

# ReportNeedles.ca: A real-time needle collection tool to foster community health partnerships

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## ABSTRACT

Technology-mediated interactions between the public, healthcare agencies, and researchers can facilitate of community health partnerships. The use of such novel technologies can lead to innovations in public health research to address disparities and access issues. This article presents **the** web-based, real-time needle collection tool ReportNeedles.ca and describes its use in an ongoing community health partnership to deploy and evaluate pop-up interventions for blood-borne infection prevention and substance use harm reduction. Since April 2021, 34,350 needles have been collected from 466 public reports on the ReportNeedles.ca app in the city of Regina, Saskatchewan (population: ~215,000). This non-walkable city with pronounced needle prevalence may be representative of medium-sized cities in Canada, the United States, and elsewhere, where brick-and-mortar healthcare is predominantly accessible only to people of relative stability. This article discusses the tool's development, implementation, and evaluation plan alongside its potential for blood-borne infection **prevention, harm reduction**, and community-based participatory research.

## KEYWORDS

Community health partnership; HIV/AIDS; Substance-related disorders; Cities; Public health

## I. Introduction

This article describes a real-time needle reporting tool as an innovation to facilitate community health partnerships. Innovations in community health partnerships are needed to significantly reduce infectious disease transmission and prevent mortality from drug toxicity overdose. The Canadian province of Saskatchewan, and its capital city Regina, have endemic rates of: a) blood-borne infection (i.e., HIV and syphilis); and b) drug overdose deaths.

HIV/AIDS and syphilis infection rates in Saskatchewan have been more than double the national Canadian averages for extended periods of time.<sup>1,2</sup> Between 2010 and 2019, injection drug use (IDU) has been the most common primary mode of HIV transmission, accounting for approximately 65% of new HIV cases per year in the province.<sup>2</sup> Saskatchewan and Alberta had the highest distribution of needles and syringes in the country, and when examined as a general population rate, Saskatchewan distributed 7.5 needles and syringes per person annually, which is more than six times the national median of one needle and syringe per person for the general population.<sup>3</sup> In Saskatchewan, there is limited access to multidisciplinary HIV clinics **and** an estimated 35.6% of the Saskatchewan population **are** unable to access **any** clinical care, partially due to a lack of robust healthcare options and health inequities (e.g., homelessness and poverty).<sup>4</sup> Although there are a few HIV specialists, there is a lack of HIV-specific care, peer support, and HIV educational resources available.<sup>5</sup>

In 2016, it was estimated that there were approximately 7,300 people who use injection drugs in Saskatchewan who are theorized to primarily reside in Regina, accounting for 0.99% of the Regina population at the time.<sup>3</sup> Rates of infectious syphilis have been increasing nationally over a similar period of time, from 5.1/100,000 in 2011 to 24.8/100,000 in 2020;<sup>6</sup> however, Saskatchewan has reported the greatest relative increase of more than 400% from 2016 to 2020, resulting in the province's rate of syphilis being double the national average.<sup>7</sup> In Saskatchewan and other provinces, IDU has been found to be a primary risk behavior for syphilis infection, and the co-occurring endemics of HIV and syphilis have also been closely linked to IDU.<sup>6</sup> This link is especially prevalent in medium-size Canadian cities, such as Regina.

As of 1 August 2023, the province reported 291 drug overdose deaths (85 confirmed fatal overdoses and 199 suspected drug deaths) in the calendar year.<sup>8</sup> This will be the 8<sup>th</sup> consecutive year that Saskatchewan has reported steady increases in overdose deaths, reaching a crisis state.<sup>9</sup> Per capita in 2021, Saskatchewan reported a drug toxicity-related death rate of 20.6 per 100,000 people compared to Ontario (13.3) and British Columbia (5.3).<sup>10</sup> The majority of these deaths in Saskatchewan also involved the presence of an opioid. Rising drug-related deaths and harms in Saskatchewan—which contribute to the province’s HIV transmission rate being more than double the national average—have been attributed to three key factors: a) lack of refined data collection, whereby health and community services are unaware of where and when drugs are being used; b) lack of knowledge among people who use drugs about content of substances and safer substance use; and c) lack of support, due to a paucity of harm reduction services accessible to people who use drugs in Saskatchewan.<sup>10,11</sup>

Regina, Saskatchewan is a midsized city in Canada that is non-walkable and predominately reliant on automobile transportation. **This** poses a significant challenge for vulnerable populations, particularly individuals **with no or low income** requiring blood-borne infection and substance use services. The issue of limited-service accessibility due to geographical constraints imposed by the city’s car dominance necessitates a creative approach to health services. That is, individuals in need of essential blood-borne infection **and substance use** support are unable to access brick-and-mortar services within a feasible walking distance.

### **I.A Objective**

To contribute to the scholarship on practical tools for health research, this article introduces a web-based application—[www.ReportNeedles.ca](http://www.ReportNeedles.ca)—aimed at fostering community health partnerships and enabling community-based participatory research (CBPR).

### **I.B Partnership Description**

In Summer 2022, AIDS Programs South Saskatchewan, Inc. (APSS) **personnel** initiated a community health partnership with **the first author, a researcher** at the University of Regina. **APSS staff (executive director – third author, research and evaluation specialist – fourth author, and harm reduction**

coordinator – fifth author) initiated this partnership due to a Fall 2022 provincial health research grant opportunity and contacted the first author due to his prior community-based health research regarding blood-borne infections and substance use.<sup>12-14</sup> APSS had developed the ReportNeedles app, launched it in April 2021, and had subsequently been collecting discarded needles from public locations based off user reports. APSS initiated the partnership in order to: a) evaluate needle prevalence in Regina over time, identifying areas of elevated prevalence; and b) deploy and evaluate blood-borne infection prevention and harm reduction interventions, geo-located to areas of elevated prevalence. The first author and APSS's executive director discussed expanding the partnership to bolster expertise on the research team, and invited the sixth author (a harm reduction implementation science specialist), seventh author (leadership expertise in Saskatchewan's HIV/AIDS response), and eighth author (expertise in geospatial methods) for the Fall 2022 grant submission focused on harm reduction. This funding proposal was approved for \$150,000 CDN over two years (2023-2025). Of this awarded amount, \$100,000 was allocated to APSS and the remaining \$50,000 allocated to the University of Regina. The second author was then hired as the project coordinator. As the project got underway, discussions began about incorporating blood-borne infection prevention and the ninth and tenth authors were invited to the partnership due to their scholarly and community expertise in this area. The team has since received supplementary funding from a national HIV trials network, and Canada's health research funding council, maintaining the funding structure of 2/3<sup>rd</sup> allocation to APSS and 1/3<sup>rd</sup> allocation to the University of Regina. This article was written by the first and second authors, with APSS providing detail on ReportNeedle.ca's development, and all authors edited and approved the final manuscript. As the partnership continues to grow, this article is written from the perspective of the partnership's primary community and academic partners with agreement from the full team.

## II. ReportNeedles.ca Tool

The tool ReportNeedles.ca is a web-based app developed by AIDS Program South Saskatchewan, Inc. (APSS) for the public and first responders to anonymously enter community needle presence. The application provides geographic data that offer valuable insights into the distribution of needles, an indicative marker of areas where individuals requiring substance use services are more likely to be concentrated. Utilizing this data and geographic information software (GIS), researchers and APSS can explore the disparity between service locations and the locations of service users in Regina. It is hypothesized that the current geographic distribution of services fails to adequately reach those in need of services. Ethics approval was obtained from the [ethics board blinded for peer review] (Protocol ID# 236).

## **II.A. Tool Purpose**

This tool serves two purposes. First, it allows members of the public to report discarded needles in public areas like parks and parking lots, so that APSS staff can collect them. Second, it helps APSS staff locate blood-borne prevention **and harm reduction** services in areas where there is a high prevalence of discarded needles.

## **II.B. Tool Development**

ReportNeedles.ca was coded by a web developer, in consultation with APSS, as part of **an event, or** hackathon, **where people gather to participate in rapid and collaborative technology development** for social innovation. APSS identified the need for the app due to the extremely high presence of discarded needles in public places, that were beyond the capacity of the fire department to collect. ReportNeedles.ca was coded for scale, as the website's code has capacity for geospatial reporting in many areas (connected via Google Maps) with the potential for discrete needle reports to be directed to distinct organizations based on location, and keeping the reports private to an organization within that local area. **At present, the tool is only being used by APSS in Regina.**

## **II.C. Tool Implementation**

Between 1 April 2021 and 31 July 2023, APSS has collected 34,350 needles from 466 reports (M=74 needles). Since its launch, APSS has worked independently<sup>15</sup> and within the community health partnership<sup>16</sup> to both raise public awareness of the app, and demonstrate to stakeholders (such as first responders who traditionally collect discarded needles) that APSS is a viable option for needle reporting and collection.<sup>17</sup> Within 24 hours of receiving a report, and often on the same day within a brief window of time, APSS collect and safely dispose of needles reported through the app. The tool has an integrated geomatics feature which enables the administrators to generate visualizations using the community needle prevalence data reported through the website. Figure 1 shows a map of needle prevalence from January to June 2023, alongside approximate 15-minute walk radii of APSS and other HIV services.

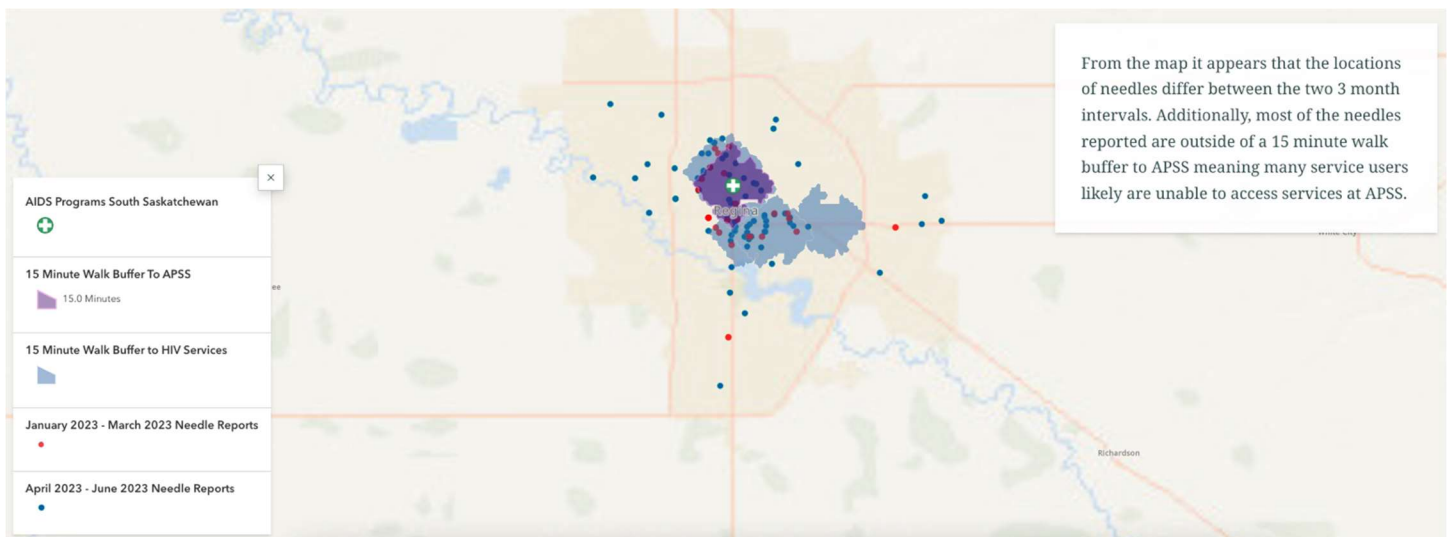


Figure 1: Map of Needles Reported through ReportNeedles.ca and HIV services

#### II.D. Tool Evaluation.

A multi-phased evaluation will be conducted to evaluate the tool's effectiveness in addressing needle presence and its potential impact on public health initiatives. Community needle prevalence reports will be generated monthly with information on the number and location of needles in Regina. These reports will include thematic maps employing heat maps to visualize using the community needle incidence data reported through the website.

Additionally, spatial analysis will be conducted using hotspot analysis techniques like Getis-Ord  $G_i^*$  to identify clusters and patterns of needle incidence in the community<sup>18</sup> and proximately analysis (e.g., buffer analysis) to analyze relationships between needle incidence and access to care.<sup>19</sup> Through these analyses, we are able to gain valuable insights into areas with higher needle prevalence, aiding in the identification of potential hotspots and helping guide targeted intervention strategies. As Regina is not a walkable city and lacks sufficient support for people who use drugs and people who are homeless, areas of injection drug use fluctuate over time. By identifying current hotspot areas of injection drug use, our community health partnership will deploy and evaluate pop-up intervention sites local to where people may be engaging in behaviours that cause elevated risk for blood-borne infection and drug toxicity overdose.

### **III. Discussion**

The ReportNeedles.ca tool shows promise as a tool to address issues of community needle prevalence and access to care. The tool has the ability to foster community health partnerships to address issues related to blood-borne infection and substance use harm reduction. Likewise, the tool has the potential to facilitate community-based participatory research (CBPR).

#### **III.A. Implications for Blood-Borne Infection Prevention**

By providing the public with the means for reporting discarded needles via an app, the tool offers a dynamic data source that aids in identifying areas with higher prevalence of needles, a key marker for locations where individuals at risk of blood-borne infections are concentrated. This spatial insight allows for targeted outreach, education, and resource allocation to effectively reach these vulnerable populations. Point-of-Care testing for HIV and syphilis are screening test that offer rapid access to testing and results in any venue (such as pop-up interventions in public spaces).<sup>20</sup> These rapid forms of testing have been recommended to curb the re-emerging endemics of HIV and syphilis in Canada, yet medium-size Canadian cities lack pragmatic possibilities for deploying this testing to individuals of highest risk such as people who use injection drugs.<sup>21</sup> Given that many individuals at high risk for HIV do not have regular access to medical care and preventative health



services,<sup>22</sup> community-based screening and pop-up interventions in areas identified by spatial analyses are advantageous and show promise in increasing testing.

### **III.B. Implications for Harm Reduction**

The introduction of the ReportNeedles.ca holds promising implications for advancing harm reduction strategies and addressing public health concerns. By providing the public with a convenient means of reporting needle presence, the platform offers a real-time data source that can guide targeted interventions in areas where individuals requiring substance use services are concentrated. This timely information empowers harm reduction organizations to allocate resources effectively, distribute clean needles, provide safe disposal options, and offer outreach services to vulnerable populations.

As a form of harm reduction, APSS is offering Naloxone trainings in hotspot areas. Naloxone training is a brief, educational harm reduction intervention comprised of distribution of naloxone alongside information about opioids, safer drug use, overdose risk and symptoms, and medication administration.<sup>23-25</sup> These trainings have been found to significantly increase knowledge regarding safer substance use amongst people who use drugs, service providers, and the public.<sup>23-25</sup> Naloxone can reverse a potentially fatal opioid overdose and can be administered by anyone,<sup>23-25</sup> however training is required to ensure proper implementation.<sup>24</sup> Additionally, harm reduction peer support groups will be offered by APSS to active drug users that focus on psychoeducation, enhancing participant support networks, and knowledge of safer drug use.

### **III.C. Implications for Community Health Partnerships**

The ReportNeedles.ca tool has the ability to foster community health partnerships between organizations. By utilizing a tool where community members, community agencies, and various stakeholders collaborate to report needle presence, the tool stimulates a culture of shared responsibility for public health and safety. This collaborative approach fosters cross-sector knowledge exchange **whereby** community organizations, emergency departments (i.e., law enforcement, fire department), healthcare providers, and researchers **can** pool their expertise and collaborate towards a common goal. Ultimately, the tool's role in

fostering active engagement, promoting data-driven decision-making, and enhancing communication underscores its potential to create community health partnerships.

### **III.D. Directions for Future Research**

The tool ReportNeedles.ca offers many potential avenues of research, including the potential for other community health partnerships to utilize the tool as a facilitator for CBPR efforts. Health-related CBPR aligns closely with an implementation science framework to guide the assessment of the acceptability, fidelity, feasibility, and cost of interventions.<sup>26,27</sup> This assessment incorporates the historical relationship between a health system and the client population, sociocultural considerations to adaptation, and equitable access to effective interventions.<sup>28</sup> The RE-AIM framework of implementation science could be employed to evaluate this tool.<sup>29</sup> Overall, the tool permits community health partnerships to develop rapid assessment and response frameworks that permit real-time needle identification, collection, and pop-up intervention that could be used to address many problems including HIV and blood-borne infections.<sup>30-32</sup> In addition to an evaluation of the tool, future research will focus on how the tool can be adapted for other health challenges in the community

### **III.E. Limitations**

While the tool ReportNeedles.ca holds considerable promise, it is essential to acknowledge its potential limitations. First, the reliance on self-reported data introduces the potential for reporting bias and underreporting, which could affect the accuracy and comprehensiveness of the reported needle prevalence. Additionally, the platform's effectiveness depends on user use and community awareness, potentially limiting its reach in certain areas. The spatial analysis of reported data might also be influenced by spatial biases, as some areas could be overrepresented due to a higher concentration of tool users. Lastly, the platform's long-term sustainability hinges on: a) consistent engagement, requiring ongoing efforts to maintain community interest and participation; and b) innovation and iteration of the tool, based on health partnership experience as well as user feedback and needs.

## **V. Conclusion**

The ReportNeedles tool may offer significant utility to service providers, healthcare professionals, researchers, and policymakers engaging in community health partnerships. By shedding light on the discrepancies between service availability and location of service users, the study underscores the importance of examining alternative service distribution models like pop-up interventions. Pop-up interventions can bring services directly to service users **by** strategically locating services based on the data-driven identification of areas of elevated needle prevalence.

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