, funding was announced for community-led projects to improve health outcomes related to scaling up of prevention, harm reduction and treatment across the country. NL’s Safer Works Access Program received $176 055 over 18 months:

> *….to provide a mobile outreach service to increase access to harm reduction-based services and wraparound care supports in the rural areas of Clarenville and Bonavista. Services will include providing opioid response training and distributing safe injection and inhalation supplies,*

naloxone, fentanyl test strips, condoms, and resources on Sexually Transmitted Blood Borne Infections and harm reduction strategies (38).

The Bell Island Sobriety, Housing and Employment Inc. also received $518,982 in funding over 18 months to target individuals and family members of individuals who use alcohol, opioids and other drugs. This initiative will develop a peer support program in the community of Bell Island (38). This kind of project funding has helped those who use substances to access treatment and preventive care in NL.

However, consultants pointed out that sustainable funding is also needed. For example, the SWAP program has had consistent program growth (i.e. new program users, new towns serviced, etc.) but without the necessary funding increases to sustain the growth long(er) term. More sustainable long-term funding would give the program greater stability would allow the program in more rural areas, where services are least available.

It is also important to consider how economic factors may differ in rural versus urban environments for preventing and treating infections in NL. Findings from Thomas et al. suggest that rurality shapes the risk environment for opioid-related harms through environment influences including economic conditions. These authors list the following economic factors as important:

- economic decline or de-industrialization;
- a lack of employment opportunities leading to poverty and the development of informal economies; and
- reduced access to health services and alcohol and other drugs treatment and harm reduction options because of cost-related factors (30).

As noted previously, improving provincial data collection capacity to obtain reliable and timely data on infection rates, injection behaviors, and service needs for people who use drugs has been noted by consultants as an existing gap for the prevention of opioid use-associated infections in NL. Funding to increase data collection capacity specific to injection drug use and evaluation of prevention strategies may be an opportunity to improve infection prevention interventions to reduce HCV, HIV and endocarditis rates in NL.

Political Factors

The criminalization of drugs was a key political factor highlighted in our discussions about preventing infections among opioid users in NL. Some consultants felt that criminalization could be an impediment to the uptake of preventive interventions or testing for infections because individuals may fear that they could be recriminalized or face other negative repercussions. The criminalization of drug use was seen as something that could also affect how a person's community, providers, or the general public treats them (e.g., whether or not they can attain housing, whether or not they are comfortable asking for the help they need). Our consultants pointed to criminalization as a significant political factor that impacts wider societal stigma around people who use drugs.

One consultant noted a pilot initiative underway in British Columbia that is set to examine the decriminalization of small amounts of certain substances for personal use as a step to reduce the shame and fear associated with substance use. The federal Minister of Mental Health and Addictions and the Associate Minister of Health under the Controlled Drugs and Substances ACT (CDSA) have announced a

three-year exemption granting “the removal of criminal penalties for people who possess a small amount of certain illicit substances for personal use” (39). The results of this pilot approach could be informative in the Canadian context for other jurisdictions across Canada, including NL.

In considering the impact of legislation on preventing or treating infection in NL, consultants were not aware of any legislation related directly to the prevention of opioid use-associated infections. However, one consultant suggested that recovery-oriented language is something that could be examined within legislation and policy around drug use and substance use in order to help prevent stigmatization of individuals who use substances.

A report published by Action Hepatitis C in 2021 provides important information to consider for the prevention of HCV in NL. This report examined the progress towards viral Hepatitis elimination by 2030 in Canada by comparing metrics of planning, HCV Testing, HCV Testing-to Treatment Link, HCV Treatment, and HCV Prevention across provinces and territories. Metrics gathered for NL showed the province was on track for HCV elimination targets; however, this was despite having no elimination plan or strategy in place, and policy barriers to starting treatment. NL HCV Testing and treatment targets were reported as being met; however, the distribution of new needles was identified as far below recommended levels for the prevention of new HCV infections. The report recommends the following next steps to keep on track for HCV elimination in NL:

- Creating a mechanism for same-day approval of Direct Acting Antiviral reimbursement requests,
- Increasing needle distribution,
- Developing an elimination plan that includes targets, in consultation with priority populations and using a health equity lens (40).

References

1. Puzhko S, Eisenberg MJ, Filion KB, Windle SB, Hébert-Losier A, Gore G, et al. Effectiveness of Interventions for Prevention of Common Infections Among Opioid Users: A Systematic Review of Systematic Reviews. Front Public Health [Internet]. 2022 Feb 22 [cited 2022 Apr 12];10:749033. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8901608/

2. Centre for Addiction and Mental Health. Opioid agonist therapy [Internet]. 2016. Available from: https://www.camh.ca/-/media/files/oat-info-for-clients.pdf

3. Palmateer N, Kimber J, Hickman M, Hutchinson S, Rhodes T, Goldberg D. Evidence for the effectiveness of sterile injecting equipment provision in preventing hepatitis C and human immunodeficiency virus transmission among injecting drug users: a review of reviews. Addict Abingdon Engl. 2010 May;105(5):844–59.

4. MacArthur GJ, van Velzen E, Palmateer N, Kimber J, Pharris A, Hope V, et al. Interventions to prevent HIV and Hepatitis C in people who inject drugs: a review of reviews to assess evidence of effectiveness. Int J Drug Policy. 2014 Jan;25(1):34–52.

5. Smith C. Tracks survey of people who inject drugs (PWID) in Canada Phase 4 (2017-2019) Final Report: Newfoundland and Labrador (NL). 2020 Mar.

6. CATIE. CATIE - Canada's source for HIV and hepatitis C information. 2021 [cited 2022 Jul 13]. Estimated number of people who inject drugs and coverage of harm reduction programs in Canada. Available from: https://www.catie.ca/catie-news/estimated-number-of-people-who-inject-drugs-and-coverage-of-harm-reduction-programs-in

7. 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. Can Commun Dis Rep Releve Mal Transm Au Can. 2020 May 7;46(5):138–48.

8. Popovic N, Williams A, Perinet S, Campeau L, Yang Q, Zhang F, et al. National Hepatitis C estimates, Canada, 2019, CCDR 48(11/12) [Internet]. 2022 [cited 2023 Jul 17]. Available from: https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2022-48/issue-11-12-november-december-2022/national-hepatitis-c-estimates-canada-2019.html

9. Mosseler K, Materniak S, Brothers TD, Webster D. Epidemiology, Microbiology, and Clinical Outcomes Among Patients With Intravenous Drug Use-Associated Infective Endocarditis in New Brunswick. CJC Open [Internet]. 2020 Sep 1 [cited 2022 Jul 13];2(5):379–85. Available from: https://www.sciencedirect.com/science/article/pii/S2589790X20300615

10. Kudrina I, Puzhko S, Filion KB, Gore G, Paraskevopoulos E, Windle S, et al. Effectiveness of interventions for prevention of common infections in people who use opioids: a protocol for a systematic review of systematic reviews. Syst Rev. 2021 Nov 15;10(1):298.

11. MacArthur GJ, van Velzen E, Palmateer N, Kimber J, Pharris A, Hope V, et al. Interventions to prevent HIV and Hepatitis C in people who inject drugs: A review of reviews to assess evidence of

effectiveness. Int J Drug Policy [Internet]. 2014 Jan 1 [cited 2022 Mar 30];25(1):34–52. Available from: https://www.sciencedirect.com/science/article/pii/S0955395913001163

12. Curtis D. Data from the NL Pharmacy Network reported to Department of Health and Community Services as of December 22, 2022. 2023.

13. ACNL. Safe Works Access Program - St. John's - [Internet]. 2023 [cited 2023 May 16]. Available from: https://acnl.net/services/swap/

14. Provincial Opioid Dependence Treatment Center of Excellence, AIDS Committee NL/ Safe Works Access Program. St. John's Harm Reduction Site - Needs Assessment and Feasibility Study. 2020.

15. ACNL. Provincial HIV/HCV Services - [Internet]. 2020 [cited 2023 Mar 27]. Available from: https://acnl.net/services/provincial-hiv-hcv-services/

16. Eastern Health. Get Tested, Sexually Transmitted and Blood Borne Infections (STBBIs) – Health Information [Internet]. 2019 [cited 2023 Mar 27]. Available from: https://hi.easternhealth.ca/healthy-living/sexual-health/stis/get-tested-stis/

17. Memorial University S of P. APPROACH. 2023 [cited 2023 Apr 28]. APPROACH. Available from: https://www.approachstudy.ca

18. Pelley C. Ending hepatitis C [Internet]. Gazette - Memorial University of Newfoundland. 2022 [cited 2023 Jun 21]. Available from: https://gazette.mun.ca/research/ending-hepatitis-c/

19. Kronfli N, Dussault C, Bartlett S, Fuchs D, Kaita K, Harland K, et al. Disparities in hepatitis C care across Canadian provincial prisons: Implications for hepatitis C micro-elimination. Can Liver J [Internet]. [cited 2023 May 25];4(3):292–310. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9202774/

20. Homewood Research Unit. Brian Rush [Internet]. Homewood Research Institute. 2020 [cited 2023 Mar 14]. Available from: https://hriresearch.com/about-us/our-people/scientists/brian-rush/

21. Rush B, Tremblay J, Brown D. Development of a Needs-Based Planning Model to Estimate Required Capacity of a Substance Use Treatment System. J Stud Alcohol Drugs Suppl [Internet]. 2019 Jan [cited 2023 Feb 14];(s18):51–63. Available from: https://www.jsad.com/doi/10.15288/jsads.2019.s18.51

22. NLCHI. Opioid data (not yet available) – Provincial Data Lab [Internet]. 2023 [cited 2023 Mar 9]. Available from: https://datalab.nlchi.nl.ca/data-catalogue/opioid-data-not-yet-available/

23. Nakayama J, Hertzberg VS, Ho JC, Simpson RL, Cartwright EJ. Hepatitis C care cascade in a large academic healthcare system, 2012 to 2018. Medicine (Baltimore) [Internet]. 2023 Mar 10 [cited 2023 Jun 6];102(10):e32859. Available from: https://journals.lww.com/md-journal/Fulltext/2023/03100/Hepatitis_C_care_cascade_in_a_large_academic.51.aspx

24. Centre for Addiction and Mental Health. Opioid agonist therapy: a synthesis of Canadian guidelines for treating opioid use disorder. [Internet]. Toronto: Centre for Addiction and Mental Health; 2021 May [cited 2023 Feb 1]. Available from: https://www.drugsandalcohol.ie/34536/

25. Public Safety Canada. Prison Needle Exchange Program [Internet]. 2020 [cited 2023 Apr 3]. Available from: https://www.publicsafety.gc.ca/cnt/trnsprnc/brfng-mtrls/prlmntry-bndrs/20200621/017/index-en.aspx?wbdisable=true

26. Department of Health and Community Services CDCS. HIV & HCV Rates and Risk Factors 2018-2022. 2023.

27. NL Health Services D and IS. Incidence and prevalence of acute and subacute infective endocarditis, based on the number of unique clients who had either a fee-for-service physician visit or a hospitalization (or both) with a related diagnosis, NL, 2017/18 to 2021/22. 2023.

28. NHI NCI. Definition of seroprevalence - NCI Dictionary of Cancer Terms - NCI [Internet]. 2011 [cited 2023 Jun 19]. Available from: https://www.cancer.gov/publications/dictionaries/cancer-terms/def/seroprevalence

29. CBC News. New drug education program aims to highlight critical gaps in N.L. school curriculum | CBC News. CBC [Internet]. 2023 Mar 25 [cited 2023 Mar 29]; Available from: https://www.cbc.ca/news/canada/newfoundland-labrador/drug-education-nl-1.6789074

30. Thomas N, van de Ven K, Mulrooney KJD. The impact of rurality on opioid-related harms: A systematic review of qualitative research. Int J Drug Policy. 2020 Nov;85:102607.

31. College of Physicians and Surgeons of NL. Practice Guideline: Opioid Prescribing for Opioid Use Disorder (2022) [Internet]. NL; 2022. Available from: https://cpsnl.ca/standards-of-practice-and-practice-guidelines/

32. British Columbia Centre of Substance Use, B.C. Ministry of Health. A Guideline for the Clinical Management of Opioid Use Disorder [Internet]. 2017 Jun. Available from: https://www.bccsu.ca/care-guidance-publications/

33. College of Registered Nurses of NL. Fact Sheet - Nurse Practitioner Authority to Prescribe Buprenorphine-Naloxone and/or Methadone for Opioid Use Disorder [Internet]. 2021. Available from: https://crnnl.ca/site/uploads/2021/09/np-authority-to-prescribe-for-opioid-use-disorder.pdf

34. NL Pharmacy Board. Standards for the Safe and Effective provision of Opioid Agonist Maintenance Treatment. 2018. Report No.: https://nlpb.ca/media/SOPP-OAMT-May2018.pdf.

35. Canadian Substance Use Costs and Harms Scientific Working Group. Newfoundland and Labrador substance use costs and harms (2015–2017) [Internet]. Prepared by the Canadian Institute for Substance Use Research and the Canadian Centre on Substance Use and Addiction; 2021. Available from: https://csuch.ca/publications/CSUCH-Canadian-Substance-Use-Costs-Harms-Newfoundland-and-Labrador-Infographic-2021-en.pdf

36. Health and Community Services W. News Releases. 2018 [cited 2023 Mar 13]. Newfoundland and Labrador First Province to Sign Agreement with Government of Canada to Fund Innovative Treatment Options for Problematic Substance Use. Available from: https://www.gov.nl.ca/releases/2018/health/0629n02/

37. Government of Canada. A PAN-CANADIAN FRAMEWORK FOR ACTION: Reducing the Health Impact of Sexually Transmitted and Blood-Borne Infections in Canada by 2030 [Internet]. 2018 Jun. Available from: https://www.canada.ca/content/dam/phac-aspc/documents/services/infectious-diseases/sexual-health-sexually-transmitted-infections/reports-publications/sexually-transmitted-blood-borne-infections-action-framework/sexually-transmitted-blood-borne-infections-action-framework.pdf

38. Canada H. Health Canada announces nearly $40 million in funding to help support people who use substances across Canada [Internet]. 2022 [cited 2023 Jun 21]. Available from: https://www.canada.ca/en/health-canada/news/2022/07/health-canada-announces-suap-funding-to-support-people-who-use-substances-across-canada.html

39. Mental Health and Addictions. B.C. receives exemption to decriminalize possession of some illegal drugs for personal use | BC Gov News [Internet]. 2022 [cited 2023 Jun 21]. Available from: https://news.gov.bc.ca/releases/2022MMHA0029-000850

40. Action Hepatitis Canada. Progress Towards Viral Hepatitis Elimination By 2030 In Canada: 2021 Report. Toronto, Ontario; 2021 May.

41. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ [Internet]. 2017 Sep 21 [cited 2022 Jun 24];358:j4008. Available from: https://www.bmj.com/content/358/bmj.j4008

42. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. J Epidemiol Community Health. 1998 Jun;52(6):377–84.

Report Appendices

Appendix 1: Summary of Puzhko et al. research methods

What type of study did Puzko et al. conduct?

The authors determined in a preliminary search of the evidence that a number of systematic reviews (SRs) had already been published on existing interventions to prevent opioid use-associated infections (OUAI) in adults who inject drugs. Given the availability of SRs on the topic, the researchers opted to conduct a systematic review of systematic reviews (SR of SRs) to examine the existing body of high-level research evidence. In the review's protocol published in 2021, the authors described why they chose this specific study design stating that "a SR of SRs methodology allows [researchers] to perform a comprehensive review of the highest level of evidence from already synthesized SR-level data, with the end product ready to be used by clinicians and policy-makers" (10).

What research question did Puzhko et al. examine?

Puzhko et al. (1) used the following research question to guide their SR of SRs:

> *What is the SR-level evidence on the scope and effectiveness of interventions to prevent opioid use-associated infections in adults who use legal/illegal opioids as compared to those not participating in an intervention or as compared to the time prior to the intervention implementation?*

What evidence did study authors look for?

The authors used several key parameters to systematically search for, identify, and select relevant systematic reviews (SRs). The review protocol outlined three main criteria that a publication needed to have in order to be considered a SR. Publications were considered SRs if they:

1. described methods, including a systematic search strategy and inclusion/exclusion criteria;
2. performed a comprehensive search (using all relevant databases and an exhaustive search strategy); and
3. conducted a formal quality assessment of included studies using a validated tool (10).

The following table summarizes the main inclusion and exclusion criteria that study authors used when selecting SRs.

Table A1: Puzhko et al. 2022 Systematic Review (SR) Selection Criteria (1)

Parameter	Inclusion Criteria	Exclusion Criteria
Study Design	• SRs that synthesized "studies of interventions to reduce or prevent infection transmission/acquisition among users of pharmaceutical or non-pharmaceutical opioids by any route of use" (all study types) • SRs that reported on the effectiveness of the interventions, with or without meta-analysis	• SRs that synthesized information not relevant to North American context • Conference abstracts

Parameter	Inclusion Criteria	Exclusion Criteria
		• SRs that did not meet PRISMA checklist[12]
Population	• Adults who use pharmacological or non-pharmacological opioids licit or illictly by any route of use	• Adults who use unusual or experimental substances • Adults who use non-opium poppy plants • Children (including teenagers)
Intervention	• All population based-interventions that aim to prevent acquisition and/or transmission of OUAIs and coinfection	• All common infectious diagnoses relevant to opioid use were considered
Comparator	• All study types either with a comparator group or time/population prior to implementation of policy were included	• Studies without a comparator group or time/population prior to implementation of policy
Outcomes	Effectiveness of intervention to prevent opioid use-associated infections, e.g., • Infection transmission (of HIV, HCV, other), or • Intervention participation, or • Identification of knowledge gaps	• NA
Setting	• North American settings	• Non-North American Setting

[12] PRISMA stands for the Preferred Reporting Items for Systematic Reviews and Meta-Analysis. This is a 27-item checklist developed to improve the transparency of systematic reviews.

Appendix 2: Summary of Puzhko et al. research findings

What evidence did the authors find?

Ultimately, Puzhko et al. found twelve eligible systematic reviews (SRs) through their searching process. These SRs examined 84 primary studies in total. Out of the 84 primary studies, 82 of them were identified as relevant to the North American context.

What are the main characteristics of the evidence included in Puzhko et al.?

The authors found that available evidence is mostly focused on the effectiveness of preventive interventions against human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infections in users of non-pharmaceutical opioids (most commonly heroin) rather than on prevention of other opioid use-associated infections (OUAIs). The authors reported that "all included SRs targeted persons who inject drugs, recruited in different settings" (1).

Taken together, the review authors synthesized evidence from twelve SRs that investigated the effectiveness of eight different types of preventive interventions. Interventions investigated in SRs included:

- opioid agonist therapy (OAT)[13],
- needle and syringe distribution programs (NSDP),
- OAT combined with NSDP,
- syringe disinfection with bleach,
- behavioral interventions[14],
- multicomponent interventions (OAT and behavioral intervention),
- outpatient parenteral antibiotic treatments, and
- addiction services[15].

Eleven SRs targeted opioid agonist therapy (OAT) and needle and syringe distribution programs (NSDP) to prevent HCV and/or HIV along with other interventions, and one SR targeted interventions to prevent infective endocarditis.

In terms of outcomes, most SRs assessed infections prevention of either HCV or HIV (four SRs evaluated HCV and four SRs evaluated HIV). In addition, three other reviews investigated the prevention of both HCV and HIV (1).

How did the authors assess and categorize the quality of the evidence?

Puzhko et al. used a systematic approach to assess and categorize the SR evidence they examined. This stepped approach is similar to the process that CHRSP Research Officers use when assessing SRs for a full Evidence in Context Report (see appendix for description of CHRSP critical appraisal methods). Each step of analysis helped researchers analyze study methods and findings in more depth to determine which conclusions to draw from the evidence they examined including:

[13] A note on terminology: Puzko et al. used the terms opioid substitution therapy and needle and syringe exchange programs in their article. However, in our report we replaced these terms with what we understand is more up-to-date terminology - opioid agonist therapy and needle and syringe distribution programs.
[14] Included peer-educator training, counseling or educational sessions on skin and needles hygiene(1).
[15] Included "consultation by social work, addiction clinical nurse and/or psychiatry, documentation of addiction in the discharge summary plan, and plan for medication assisted treatment in the community(1)."

- an initial assessment of the risk of bias/methodological quality of individual systematic reviews using the AMSTAR-2 critical appraisal tool;
- a secondary assessment to distinguish high quality 'core' reviews from 'supplementary' reviews; and
- a final evaluation of the type of evidence statements available from SRs that were categorized as either 'sufficient', 'tentative', 'insufficient' or 'no' SR-level evidence using a previously developed framework.

In this final categorization of evidence, the authors identified 'sufficient', 'tentative', 'insufficient' or 'no' SR-level evidence based on a number of factors such as clarity of evidence, consistency of evidence, quality of evidence, and whether evidence came from a high-quality core SR or a lower quality supplementary SR. For more details on how the authors assessed and categorized the quality of the evidence they reviewed please see Appendix 5 in Puzhko et al. (1,3,11).

What are the main synthesis findings from Puzhko et al.?

After a thorough examination of systematic review evidence, Puzhko et al. concluded that the strongest evidence for the effectiveness of interventions to prevent opioid use-associated infections (OUAI) includes:

- sufficient evidence for the effectiveness of **opioid agonist therapy** to prevent **HIV**;
- tentative evidence for the effectiveness of **opioid agonist therapy** to prevent **HCV**;
- tentative evidence for the effectiveness of **needle and syringe distribution programs** to prevent **HIV**; and
- sufficient evidence for the effectiveness of **opioid agonist therapy combined with needle and syringe distribution programs** to prevent **HCV**.

All other interventions examined by Puzhko et al. either had insufficient evidence to support or discount the effectiveness of preventing common infections among people who inject drugs, or had no evidence available[16]. This includes insufficient evidence on the prevention of recurrent infective endocarditis for persons who inject drugs.

A full list of interventions and outcomes with insufficient evidence to support or discount the effectiveness of preventing common infections includes:

- behavioral interventions for HCV prevention;
- syringe disinfection with bleach for HCV prevention;
- multicomponent interventions (OAT + behavioral interventions) for HCV prevention;
- NSDP combined with OAT for HIV prevention;
- behavioral interventions for infective endocarditis prevention;
- addiction services for infective endocarditis prevention; and
- outpatient parenteral antibiotic treatments and addictions services consultations with a social worker, an addiction clinical nurse, or a psychiatrist to prevent infective endocarditis.

The authors also identified key knowledge gaps in the research evidence they reviewed:

[16] The authors categorized systematic review-level evidence on the effectiveness of interventions to prevent opioid use-associated infections (OUAIs) as insufficient when there was: no evidence available, insufficient evidence to support or discount the effectiveness of certain interventions, inconsistent evidence, or weak evidence.

- a lack of SR level evidence regarding interventions to prevent infections other than HCV and HIV (e.g., such as skin infections [soft tissue abscesses, cellulitis], bone infections [osteomyelitis], or fungal infections in persons who inject opioids); and
- a lack of SR level evidence regarding interventions that target users of pharmaceutical opioids in legal and mixed opioid users (e.g., like individuals with chronic pain or populations with multiple comorbidities) (1).

Appendix 3: CHRSP methods for critical appraisal and study quality

CHRSP Critical Appraisal Method for Evidence in Context Reports

Assessing Quality

CHRSP Research Officers use the AMSTAR[17] instrument (the maximum AMSTAR score is 11) to appraise the methodological quality of systematic reviews:

- a score of 0 to 3 indicates a Low Quality Systematic Review;
- a score of 4 to 7 indicates a Moderate Quality Systematic Review; and
- a score of 8 to 11 indicates a High Quality Systematic Review (41).

As well, we use a critical appraisal tool developed by Downs & Black to assess the methodological quality of primary studies (42). Primary studies scoring 28-26 are deemed to be of excellent quality with scores of 25-20 deemed to be good, 19-15 fair, and less than 14 poor.

The CHRSP Evidence Rating System

The CHRSP Evidence Rating System assesses the strength of the combined body of evidence about a particular intervention for achieving a given outcome for a defined population. The strength of the body of evidence increases with:

- the quality of the systematic reviews included in the analysis;
- the number of unique primary research studies included within the reviews; and
- the consistency of the findings.

Assessing Number of Studies and their Consistency

The table below outlines the thresholds for the number of reviews and included primary studies required to determine the strength of the body of evidence. Largely inconsistent findings, regardless of the number and quality of systematic reviews, are interpreted as a "Very Weak" body of evidence by default.

Table A3: CHRSP Evidence Rating System- Evidence thresholds for strength of body of evidence

Strength of the Body of Evidence	# of Systematic Reviews	# of Primary Studies included in the review literature
Strong	2 or more High Quality reviews	10+
Moderate	1 or more High Quality reviews	10+
Weak	1 or more High Quality reviews	5+
Very Weak	1 review with moderate or inconsistent findings	1-4

Considering the Impact of an Intervention on an Outcome

The CHRSP Evidence Rating System also considers whether the body of evidence:

- favors the intervention (i.e., the evidence indicates that the intervention works effectively enough to consider implementing it);
- indicates no benefit when the intervention is compared to the control (i.e., the intervention is no better than usual care); or

[17] AMSTAR (Assessing the Methodological Quality of Systematic Reviews) is a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions (41).

- is unable to indicate whether the intervention achieves better outcomes than the control (i.e., the report authors cannot draw any conclusions because there is a lack of evidence or there is conflicting evidence).

Appendix 4: Summary Table of Systematic Reviews from Puzhko et al.

Table A4: Summary of systematic reviews from Puzhko et al. (1) by intervention, outcome and study quality

Intervention	Outcome	SR Author	# of Primary Studies in each SR for this Intervention + Outcome Pair	SR Quality Rating and Core / Supplemental	Sufficient Evidence	Tentative Evidence	Insufficient Evidence
Outpatient parenteral antibiotic treatment (OPAT)	Infective endocarditis X	Bahji et al.	1	High quality, core review			X
Addiction Services	Infection acquisition X	Bahji et al.	1	High quality, core review			X
Syringe Disinfection with Bleach	HCV X	Hagan et al.	4	Low quality, supplemental review			X
Behavioral Interventions	Infective endocarditis X	Bahji et al.	1	High quality, core review			X
	HCV X	Sacks-Davis et al.	3	Moderate quality, core review			X
		Hagan et al.	2	Low quality, supplemental review			
Multicomponent Interventions (OST + BI)	HCV X	Hagan et al.	2	Low quality, supplemental review			X
Needle and Syringe Programs	HIV X	Sawangjit et al.	1 (2 seriously biased studies removed)	Moderate quality, core review		X	
		Aspinall et al.	12	Moderate quality, core review			
		Abdul-Quader et al.	12	Low quality, supplemental review			
	HCV X	Davis et al.	4	High quality, core review		X	
		Platt et al.	4	High quality, core review			
		Sawangjit et al.	2	Moderate quality, core review			

		Abdul-Quader et al.	6	Low quality, supplemental review			
		Hagan et al.	7	Low quality, supplemental review			
Opioid Substitution Therapy	HIV X	MacArthur et al.	9	Moderate quality, core review	X		
		Gowing et al.	4	High quality, core review			
	HCV X	Platt et al.	12	High quality, core review		X	
		Hagan et al.	1	Low quality, supplemental review			
NSP + OST	HIV X	Jones et al.	1	Critically low quality, supplemental review	X		X
	HCV X	Platt et al.	6	High quality, core review			
		Hagan et al.	1	Low quality, supplemental review			
		Jones et al.	1	Critically low quality, supplemental review			

Appendix 5: Summary of SWAP Services

Table A5: Summary of SWAP Services

NL SWAP Services and Satellite Sites 2023			
Site/Organization Name	Location	Population Serviced	Date Site Began
Shoppers Drug Mart	155 Torbay Road, St. John's	Any individual	November 2022
Choices for Youth Outreach	Carter's Hill Place, St. John's	Age 29 and below	November 2019
The Gathering Place	72 Military Rd, St. John's	Age 26 and above	May 2020
Naomi Centre	Patrick Street, St. John's	Women and non-binary individuals	November 2019
Thrive	Water Street West, St. John's	Any individual	September 2020
Safe Harbor Outreach Program (SHOP)	Downtown, St. John's	Women and non-binary individuals involved in sex work	May 2019
Managed Alcohol Program (MAP)	Downtown, St. John's	Current program participants. Women	January 2022
Shoppers Drug Mart Pharmacy	LeMarchant Road, St. John's	Any individual	February 2022 (Brown Bag Program)
Eastern Health/ Former TGP Clinic	LeMarchant Road, St. John's	Guests from the Gathering Place	June 2021
Lakeside Pharmacy	LeMarchant Road, St. John's	Pharmacy Patients	August 2022
Planned Parenthood	St. Claire Ave, St. John's	Any individual	November 2021
Harm Reduction Nurses Clinic (Eastern Health)	50 Mundy Pond Road, St. John's	People who use drugs	March 2021
St. John's Women's Centre	170 Cashin Ave. St. John's	Women and non-binary individuals	May 2021
Sobey's Pharmacy	Topsail Road, St. John's	Any individual	May 2022
Tommy Sexton Centre Shelter	47 Janeway Place, St. John's	Residents of the shelter	December 2020
ODT Clinic	Bell Island	Current patients	April 2019
Shoppers Drug Mart Pharmacy	Conception Bay South (CBS)	Any individual	February 2022 (Brown Bag Program)
Sobeys Pharmacy	Marystown, NL	Any individual	July 2021 (Brown Bag Program)
LifeWise Marystown	Marystown, NL	Individuals 16+ y/o living with mental health issues/illness	April 2022
REACH (Regional Action Committee on Housing)	Clarenville, NL	Any individual	January 2022
Individual Volunteer	Clarenville, NL	Any individual	August 2021
ODT Clinic	Gambo, NL	Current patients	June, 2021
Shoppers Drug Mart Pharmacy	Lewisporte (BBP)		(Brown Bag Program)
Shoppers Drug Mart Pharmacy	Grand Falls-Windsor, NL	Any individual	July 2021 (Brown Bag Program)

NL SWAP Services and Satellite Sites 2023			
The Medicine Shoppe Pharmacy	Pasadena, NL	Any individual	February 2022 (Paper Bag Pilot Program)
Mokami Status of Women's Council	Happy Valley-Goose Bay, NL	Women and non-binary individuals	July 2021
Labrador-Grenfell Health (ODT Clinic)	Happy Valley-Goose Bay, NL	Current patients	July 2021
ODT Clinic	Gander, NL	Current patients	April 2022
Outdoor Mailboxes			
St. John's Women's Center	170 Cashin Ave, St. John's	Mailbox (anyone) red mailbox outside of front door available 24/7	
SWAP Office Mailbox	47 Janeway Place, Pleasantville	Mailbox (Black mailbox) (Not serviced 24/7)	
Mobile Services			
SWAP Outreach Van Delivery	St. John's	Mondays and Thursday 7-10pm.	
	Corner Brook	Tuesday and Thursday evenings from 7:00-10:00pm website and (7-9:30 on Facebook info)	
Harm Reduction Nursing Van	St. John's		
RIOT (Rural Initiative Outreach Team)	Mobile outreach - Services all communities in the Clareville- Bonavista area	Call/text to arrange free delivery	June, 2022
Good Hands RV (Supplies provided by SWAP)	Bell Island, Peer Volunteer RV needle distribution		2017
Mail Orders anywhere in the province at no charge			

Appendix 6: Injection Behaviors reported by two NL based surveys

Table A6: Summary of Drug Use and Injection Behaviors reported by study participants of two NL survey studies

Drug Use and Injection behaviors	**Participant responses (136 recent drug users in NL, conducted 2020)** Source #1: Needs Assessment, 2020[18]	**Participant responses (130 individuals who inject drugs from NL, conducted in 2018)** Source#2: Tracks Survey, 2020[19]
Use by injection	• 34% used drugs by injection • 24% injected drugs daily • 10% injected drugs at least once a week • 46 % did not know last 6-month history of injection drug use or did not answer	• Survey population exclusively PWID (all used by injection) • 38% injected every day in the preceding month • 13.2% injected regularly one or twice a week • 76% injected more than one type of drug during the last 6 months
Needle use/reuse/ borrowing	• 40% reused personal needles • 22% have reused needles used by other people • 42% needed help injecting substances either all or some of the time	• 84.3% indicated using sterile needle and syringe at last injection • 87.4% reported never injecting with previously used needles and/ or syringes in last 6 mons • 12. 6% borrowed needles and/or syringes in the past 6 months
Borrowing/sharing other injection equipment	• 19% share other used equipment with people who also use substances (water, cookers, alcohol swaps, ties, filters, acidifiers)	• 46.9% borrowed injection related equipment in last 5 months Top 3 types of ancillary injection equipment borrowed in last 6 months • 38.9% borrowed tourniquets/ ties • 29.9% borrowed cookers/spoons • 26.8% borrowed water
Location of Injection Drug Use	• Top 5 places reported = Home, friend or families place, car, parking lot, stairwell • 26% have injected drugs in public or semi-private area • 14% refusing to answer or did not know	• 75% cited private homes or apartments, • 57.4% cited family member's place • 40.3% have injected in a public place

[18] The Tracks survey of people who inject drugs (PWID) in Canada Phase 4 (2017-2019) Final Report: Newfoundland and Labrador (NL) conducted in 2018 by Smith and colleagues examines the prevalence of HIV and hepatitis C as well as the associated risk behaviours among PWID in NL (5).

[19] The St. John's Harm Reduction Site Needs Assessment and Feasibility Study, conducted in partnership between the Provincial Opioid Dependence Treatment Center of Excellence and the AIDS Committee of Newfoundland and Labrador in 2020. As a part of this study people who use drugs in NL were surveyed about a number of areas including demographic information, drug use and methods, frequency of injection drug use, location of drug use, injection practices, types of drugs injected and general use, stigma & substance use disorder treatment and the demand for supervised injection services (14).