Syphilis Point-of-care Rapid testing and Immediate Treatment Evaluation (SPRITE): A Locally-Driven Collaborative Project (2023-2024)

Final Report to Public Health Ontario

October 2024

Highlights

- Public health units (PHUs) in Ontario have experienced a dramatic spike in the incidence of infectious syphilis. Underserved populations, such as people who are street-involved, are at increased risk for syphilis and other sexually transmitted and bloodborne infections (STBBIs). Using point-of-care tests (POCTs) in combination with outreach models of care represents a low-barrier method to reach undiagnosed and underserved populations.
- The aim of this Locally-Driven Collaborative Project (LDCP) was to evaluate the real-world implementation of a syphilis POCT and treatment model of care targeting underserved populations across five Ontario PHUs [Kingston, Frontenac and Lennox & Addington Public Health (KFL&APH), Hastings Prince Edward Public Health (HPEPH), Leeds, Grenville and Lanark District Health Unit (LGLDHU), Ottawa Public Health (OPH), and Thunder Bay District Health Unit (TBDHU]) using the INSTI® Multiplex HIV-1 / HIV-2 / Syphilis Antibody POCT.
- KFLA&PH implemented the dual POCT (June-August 2023) before the LDCP, which commenced in August 2023 and continued until August 2024. Results from this pre-LDCP period in KFL&APH are included in the overall LDCP results reported here.
- 567 POCTs representing 512 unique individuals were attempted across the participating PHUs from June 23, 2023 to Aug. 22, 2024. Most people were tested at an outreach blitz/pop-up (51.3%) or at a community service hub (26.8%). 41.3% were female, 24.5% reported having multiple sex partners, 31.4% used injection drugs and 24.3% reported they were not linked to any community services.
- The majority of participants (66%) reported being un(der)housed and 47.1% reported that they had no postal code of residence. Of people reporting valid postal codes that linked to deprivation indices (n=252), 66.7% lived in the most materially-deprived neighbourhoods and 88.5% in the most socially-deprived neighbourhoods (quintiles 4 and 5).
- To detect a sensitivity of 90% with a 10% margin of error and 95% confidence if the prevalence of syphilis in the study population is 10%, the sample size was calculated to be 346 (with valid POCT and serology results). Given the underlying prevalence of syphilis may be different in each PHU, the preference would be to have a sample size of 346 at each PHU. In light of this, the following performance results aggregated across PHUs are for monitoring purposes only:
    - Of the 567 POCTs, 479 had paired serology results in which performance statistics were calculated. Test performance for syphilis was calculated to be sensitivity 70.3% (53.0, 84.1), specificity 99.3% (98.0, 99.9), positive predictive value 89.7% (72.6, 97.8) and negative predictive value 97.6% (95.7, 98.8). The test was able to detect all HIV cases (N=8); however, there was one dual false positive (syphilis and HIV), two false positives for syphilis, and two false positives for HIV.
- A survey of health-care providers involved in implementation showed high feasibility and acceptability of the POCT. However, concerns were noted in terms of functionality of the test,

both in general and in outreach conditions with the target population, as well as concerns with potentially missing early infectious syphilis and latent syphilis.

- Outreach models and timing of POCT implementation differed across participating PHUs. Developing medical directives, clinical policies and procedures, and managing staffing capacity depended on the unique contexts and history of outreach models within each PHU.

- Across all PHUs, 164 testing events occurred. Staffing depended on the type of event and location and usually included at least one to two public health nurses (PHN) or nurse practitioners; other staff involved in supporting logistics included, social workers, outreach workers, students, and data clerks.

- This LDCP has catalyzed other research and has expanded to include other non-urban or rural PHUs, with grants totalling $500,000.

- More data is needed to determine the POCT's performance across different background rates of infectious syphilis. However, this research has demonstrated that a flexible outreach model of care with rapid POCT and treatment for syphilis increases connection with underserved populations, removes barriers, and identifies and treats new syphilis infections, including reinfections.

Acknowledgements

Public Health Ontario and Locally-Driven Collaborative Projects Program

With the aim of tackling an applied public health research or evaluation question of shared interest, the Locally-Driven Collaborative Projects (LDCP) program fosters collaboration across Ontario public health units (PHU) and with academic and community parties. Anticipated outcomes include applied research and evaluation evidence, increased research and evaluation capacity, and solidified partnerships. The LDCP program is funded by Public Health Ontario (PHO). The SPRITE Team gratefully acknowledges this funding, and the support provided by the PHO LDCP team from August 2023 to March 2024.

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Land Acknowledgement

This project was conducted on many different traditional Indigenous lands across Ontario. From Oji-Cree in the north to Huron-Wendat in the south. We are grateful for the care and attention these diverse Indigenous groups brought to their lands and for us now to be able to work and collaborate across them. We acknowledge the work that is needed to improve the lives of Indigenous peoples living in our public health units.

List of Acronyms

CNF	Clinical nursing facilitator
CoP	Community of practice
HPEPH	Hastings Prince Edward Public Health
HCP	Health-care provider
iPHIS	Integrated Public Health Surveillance System (for Ontario)
KFL&APH	Kingston, Frontenac and Lennox & Addington Public Health
LGLDHU	Leeds, Grenville and Lanark District Health Unit
LIM-AT	Low-income measure, after-tax
OPH	Ottawa Public Health
POCT	Point of care test(s)(ing)
PHN	Public health nurse
PHU	Public health unit
RE-AIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance
RPR	Rapid plasma reagin
STBBI	Sexually transmitted and blood-borne infections
TBDHU	Thunder Bay District Health Unit
WHO	World Health Organization

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Disclaimer

The views expressed in this publication are the views of the project team, and do not necessarily reflect those of Public Health Ontario.

Why did we undertake this work?

Infectious syphilis rates are on the rise in many regions of the country, including Ontario. Syphilis is caused by the bacterium *Treponema pallidum* subspecies *pallidum* and is transmitted through vaginal, anal, or oral sex, sharing sex toys, skin contact with a sore (chancre) or rash, placenta to developing fetus, during childbirth from mother to baby, and from blood transfusions in places where blood is not screened. Multistep laboratory serological testing is considered the gold standard to diagnosis and stage syphilis infections. Undiagnosed and untreated syphilis may pass through four stages with varying signs and symptoms, potentially leading to serious health complications and even death. However, it is easily cured with antibiotics, usually given by injection.

In Ontario, the rate of infectious syphilis has doubled from approximately 12 cases per 100,000 people in 2017 to 24 cases per 100,000 people in 2022 (1). There has been a demographic shift away from primarily men who have sex with men being infected with syphilis, to include women, and then subsequently to their babies (1–3). Across Canada, congenital syphilis cases have soared by 1271% from 7 cases in 2017 to 96 cases in 2021 (3). In Ontario, the number of congenital cases averaged about one per year from 2013 to 2018, but started to climb in 2019, and in 2022 reached 27 cases (10 cases per 100,000 population that are less than two years of age) (1).

Geographically in Ontario, rates of infectious syphilis vary between the 34 PHUs, and have not increased at the same rate over time (1). From 2020 to 2022, the greatest increases have been experienced by Algoma Public Health, Leeds, Grenville and Lanark District Health Unit (LGLDHU), KFL&A Public Health (KFL&APH), and Thunder Bay District Health Unit (TBDHU).

People, especially women, who are un(der)housed, street-involved, work in the sex trade, or use injection drugs are known to be disproportionately affected by syphilis (1,4,5). In 2022, the age-standardized rate of infectious syphilis among females 15 to 44 years of age was almost three times higher in neighbourhoods with the most materially related marginalization compared to those with the least materially related marginalization (1). Housing instability, stigma, discrimination within the healthcare system, and syndemics of substance use (particularly opioids and crystal methamphetamines) and co-infections all lead to limited access to care, resulting in delayed diagnosis and treatment (2,6–8). This specific syndemic also correlates to failed opportunistic care for pregnant persons. Every congenital syphilis case is a blatant sign of health inequity, an unnecessary reminder to all players in the health system and beyond that they can do better.

In addition to social risk factors, the COVID-19 pandemic decreased capacity to deliver sexually transmitted and blood-borne infection (STBBI) prevention, testing, and treatment services (9), which resulted in the underdiagnosis and underreporting of STBBIs for all population groups. This has been the case for several PHUs across Ontario, many of which had to pivot sexual health services to accommodate COVID-19 case and contact management and clinical support for mass immunizations.

Diagnostic screening for syphilis in Ontario is typically conducted within a health-care setting based on clinical guidelines outlined by Public Health Ontario (PHO) and the Canadian Guidelines on Sexually Transmitted Infections (10,11) (See Appendix 1 for more information). Reducing barriers to testing is seen as integral to STBBI detection and control, especially among underserved groups (8,12,13). Point-of-care tests (POCT) can substantially remove barriers by allowing individuals to be tested outside of traditional clinic settings, providing results in a matter of minutes versus days, and linking individuals to treatment and

follow-up services at time of testing (14). The Government of Canada has declared that it is "committed to playing its role in the development, regulatory approval and deployment of POCT and additional novel technologies" so that new technologies can be used in non-health-care settings and are part of the strategy to reach those who are undiagnosed and link them to treatment (13,15). Low-barrier POCTs have been demonstrated to be acceptable and reliable in various settings (14).

In December 2022, in response to spikes in both the rates of infectious and congenital syphilis cases, KFL&APH declared a syphilis outbreak. As part of community mobilization, the early detection of syphilis in underserved communities was prioritized through outreach nursing with partners and special access permission from Health Canada to use the INSTI® Multiplex HIV-1 / HIV-2 / Syphilis Antibody Test (16). This POCT, referred to as the INSTI® dual POCT, provides simultaneous screening for both syphilis and HIV in approximately 60 seconds. At the time in Canada, the INSTI® dual POCT was being used in Alberta and shown to be a valuable tool in the rapid and low-barrier recognition of syphilis and HIV (17,18). By spring 2023, KFL&APH ordered 50 INSTI® dual POCTs and began pilot-testing.

Very little is known about implementation and effectiveness of POCTs, and most evidence to date is not relevant for local public health agencies and the populations they serve. By March 27, 2023, bioLytical received regulatory approval from Health Canada to sell the INSTI® dual POCT across Canada for professional use in point-of-care settings (19), making larger scale evaluation feasible. It is currently the only Health Canada approved syphilis POCT on the market.

This Locally-Driven Collaborative Project provided a unique opportunity for a larger scale, real-world evaluation of a syphilis POCT and treatment protocol implemented to reach populations at highest risk by bringing together five Ontario PHUs with a similar interest and readiness to act.

Results from this evaluation will inform continuous quality improvement in implementation, provide information necessary for program decision-making, and add to this nascent body of research.

Research Goal

The overall goal of this project was to evaluate the real-world implementation of POCT for syphilis in underserved populations using the INSTI® Multiplex HIV-1 / HIV-2 / Syphilis Antibody Test across multiple Ontario PHUs.

Research Objectives

The major research objective was to build capacity to implement and evaluate a flexible outreach POCT and treat model of care in HPEPH, KFL&APH, LGLDHU, OPH and TBDHU from August 2023 to March 2024[1] as part of each PHUs' sexual health/harm reduction outreach services to underserved groups.

Specific objectives included:

- Developing a community of practice (CoP) among participating PHUs where experiences could be shared and built upon, procedures, policies, and resources shared or jointly developed, and where coordination between front-line public health activities and provincial public health functions could take place.
- Monitoring program process metrics including test performance of the POCT in real-world settings.

[1] Data collection, analysis and knowledge dissemination continued until August 2024

- Understanding factors related to the delivery and utility of the test from a clinical and population health perspective.

How did we do this work?

Study Design

This was a mixed-methods implementation evaluation containing multiple components, including assessing diagnostic test performance of the POCT in non-traditional clinic settings. Collaboration between the five PHUs began on Aug. 28, 2023. POCT implementation had begun in KFL&APH (June to August 2023) just prior to the LDCP as part of the Health Canada special access program approval. Data collected as part of this evaluation includes what was collected during this pre-LDCP period in KFL&APH and is current up to Aug. 22, 2024.

Target population

Delivery of STBBI clinical services to residents in Ontario varies by PHU, as each PHU has different internal resources, access to community services, or community need. However, all have underserved groups at higher risk for STBBIs (e.g., un(der)housed, live with low income, use injection drugs, experience mental health concerns, or otherwise street-involved). This street-involved population was the target for POCT in the catchment areas of HPEPH, KFL&APH, LGLDHU, OPH, and TBDHU.

Three of the PHUs have similar sociodemographic profiles (HPEPH, KFL&A, TBDHU - Statistics Canada's Health Peer Group C), one is more rural (LGLDHU) and classified as Peer Group D, and OPH is the largest and most densely populated (Peer Group B) (20).

From 2017 to 2022, both KFL&APH and TBDHU have experienced similar trajectories of increase in the rate of infectious syphilis. Contextually speaking, both are similar sociodemographically and have cities acting as hubs for the surrounding area. However, they are different in that TBDHU is one of the most northerly and expansive PHUs in Ontario, while KFL&APH is home to five out of the eight Corrections Service Canada institutions that are located in all of Ontario (21).

From 2021 homelessness point-in-time counts, there were 180 people in Belleville (HPEPH) estimated to be experiencing homelessness, 207 in Kingston, and 221 in Thunder Bay. The most recent count for Ottawa (2018) enumerated 1,400. The City of Kingston maintains a registry of individuals who are homeless or at risk for becoming homeless and who are accessing homelessness-related services. In 2023, there were 1,924 unique individuals who received services (personal communication with Housing Program Administrator, City of Kingston). Please see Appendix 2 for a comparison of select 2021 Census indicators by participating PHU.

Individuals who are street involved are at high-risk of being lost to follow-up, due to transiency and their limited personally-linked contact information. Traditional serology testing takes a number of days for the blood specimen to be sent to the lab, tested, and results returned to the PHU (10). If positive, by the time the PHU is able to follow-up, the person may be difficult or impossible to locate for treatment. Testing and empiric treatment need to occur at the same time for effective prevention and control of syphilis in this underserved population.

Intervention: Point of Care Testing (POCT) and Rapid Treatment

The POCT comprises individual test kits with a lancet, pipette, alcohol swab, membrane unit, sample diluent, colour developer, and clarifying solution in three separate bottles; it must be administered by trained health-care providers (HCPs). Blood from a finger prick is collected by capillary-fill pipette, mixed using sample diluent, added to the membrane unit, followed by colour developer, and clarifying solution. Results are read after full absorption of the clarifying solution and are no longer valid after five minutes.

Medical directives were developed in four of the five[2] participating PHUs, allowing public health nurses (PHN) to treat for suspected (based on positive POCT) or confirmed syphilis cases with Benzathine penicillin G-LA 2.4 million units IM as a single dose. Regardless of POCT result, participants receive health education and are asked to provide a single venous blood specimen (serum) for confirmatory testing. After confirmatory serologic results are received by the PHU from the Public Health Ontario Laboratory, a nurse compares the POCT result to the confirmatory serologic result. The nurse initiates immediate follow-up if the serologic test results differ from that of the POCT, specifically if the POCT was nonreactive but the serologic test is indicative of a new infection, including reinfections. Otherwise, follow-up occurs based on clinical judgement for multiple injection treatment or at standard post-treatment intervals to confirm adequate treatment response. Ideally, clients with new infections should be examined by a licensed physician or nurse practitioner to ascertain staging and a detailed follow-up plan.

The main purpose of the POCT is rapid treatment for those testing newly positive for syphilis. PHUs incorporated POCTs into an outreach sexual health/harm reduction model where PHNs provide testing and treatment in locations where the target population is known to congregate, such as shelters, addictions and mental health services organizations, meal programs, supervised consumption sites, encampments, etc. Settings and recruitment will be discussed in the results section.

Please refer to (22) for more detailed information on the study protocol. This has been submitted and is currently under review at BMJ Open. Syphilis is different than other STIs in that once infected, individuals will have treponemal antibodies for life. The INSTI® dual POCT identifies treponemal antibodies (IgG and IgM) and thus cannot differentiate between new or past (previously treated) infections. Other known limitations are difficulty identifying people who are newly infectious or in the latent stages of infection (see Appendix 1), with low rapid plasma reagin (RPR) titres, and cross-reactivity with other infections like hepatitis C (16). As recommended by the manufacturer, regular quality assurance (QA) testing of kits was conducted throughout the project (16).

Community of Practice (CoP)

Regular monthly meetings were planned between LDCP members using KFL&APH's Microsoft Teams and SharePoint platforms. The purpose of meeting regularly was to allow project members to ask questions and provide input about POCT implementation and evaluation processes, procurement of tests, and HCP training. Members were asked to provide updates on the progress of POCT implementation and lessons learned in their respective PHUs.

[2] In one PHU, nurse practitioners were part of the model of care and provided orders for treatment; therefore, they did not require the medical directive.

Outcomes

Outcomes and indicators were developed to answer evaluation questions related to the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework (23).

R	Who is participating? Are we reaching our target population? Why might we not be reaching people?
E	What is the performance of the POCT (sensitivity, specificity, positive and negative predictive values)? What was the percentage of new infections treated in the field? What was the time to treatment before POCT was implemented?
A	What are the barriers and lessons learned to implementation in different contexts? What are PHN implementers' experiences and perspectives?
I	How is the POCT delivered? Are there differences across contexts? If so, why?
M	Will this dual POCT continue to be implemented past LDCP funding? If so, how? What is the long-term effectiveness of the POCT?

The sample size was calculated to determine the real-world performance of the POCT based on our target population. To detect a sensitivity of 90% with a 10% margin of error and 95% confidence if the prevalence of syphilis in the study population is 10%, the sample size was calculated to be 346 (with valid POCT and serology results).[3] Given that the underlying prevalence of syphilis may be different in each PHU, we would ideally prefer a sample size of 346 at each PHU.

Data collection

Data on POCT participants was collected as part of normal documentation practice at each of the PHUs (for most PHUs this was paper assessment forms in the field and then scanned into the PHU Electronic Medical Record (EMR) in the office). Assessment forms were modified to include details on participants' POCT results, risk factors, and necessary consent processes for research and evaluation purposes. Each PHU shared POCT participant results anonymously to KFL&APH via a secure online data entry form on Medallia. Data for this was obtained from outreach assessment forms and electronic or paper EMRs, including serologic results from the Public Health Ontario Laboratory.

A tracking form for POCTs administered at specific times/dates and locations was kept by each PHU; updates were sent at regular intervals to KFL&APH for evaluation purposes.

Details of how POCT was implemented at each of the PHU participant sites were gleaned from documents shared in the CoP SharePoint site, through LDCP meeting minutes, and email follow-up with individual sexual health managers or project implementers.

Assessing HCP perspectives in terms of feasibility and acceptability of the POCT, largely borrows from a framework and set of questions developed by the WHO ProSPeRo Network (24). The adapted survey contains a series of Likert items consisting of a discrete number of response choices per question. Staff were asked to select a level of difficulty corresponding to tasks and rank their level of agreement with different statements related to the POCT intervention, which resulted in subdomain scores in the areas of learnability,

[3] This has been increased from the original protocol and mid-term report

willingness, suitability, and satisfaction (Table 1). Respondents could provide further open-ended commentary after each set of domain questions.

The survey was pre-tested with the working group and updated before being deployed. Sexual health/harm reduction managers or project leads across each of the participating PHUs asked their HCP staff involved in POCT delivery to complete the survey online using Medallia, after two to three months of implementation (or two to three months after staff were trained to deliver the POCT).

Table 1- Health-care Provider (HCP) POCT Implementer Survey - subdomain definitions and related questions

Learnability	
Definition	Ability of the providers to understand how to perform the POCT and accurately read the results.
Questions	Correctly reading and interpreting the dual HIV/syphilis POCT is... (Very difficult, Difficult, Neither easy nor difficult, Easy, Very Easy, N/A)
	Interpreting indeterminate dual HIV/syphilis POCT results is... (Very difficult, Difficult, Neither easy nor difficult, Easy, Very Easy, N/A)
	Overall, performing the dual HIV/syphilis POCT is... (Very difficult, Difficult, Neither easy nor difficult, Easy, Very Easy, N/A)
	POCT kit instructions are... (Unclear, Somewhat clear, Clear)
	The training offered was enough to perform the dual POCT... (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
Willingness	
Definition	The Providers intention to carry out the POCT, wait for results, treat, and refer as necessary.
Questions	I am willing to consistently offer and perform the dual HIV/syphilis POCT while providing outreach… (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
	Current supporting components of providing dual HIV/syphilis POCT during outreach — including training, supervision, and quality maintenance — are sufficient to integrate it into routine activities…(Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
Suitability	
Definition	The belief that the test is relevant for the providers work and that it could be successfully integrated into existing services.
Questions	Dual HIV/syphilis POCT will improve the health of outreach clients and their contacts… (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
	Dual HIV/syphilis POCT is a necessary intervention to curb the syphilis outbreak in my region… (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
	I am confident in the results of the dual HIV/syphilis POCT while providing outreach services... (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
	I am confident in my ability to validly perform the dual HIV/syphilis POCT while providing outreach services... (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
	Routine dual HIV/syphilis POCT should continue while providing outreach services... (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
Satisfaction	
Definition	Feeling that completing the test is both convenient and enjoyable.
Questions	In your opinion, how do newly tested clients feel about the dual HIV/syphilis POCT? (Very negative, Negative, Neither positive nor negative, Positive, Very Positive)
	Use of dual HIV/syphilis POCT reduces workload for outreach nurses… (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)
	Dual HIV/syphilis POCT is more acceptable to outreach clients than routine serology… (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree, N/A)

Analysis

All quantitative analysis was conducted in R and R studio and was descriptive in nature, including frequencies, percentages, and measures of central tendency.

Responses to Likert questions in the HCP POCT implementer survey were scored on a scale of 1 to 5, with 1 being the least favourable response and 5 the most. Each participant's subdomain score was calculated by taking the mean of all the subdomain question scores (excluding any 'N/A' responses) using a summated scores method, where the same weight was considered for all questions in each subdomain.

Material and social deprivation of participants were derived by linking postal codes to census data describing neighbourhoods (dissemination area). The 2021 version of the material and social deprivation index from the Institut national de santé publique du Québec was used in this analysis (25,26). Material deprivation measures socioeconomic status (combines area census data for income, education, and employment status). Social deprivation captures social isolation (combines area census data on single-parent status, living alone and being separated, divorced, or widowed).

Performance metrics for the POCT were calculated according to standard procedures (27) along with 95% confidence intervals calculated using the exact binomial method.

To understand implementation of POCT in different PHUs, a qualitative content analysis of documents and thematic analysis of open-ended text from HCP surveys was conducted. Similar content from documents was grouped together based on the broad themes of challenges, facilitators, lessons learned to improve, crosscutting by commonalities and differences across PHUs. In Medallia, open-ended survey data was coded into themes observed in the data and then frequencies were tabulated for each theme.

Ethics

This project received ethics clearance from the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board #6039604.

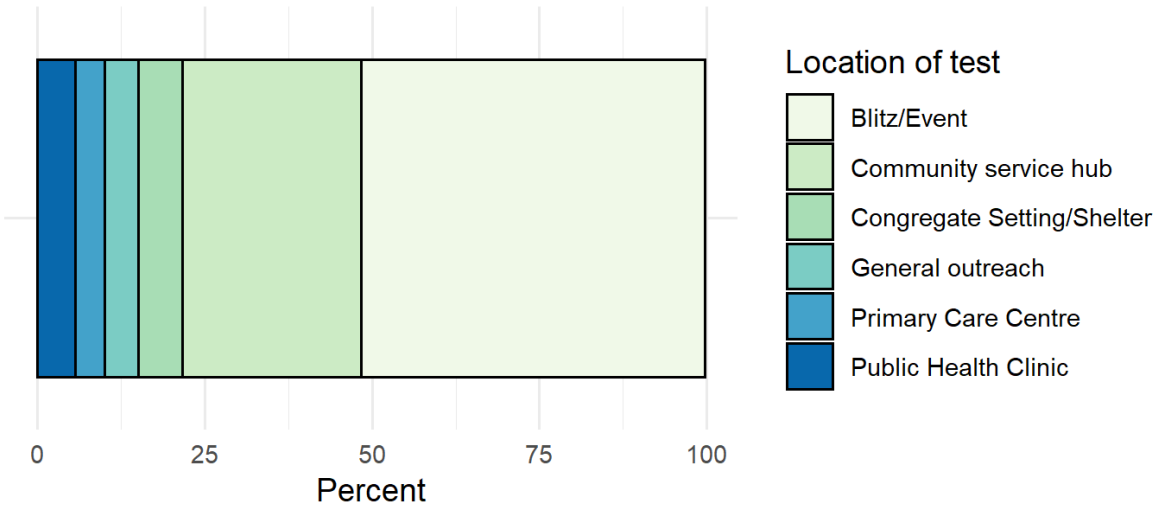
What happened?

Reach

From June 23, 2023, to Aug. 22, 2024, there were 567 POCTs of 512 unique individuals across HPEPH (88, 15.5%), KFL&APH (261, 46.0%), LGLDHU (34, 6.0%), OPH (30, 5.3%) and TBDHU (154, 27.2%). Of 49 repeat testers, 87.8% tested twice and 12.2% tested three times.[4]

[4] Repeat testing every three months is recommended for high-risk groups (11)

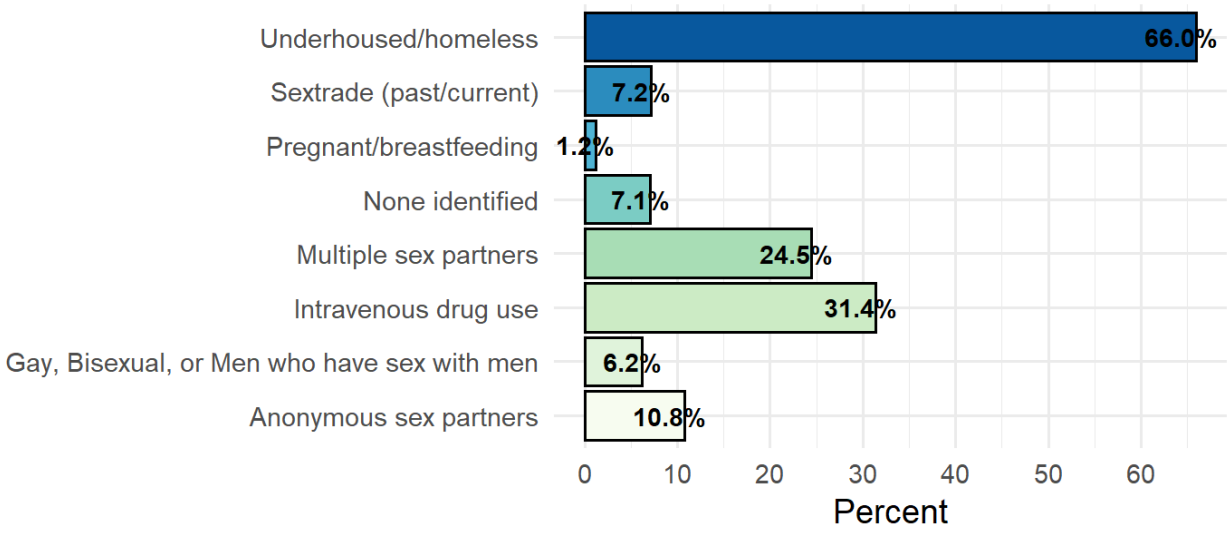
Figure 1 - POCTs by location (%), SPRITE June 23, 2023 to Aug. 22, 2024 (N=567)



Of the 567 tests:

- The mean age was 39.9 years (min of 16 to max of 72 years).
- 41.3% were female.
- 24.3% reported they were not yet connected to community services.
- 87.3% received an incentive for the POCT.
- 3.4% had symptoms of syphilis, less than 1% had symptoms for acute HIV.
- Most had their POCT at a blitz or large testing event (51.3%), or at a community service hub (26.8%) (Figure 1).

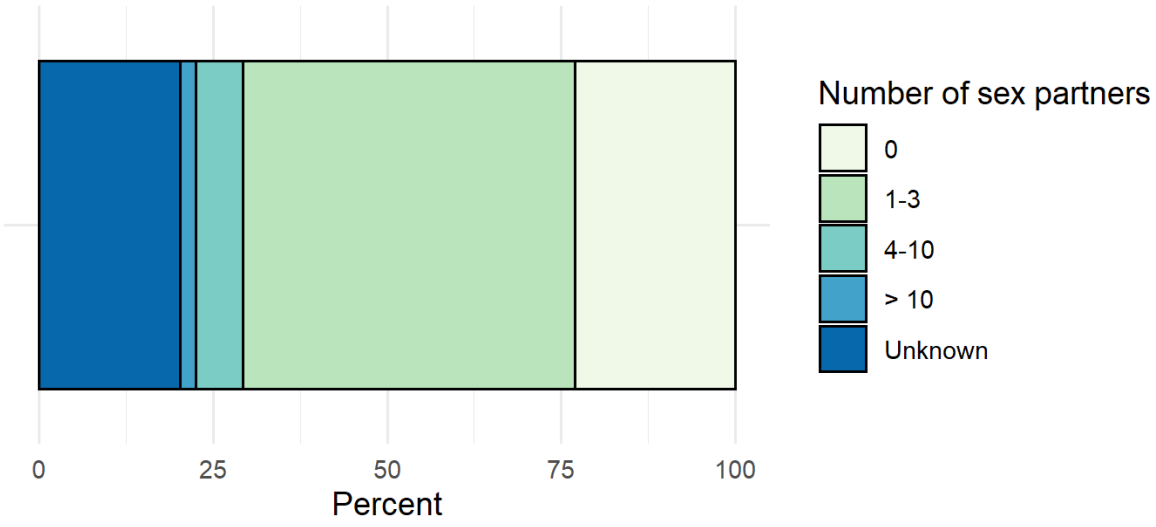
Figure 2- Risk factors (%), SPRITE, June 23, 2023 to Aug. 22, 2024 (N=567)



From Figure 2, the majority of tests involved people who were un(der)housed and almost a third reported ever using injection drugs. Nearly a quarter also noted they had multiple sex partners. Sex trade work[5] and anonymous sex partners were reported by some individuals. A very small number said they were pregnant or breastfeeding.

In terms of the number of sex partners reported by participants in the previous six months, most people attested to one to three (47.6%) (Figure 3); for a sizable proportion, number of partners was unknown (20.1%).

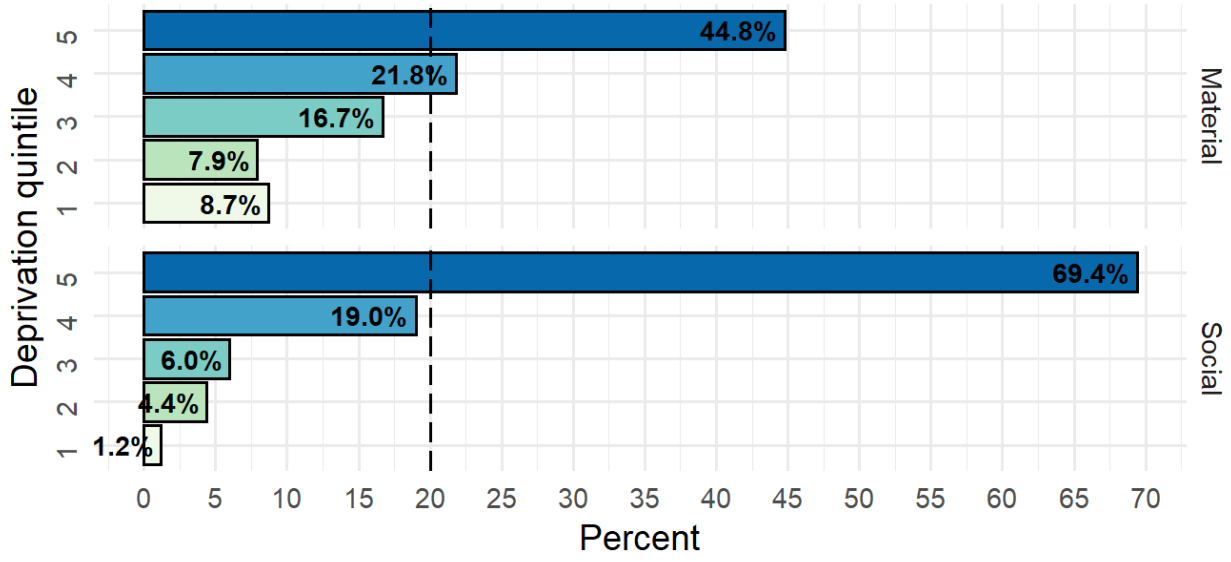
Figure 3 - Number of sex partners in previous six months (% category), SPRITE June 23, 2023 to Aug. 22, 2024 (N=567)



Of all 567 tests, 47.1% of participants reported having no postal code of residence, while 2.5% did not know their postal code. Of those who provided valid postal codes of residence that linked to material and social deprivation index scores (44.4% of all participants, N = 252), the majority resided in neighbourhoods with the highest material and social deprivation (quintiles 4 and 5; Figure 4).

[5] This question was changed to make clearer past and current sex trade work

*Figure 4 - Material and social deprivation quintile of those providing valid postal codes (N=252), SPRITE June 23, 2023, to Aug. 22, 2024 (quintile 1= least to quintile 5 = most deprived) ****



***55.6% did not provide a valid postal code and are not included in the graph

Effectiveness - POCT Performance Monitoring Results

- Of the 567 POCT attempts:
  - 97.4% were valid (n=552).
  - 87.8% consented to standard laboratory serology testing (n=498).

Table 2 - Overall Syphilis and HIV Test Results %(n), SPRITE June 23, 2023 to Aug. 22, 2024

Syphilis POCT	94.0% (519)	Nonreactive	**Syphilis serology**	90.6% (451)	Nonreactive
	5.6% (31)	Reactive		7.6% (38)	Reactive
	0.4% (2)	Indeterminate		1.8% (9)	Lab cancellation/Invalid
Total N	552		**Total N**	498	
HIV POCT	97.4% (538)	Nonreactive	**HIV serology**	97.0% (483)	Nonreactive
	2.2% (12)	Reactive		1.6% (8)	Reactive
	0.4% (2)	Indeterminate		1.4% (7)	Lab cancellation/Invalid
Total N	552		**Total N**	498	

Figure 5 - Participant exclusions and confirmed sample size for syphilis POCT performance, SPRITE June 23, 2023 to Aug. 22, 2024

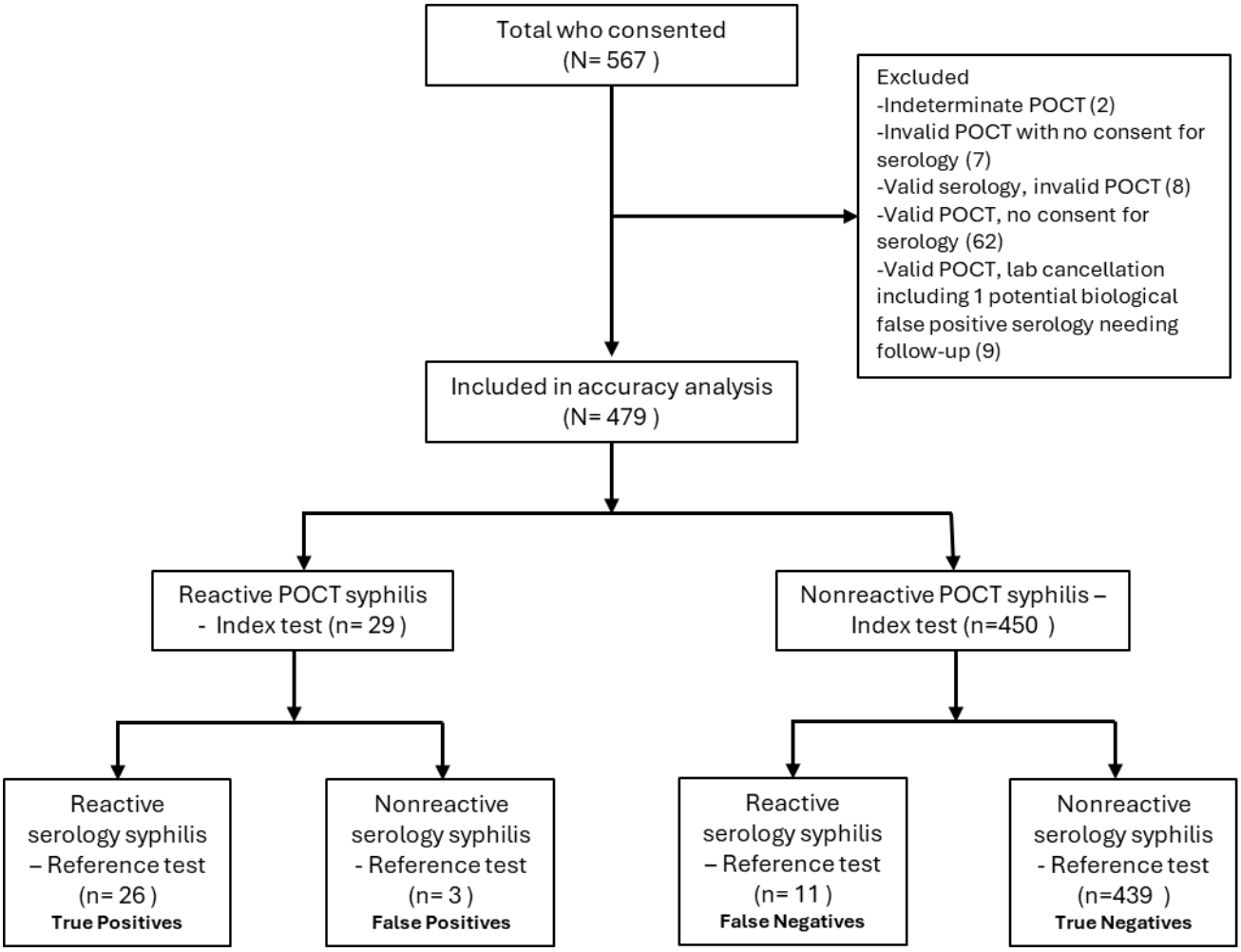


Table 3 - Syphilis POCT Performance Statistics (95% confidence intervals), SPRITE June 23, 2023 to Aug. 22, 2024 (N=479)

Performance Statistic	**% (95% Confidence Interval)**
POCT (Index) % Positive	6.1 (4.1, 8.6)
Serology (Reference) % Positive	7.7 (5.5, 10.5)
Sensitivity	70.3 (53.0, 84.1)
Specificity	99.3 (98.0, 99.9)
Positive predictive value	89.7 (72.6, 97.8)
Negative predictive value	97.6 (95.7, 98.8)

- Of the 26 syphilis true positives:
  - 15 (58%) were new/reinfections.
    - Of these, 12 (80%) were treated at the POC.
    - Two of the three not treated were reinfections where clients reported being recently treated elsewhere. For the third, the person did not want to get treated due to lack of privacy at the POC. They did however, consent to notify their primary care provider of the results and need for treatment.
  - 13 (50%) had RPR dilutions ≥ 1:8.

- Of the 11 syphilis false negatives:
  - The majority (73%) were previously treated infections.
  - All had RPR dilutions of ≤ 1:2 or nonreactive.

- Of the three syphilis false positives:
  - All were treated at POC.
  - Two of these clients were notified and counselled about unnecessary treatment, and one was not locatable.
  - The INSTI® dual POCT is known to cross-react with other diseases like hepatitis C. Other STBBIs were not systematically collected in this study, however, for two of three false positives, it was noted in the comments variable "Important information about the encounter" that these participants had hepatitis C antibodies (but no RNA).

- For HIV (482 POCT/serology pairs), the POCT correctly identified all eight cases with no false negatives (serology percent positive of 1.7%). All were determined to be previously identified cases. However, there were three false positives. Of these three:
  - One was a dual false positive — false positive for HIV and syphilis (this includes one of the three false positives for syphilis discussed above). This person was immediately retested and was nonreactive for both syphilis and HIV on the second POCT.
  - One other was also retested where both syphilis and HIV were nonreactive on the second POCT.

Table 4 - Incidence of infectious syphilis (confirmed cases) in the general population in 2023 (%) by PHU and Ontario (Infectious Diseases Query, PHO, downloaded 2024-02-08)

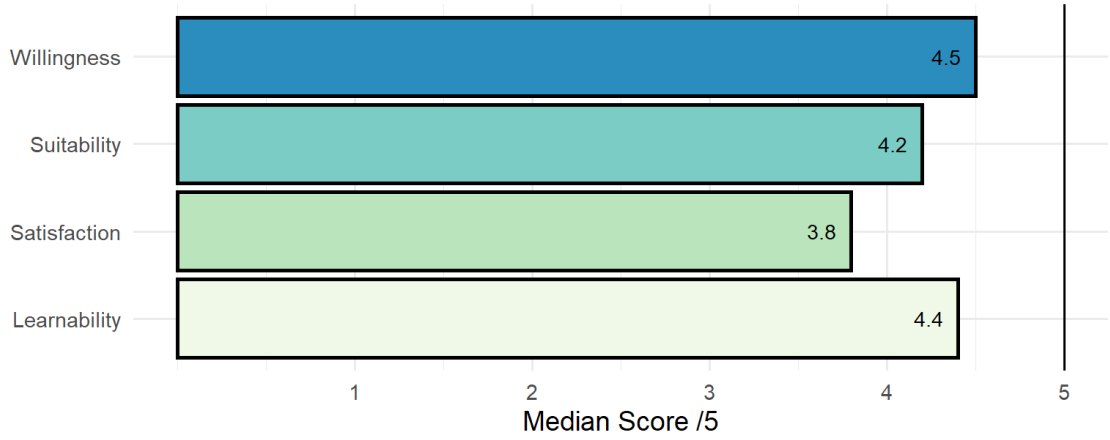
Public Health Unit	Incidence (%)
HPEPH	0.016
KFL&APH	0.045
LGLDHU	0.008
OPH	0.015
TBDHU	0.055
Ontario	0.020

Table 4 provides a comparison of the percentage of infectious syphilis in the population by PHU to percentage of syphilis identified in the POCT sample (Table 3 earlier) and percentage of new/reinfections identified by the POCT (3.1% 15/479).

Adoption

In total, 26 people participated in the HCP POCT implementer survey, representing HPEPH (35%), KFL&APH (35%), LGLDHU (8%), OPH (4%) and TBDHU (19%).

Figure 6 - Median subdomain scores (out of five) for the healthcare provider POCT implementer survey (N=26), SPRITE, 2023-2024.



The median number of trainings POCT survey participants needed to perform before they felt comfortable performing the POCT in the field was one.

The obtained median scores for each subdomain in the survey demonstrate high overall feasibility of the dual syphilis/HIV POCT intervention (Figure 6). However, responses to certain Likert questions and open-ended questions need to be explored to offer a fuller evaluation. Frequency breakdowns for each individual Likert question in the survey are available in Appendix 3.

Of note, 77% of respondents reported being confident in the results of the dual HIV/syphilis POCT. However, this is further contextualized through respondents' comments, where 31% (n=8) indicated concern over the performance of the results, in particular the performance of the tests for clients with low RPR who may have syphilis in either the "incubating [or] late latent stage." Two other participants were concerned with the possibility of false positives — one respondent said they had a false positive result, and the other respondent reported difficulty understanding the manufacturer's instruction sheet with reference to other non-syphilis infections that may cause false positive results. Confidence in the test results can directly impact an individual's perception of its utility:

"Most clients we offer POCT to want to complete the POCT but are not interested in completing serology or even when we attempt serology are unable to obtain it for confirmation — so [for] the [test] to be truly useful, the accuracy of the POCT would need to be similar to serology."

Another question that received a mixed response was the impact that the dual HIV/syphilis POCT has on the workload for outreach nurses. Only 35% of survey respondents agreed that it reduces workload, with 23% disagreeing and 42% selecting 'neither agree nor disagree'. Multiple responses (n=5) noted that the POCT takes longer than usual serology as an additional step, and following-up with confirmatory serology poses a challenge:

"Many of the clients we see are homeless and sometimes meeting them at the drop in in a timely manner doesn't happen. They have no phone, no address, some are MIA for a bit, incarcerated, etc.".

Some participants' frustrations extended to the functionality of the kits themselves. Nine of the 26 respondents (35%) commented on the challenge that the pipettes posed, with several noting that they did not 'suck up' the blood sample and one person commenting that "the hardest part is angling oneself so that the blood is being absorbed properly by the plastic [pipette]".

Four respondents (15%) commented on the difficulty of collecting an adequate amount of blood due to the lancet provided in the kits, with two participants (8%) noting that this can result in needing to perform multiple finger pricks. The intersection of these challenges with common characteristics in the target population was also commented upon:

"Many of my clients live outdoors, and when they come to the drop-in their hands are freezing and/or very callused. We do try to warm them up but maybe if the needle in the lancet was longer, we would have better results."

Outreach conditions themselves posed a challenge for respondents. Concerns specific to outdoor settings included challenges posed by windy conditions when using the lightweight kits. The kits also require temperature stable between 15-30°C, resulting in five (19%) individuals indicating that temperature control was an issue:

"Temperature management is a significant problem — outreach is not just an activity during summer months, and transporting the tests to locations of outreach in the car can also be worrisome."

Despite these concerns, 100% of respondents indicated that they are willing to consistently offer and perform the dual HIV/syphilis POCT while providing outreach, with 30% agreeing and 70% strongly agreeing that routine dual HIV/syphilis POCT should continue while providing outreach services. Participants commended the intervention on its ability to get immediate treatment to individuals, and the opportunity that it offered to connect with clients:

"Excellent tool to engage clients in STBBI screening. The quick result is enough to engage clients to accept POCT screening, allowing the opportunity to discuss other STBBI screening and Public Health Services they could benefit from during that encounter. Anecdotally, the availability of the POCT has increased the number of individuals engaging [Public Health Nurse's] for STBBI testing during outreach encounters."

Implementation

Representatives from LDCP PHUs participated in each of the monthly CoP meetings from August 2023 to March 2024, and then two more meetings in May and July 2024. Here, updates were provided on the project from the lead PHU (KFL&APH), feedback was sought in terms of pragmatic research approaches, and methods for future projects. PHUs provided updates on implementation in their respective jurisdictions, and resources and other updates were shared.

Implementation began first in KFL&APH in June 2023, given work that had been completed prior to the LDCP timeline through Health Canada special access program approval. A clinical services policy and procedure document and the medical directive for PHNs to treat for suspected (based on positive POCT) or confirmed syphilis cases, or contacts of confirmed cases had also been developed by KFL&APH prior to the commencement of the LDCP timeline. For the two smallest PHUs (HPEPH, LGLDHU), developing their own clinical services policy and procedure and medical directive took two to three months, with training and quality assurance testing occurring with staff in November-December 2023. Outreach testing occurred soon after that. For one PHU (TBDHU), finalizing the medical directive that was satisfactory to the PHU took several months, with training, quality assurance, and outreach events starting in early January 2024.

For OPH, concurrent implementation of a new electronic health records system and capacity issues during the study period delayed the launch of outreach events until March 2024. For all PHUs, capacity issues related to staffing and competing public health priorities posed a challenge throughout the study. Examples include constant staff turnover, pivoting to deal with local emergencies like a Tuberculosis outbreak, and changes in team structures. A more detailed explanation of outreach incorporating POCT is given in the next paragraphs.

TBDHU has a team completely dedicated to outreach and a longstanding relationship with community partners. The street outreach program, including mobile clinical services, was created in 2018 in response to a Tuberculosis outbreak, with later refinements in 2019 to help control an HIV outbreak. POCTs are provided from an outreach van and at set testing events called 'pop-ups'. Both POCTs and serology tests are usually incentivized (cash), however, the mobile clinic does not provide incentives for safety reasons. Incentivization has increased uptake of both serology tests and POCTs, respectively. The mobile clinic usually functions with three PHU staff including an outreach worker, nurse practitioner, and PHN. Mini pop-ups have also been organized where one to two PHNs are sent out to locations where target populations are known to congregate. Bigger pop-up events have six nurses and an outreach worker who coordinates logistics and people. The TBDHU outreach team aims to create a one-stop-shop model where people can get the services they need, including urgent and primary care type services (i.e. wound care), and there are sometimes draws for prizes; these other activities and services also help to fill the time as people wait to be tested. Events are not advertised, with awareness generally traveling by word-of-mouth.

KFL&APH has had an outreach program incorporating STBBI services since June 2022, catalyzed by the COVID-19 pandemic in 2021. POCT efforts are focused on similar organized events called "blitzes" held monthly at partner organizations, as well as regular bi-weekly or bi-monthly visits to shelters and youth hubs. Additionally, once a week throughout the summer months, one PHN and an outreach worker from a community partner provide STBBI services, including POCTs, at various encampment sites. In the colder months it was harder for the team to locate people to be tested. Blitzes have about three PHNs, while shelter visits usually need only one or two. Incentivizing POCTs works well ($5 gift cards), as well as providing other

services at the same time (such as routine and seasonal immunizations). Later in the study period, a partner organization known as the Street Health Centre, a specialized community health centre addressing the needs of street-involved individuals, joined the project and began offering POCTs in July 2024 under the direction of a nurse practitioner.

Several years ago, HPEPH established an outreach program, however, in the fall of 2023 it required restructuring before POCTs could be implemented. In the beginning, HPEPH offered POCTs at organized blitzes similar to KFL&APH and TBDHU, but later incorporated POCTs into its regular outreach nursing, as the outreach program became more established. Generally, two PHNs visit community service organization locations and recruit people while they are waiting to receive other services. Incentives are offered and rarely do people decline. Awareness of incentives and POCTs generally travels by word-of-mouth. They also provide POCTs at encampments, an opioid agonist clinic in a more rural area, and at their various public health clinic sites when clients meet the target population criteria.

In March 2024, OPH began offering POCT outreach pop-ups at shelter and supportive housing locations. Additionally, POCT services were offered through OPH's Harm Reduction drop-in and Supervised Consumption Service as well as at an outdoor blitz event outside one of Ottawa's emergency shelters. Outreach services and testing events are supported by a PHN, nurse practitioner and social worker or outreach worker.

Finally, LGLDHU is in the beginning stages of re-establishing an outreach program. Uptake has been low, and they have had to continually refine their approach, changing tact based on lessons learned and staffing instabilities. Testing activities are generally conducted by one nurse practitioner and one PHN. Currently, most tests have been conducted in the PHU clinic for those in the target population. They have also been working with a methadone clinic in a more rural area of the PHU catchment and were able to recruit several clients by incentivizing with $5 gift cards.

Table 5 SPRITE PHU POC testing metrics by outreach type (June 23, 2023, to Aug. 1, 2024)

Outreach event type	Number of events	Number tested	Median tested per event
Blitz/Large event	22	289	10
Community service hub	77	176	1
Congregate setting or shelter	13	35	2
General outreach	19	24	1
Primary care centre	12	28	1.5
Public health clinic	21	33	1
Total	**164**	**585**	

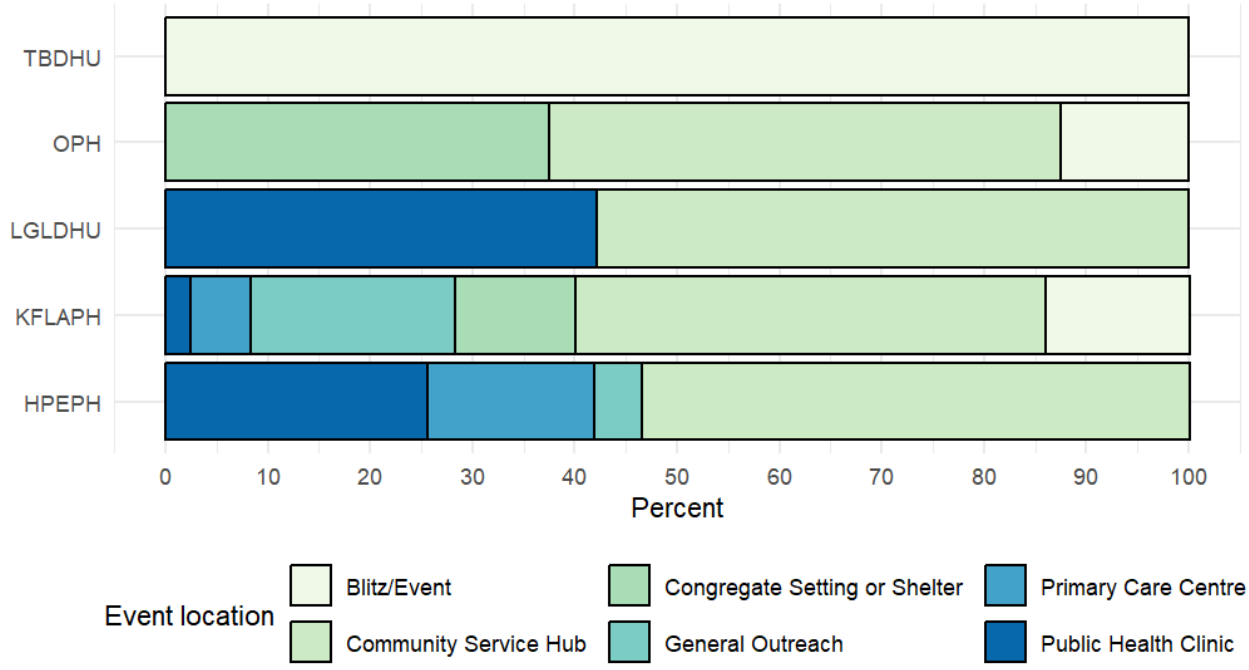
Across all PHUs, a total of 164 different events, blitzes, outreach activities, etc. occurred during the study period (Table 5), where 585[6] people were tested and 92.3% (n=540)[7] consented for data to be included in the

[6] Some people were tested multiple times because of invalid results; therefore, this number is likely lower, and the resulting % consenting higher.

[7] This denominator is based on the last testing date in Medallia of Aug. 1, 2024. The full analysis of participants presented earlier is based on the last testing date of Aug. 22, 2024.

evaluation. Consent was highest for larger planned events like blitzes and pop-ups (96%) and somewhat lower for visits to a community service hub (85%). Larger planned events tended to happen outside, as did general outreach, often at encampments. Testing at congregate living settings/shelters, public health or primary care clinics occurred inside, while at community service hubs, it could be inside or outside. However, across all activities, about 76% were indoors. The number of nurses per outreach activity ranged from one to six, with just over 80% of activities using one or two nurses only. More nurses were typically needed for larger planned events (median of 3), whereas visits to community services hubs, congregate settings/shelters or general outreach required about two, and primary care centres or public health clinics required less than two nurses (median of 1.5 and 1, respectively). Other staff who did not perform the POCT but supported delivery of the program included a data clerk, an outreach worker, a social worker, and a student; however, they were in attendance in about 14% of all activities. The median number of tests completed across similar activities are found in Table 5, ranging from 1 to 10. Of note, 16% (n=27) of activities did not result in any tests being administered.

Figure 7 Distribution (% /164) of outreach event types across SPRITE PHUs (Jun 23, 2023 to Aug. 1, 2024)



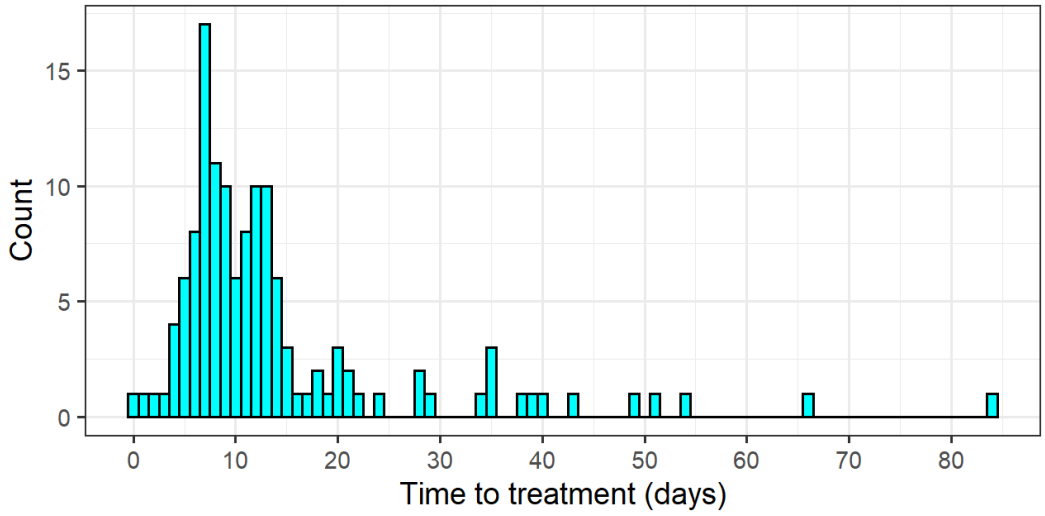
As evidenced in Figure 7, the outreach model of care was flexible and implemented differently across PHUs, depending on their current context, resources, and community partnerships.

Maintenance

The SPRITE team has received three Canadian Institute for Health Research (CIHR) grants (Catalyst: SR8 190795, Operating: AS1-192619, Knowledge Mobilization: EKS 193138) to expand and continue the project with non-urban and rural PHUs until at least March 2025. These include four original SPRITE PHUs (HPEPH, KFL&APH, LGLDHU, and TBDHU) with the addition of Algoma Public Health, Porcupine Health Unit, and

Renfrew County and District Health Unit. All three are now operational and offering POCTs to the target population in their catchments.

Figure 8 - Distribution of time to treatment for syphilis (new or reinfected cases only) in KFL&APH, 2021 to 2022, iPHIS



One objective of the catalyst grant (SR8 190795) is to determine the longer-term effectiveness of the POCT by evaluating time to treatment for new syphilis cases and reinfections pre-POCT and then again after about 18 months of POCT implementation (after March 2025) using interrupted time-series methods. Preliminary pre-POCT data show that in 2021/2022 for KFL&APH, the median time to treatment for new/reinfections was 10 days (mean of 14.1 and standard deviation of 12.7; Figure 8). This is calculated based on 'Effective Date' minus 'Requisition Date' in iPHIS. The POCT aims to make time to treatment zero days and shift the distribution of Figure 8 to the left. Investigation into the characteristics of outliers in Figure 8 will also be explored.

Another objective of the catalyst grant is to collaborate with mathematical modellers to predict the long-term impact of the POCT and treatment protocol at KFLA&PH using network modeling. This work is complete and has been submitted to a scientific journal.[8] Briefly, it was first found that edge-base network modelling more accurately predicted transmission rates compared to traditional SIR (susceptible, infectious, recovered) models. And secondly the POCT and treatment protocol could efficiently decrease the final infection size and potentially be cost-effective. These results emphasize the utility of maintaining the POCT intervention in the KLF&APH area and other areas.

As part of CIHR Operating Grant: AS1-192619, perspectives on syphilis testing in the target population will be determined based on individual interviews of un(der)housed people in the KFL&APH area using a grounded theory approach. A survey of decision-makers at the local PHU level will glean insights into

[8] Manuscript to be submitted Zhao S, Saeed S, Carter M, Stoner B, Hoover M, Guan H, Magpantay FMG. Edge-based Modeling for Disease Transmission on Random Graphs: An Application to Syphilis in KFLA.

organizational facilitators and barriers to implementation of the POCT in practice, including an understanding of maintenance of the program. CIHR Knowledge Mobilization Grant: EKS 193138 will allow further work to build on this knowledge, seeking to engage with community organizations and people with lived and living experience.

Finally, the grants allowed for a Clinical Nursing Facilitator (CNF) to be hired to coordinate and build capacity with participating and interested PHUs and other health-care organizations. Resource documents like medical directives, clinical policy and procedures, forms, updates, etc. were all shared on a secure SharePoint site. Frequently asked questions documents on POCT kit logistics, including ordering, quality assurance, and other processes were developed by the CNF. The CNF updates tracking documents, monitors data entry, follows-up with PHU clinical and project-related questions, onboards new PHU participants, and has begun planning for knowledge exchange and partnership development with community-based organizations.

This LDCP has allowed PHUs to work together, building capacity around outreach models of care that provide rapid testing and treatment for syphilis in underserved populations. It has catalyzed three other tri-agency grants worth $500,000. The return on investment from this LDCP has so far been 4.7:1.

So what?

By August 2024, flexible outreach models using syphilis POCTs have been implemented in five Ontario PHUs, with expansion to three PHUs who have been onboarded and are already contributing data to SPRITE 2.0. Participating LDCP PHUs have collaborated on the project throughout the August 2023 to August 2024 timeframe, submitting data and providing insights, allowing for the overall research goal to be achieved. Experiences and lessons learned have built capacity in these PHUs and are already being shared with other interested PHUs.

Outreach activities have resulted in 567 POCTs attempted with 552 valid results in a very short time span. Sociodemographic indicators thus far show that PHUs are reaching the target population.

To date, the POCT performance statistics indicate the test is performing well. However, the lower sensitivity indicates that some cases may be missed; specifically, the test appears to have difficulty detecting RPRs less than 1:8, a known limitation of the test (16). The PoSH study in Alberta estimated a somewhat higher sensitivity with the INSTI® dual POCT 76.7% (72.7- 80.2). However, this study focused on a different target population in more controlled settings, and was also able to stratify by RPR dilution, showing sensitivity drastically improved for RPRs ≥ 1:8 dilutions 97.9% (95.1-99.1)(18).

The reader is cautioned that the performance metric estimates are underpowered and for monitoring purposes only. Increasing the sample size will also allow for stratification of results by at least some PHUs; it is assumed that the prevalence in the target population differs by participating PHU catchment (extrapolating from Table 4), which can affect the overall POCT performance statistics.

When individuals are infected with syphilis, they will have treponemal antibodies for life. The INSTI® dual POCT is indicated to detect both IgG and IgM antibodies, which means the test cannot distinguish between new/reinfections and previous infections. This underlines the importance of clinical judgment in determining syphilis infection, regardless of test type. However, this is also more difficult in the field — i.e. contact tracing, symptom assessment, climate, etc. — when delivering the POCT.

Based on results thus far, use of syphilis POCT among underserved populations, looks to be disrupting the chain of transmission, however, it may be more effective for populations without previous infections and populations early in their epidemic curve.

While providers' perception of the POCT and treat intervention is mostly positive, as indicated by high HCP POCT Implementer Survey subdomain scores in learnability, willingness, suitability, and satisfaction, there are still areas of concern. The functionality of the test both in general and in outreach conditions with the target population, as well as the concern over performance of the tests in terms of missing early infectious syphilis and latent syphilis, need to be addressed moving forward.

Regardless of performance, the POCT has enabled discussions with people who had been previously treated for syphilis on the importance of follow-up serology, assisted in identification of new and reinfections, and allowed for more engagement in this client population with respect to STBBI testing and public health services overall.

Building capacity to deliver the intervention occurred in the initial months of the LDCP when the weather was more amenable to outreach, but POCTs were not ready to be deployed (except in KFL&APH, who initiated testing sooner than other participant PHUs). When most PHUs were ready to deliver the POCT, the weather was colder, where fewer people were available to participate. Expanding the LDCP into the summer allowed for PHUs to plan for more activities, engage with community partners, and conduct more tests.

Building trust and awareness with community-based organizations and in the target population ahead of time when recruiting at local events or organizations serving those experiencing poverty and/or homelessness has been noted as crucial to increasing participation in POCTs and STBBI assessment.

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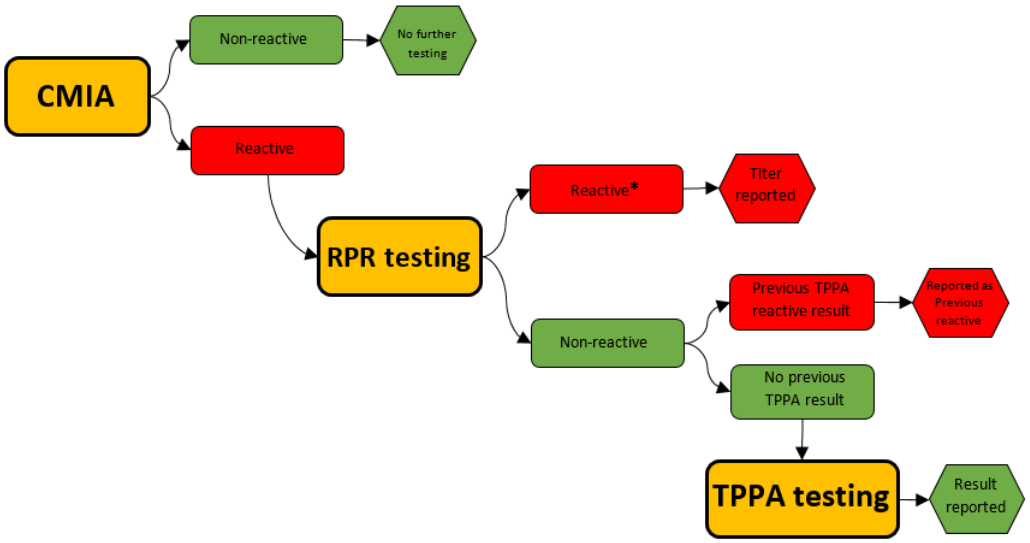
Appendix

Appendix 1 - Syphilis Diagnoses in Ontario (10,22)

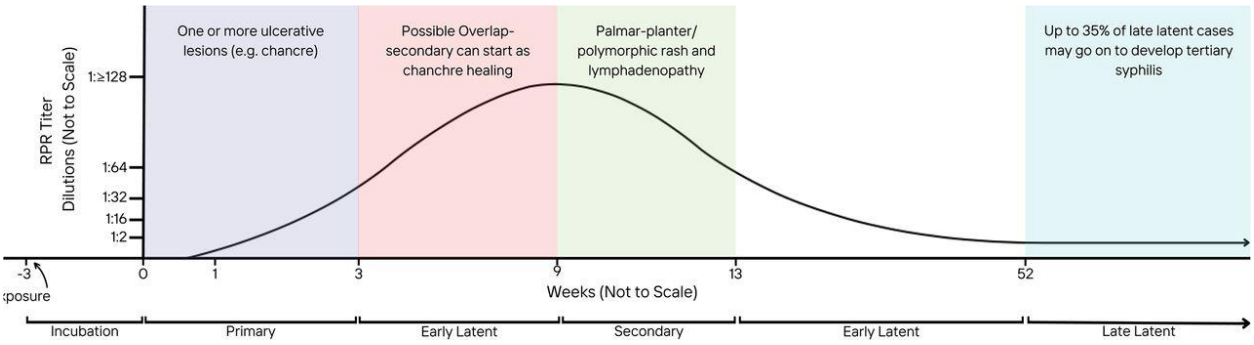
Syphilis serology

PHO follows a reverse algorithm, starting with a chemiluminescent microparticle immunoassay (CMIA), a qualitative immunoassay that detects treponemal antibodies (IgG and IgM). If reactive, confirmatory semi-quantitative rapid plasma reagin (RPR) is performed — this detects non-treponemal antibodies. Any non-reactive confirmatory RPRs will have the *Treponema pallidum* particle agglutination (TPPA) assay performed to aid in diagnosing current/past syphilis infections.



*For infants ≤18 months, TPPA testing is completed regardless of RPR result.

Syphilis symptoms and stages from time of exposure



Appendix 2 – Selected Census 2021 characteristics of participating PHUs

Public Health Unit	HPEPH	KFL&APH	LGLDHU	OPH	TBDHU
Total population, 2021	171,450	206,962	179,830	1,017,449	152,885
Population density per square km, 2021	24.0	31.2	28.0	364.6	0.7
Median total income of individuals ($), 2019	36,400	40,400	41,200	47,200	40,400
Prevalence of low-income (low-income measure after tax – LIM-AT, %, 2020)	11.5	10.4	9.3	8.9	12.5
Prevalence of LIM-AT – 0 to 17 years, 2020	12.4	10.5	9.8	10.7	17.4
Prevalence of LIM-AT – 65 years and older, 2020	12.9	10.0	10.8	9.5	11.4
Visible minority (%)	5.3	9.5	3.2	32.5	5.8

Appendix 3- Responses to Likert questions in the HCP implementer survey

Responses	Frequency	Percentage
Please indicate the public health unit you work for or with to implement the dual HIV/syphilis POCT		
Hastings Prince Edward Public Health	9	34.6%
KFL&A Public Health	9	34.6%
Leeds Grenville Lanark District Health Unit	2	7.7%
Ottawa Public Health	1	3.8%
Thunder Bay District Health Unit	5	19.2%
Overall, performing the dual HIV/syphilis POCT is…		
Very easy	12	46.2%
Easy	11	42.3%
Neither easy or difficult, Difficult, Very Difficult	3	11.5%
Correctly reading and interpreting the dual HIV/syphilis POCT is…		
Very easy	16	61.5%
Easy	9	34.6%
Neither easy or difficult, Difficult or Very Difficult	1	3.8%
Interpreting indeterminant dual HIV/syphilis POCT results is…		
Very easy	9	42.9%
Easy	9	42.9%
Neither easy or difficult, Difficult, Very Difficult	3	14.3%
N/A	5	
POCT kit instructions are…		
Clear	23	88.5%
Somewhat clear, Not at all clear	3	11.5%

How many training POCTs did you need to perform before you felt comfortable to perform the POCT in the field?		
1	15	62.5%
2	5	20.8%
3	4	16.7%
N/A	2	
The training offered was enough to perform the dual POCT…		
Strongly agree	9	34.6%
Agree	17	65.4%
Neither agree or disagree, Disagree, Strongly Disagree	0	0%
I am willing to consistently offer and perform the dual HIV/syphilis POCT while providing outreach…		
Strongly agree	18	69.2%
Agree	8	30.8%
Neither agree or disagree, Disagree, Strongly disagree	0	0%
Current supporting components of providing dual HIV/syphilis POCT during outreach — including training, supervision, and quality maintenance — are sufficient to integrate it into routine activities…		
Strongly agree	12	46.2%
Agree	13	50.0%
Neither agree or disagree, Disagree, Strongly disagree	1	3.8%
I am confident in the results of the dual HIV/syphilis POCT while providing outreach services…		
Strongly agree	8	30.8%
Agree	12	46.2%
Neither agree or disagree, Disagree, Strongly disagree	6	23.1%
I am confident in my ability to validly perform the dual HIV/syphilis POCT while providing outreach services…		
Strongly agree	10	38.5%
Agree	15	57.7%
Neither agree or disagree, Disagree, Strongly disagree	1	3.8%
Routine dual HIV/syphilis POCT should continue while providing outreach services…		
Strongly agree	17	65.38%
Agree	9	34.6%
Neither agree or disagree, Disagree, Strongly disagree	0	0%
In your opinion, how do newly tested clients feel about the dual HIV/syphilis POCT?		
Very Positive	6	23.1%
Positive	16	61.5%
Neither positive or negative, Negative, Very negative	4	15.4%
Use of dual HIV/syphilis POCT reduces workload for outreach nurses…		
Strongly agree	2	7.7%
Agree	7	26.9%
Neither agree or disagree	11	42.3%
Disagree, Strongly disagree	6	23.1%
Dual HIV/syphilis POCT is more acceptable to outreach clients than routine serology…		
Strongly agree	11	42.3%
Agree	11	42.3%

Neither agree or disagree, Disagree, Strongly disagree	4	15.4%
Dual HIV/syphilis POCT will improve the health of outreach clients and their contacts…		
Strongly agree	14	53.8%
Agree	12	46.2%
Neither agree or disagree, Disagree, Strongly disagree	0	0%
Dual HIV/syphilis POCT is a necessary intervention to curb the syphilis outbreak in my region…		
Strongly agree	11	42.3%
Agree	12	46.2%
Neither agree or disagree, Disagree, Strongly disagree	3	11.5%