Intersecting Risks: Syphilis Seropositivity Among Equity-Deserving Populations in Ontario, Canada

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Background

Infectious syphilis has reemerged as a global public health concern, with a 220% increase in Ontario, Canada, since 2013 (1).

This surge has been accompanied by significant demographic shifts, particularly among women pronounced outside of large urban settings (1).

Purpose

We assessed the association of individual risk factors and the intersection of drug use, sexual risk factors, and housing status with seropositivity among street-involved individuals across seven small urban, rural, and/or remote Ontario Public Health Units.

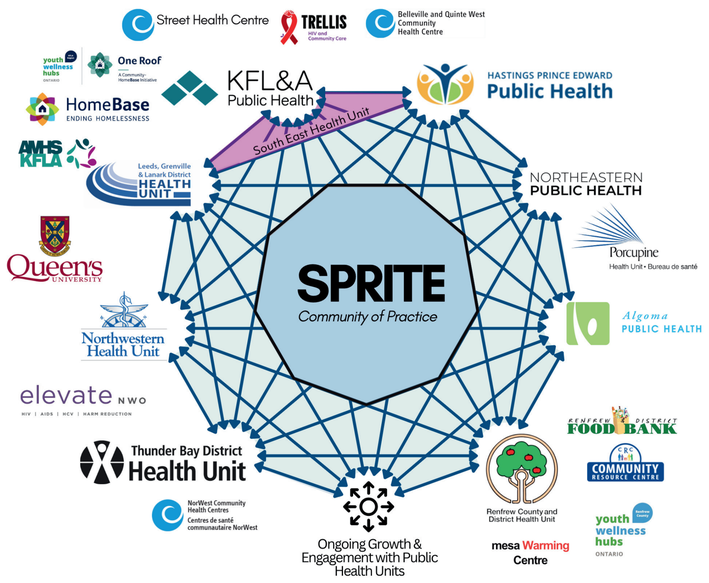
Methods

- **Design:** Cross-sectional study that used data collected from the ongoing Syphilis Point of Care (POC) Rapid Test and Immediate Treatment Evaluation (SPRITE) Study. Each participant provided a single venous blood specimen (serum) for serologic syphilis testing and self-reported on sociodemographic and risk factor variables.
- **Recruitment:** Any individual present at the outreach location (community based organizations (CBOs)) who was determined to be street-involved by the public health outreach nurse was eligible for this study.
- **Analysis:** Seroprevalence was presented overall, and stratified by sex, age groups, public health unit (PHU), and risk factors using an exact binomial confidence interval. A mixed-effects regression model with a log-binomial distribution, adjusted for age and sex, was used to estimate the adjusted prevalence ratio (aPR).
- Ethics approval by the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board.

(1) Infectious Syphilis and Early Congenital Syphilis in Ontario: Focus on 2023 Public Health Ontario, 2025

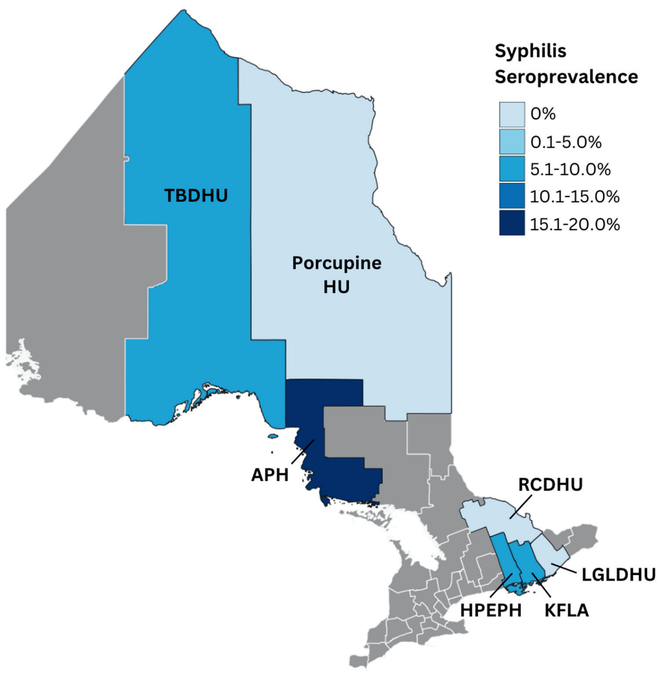
The SPRITE Study

SPRITE is a prospective community-based outreach study aims to evaluate a model of care that utilizes the INSTI® Multiplex HIV-1/HIV-2/Syphilis Antibody Test for syphilis screening, followed by immediate treatment of suspected cases. Outreach models include organized events at CBOs and routine harm reduction outreach in the community.



Seroprevalence Results

Among 630 participants (median age 38; 42% female), syphilis seroprevalence was 7.6% (95% CI 5.5–9.7). The rate of newly diagnosed infections was 3.8% (95% CI 2.6, 5.6). Map of Ontario segmented by PHU, highlighting study seroprevalence



Reporting **anonymous** or **multiple** sexual partnerships, previous **sex work**, **illicit drug use** - in particular **crystal methamphetamine**- were all associated with syphilis seroprevalence (treponemal antibodies (IgG and IgM)) (Table 1).

Table 1: Association between risk factors and seroprevalence

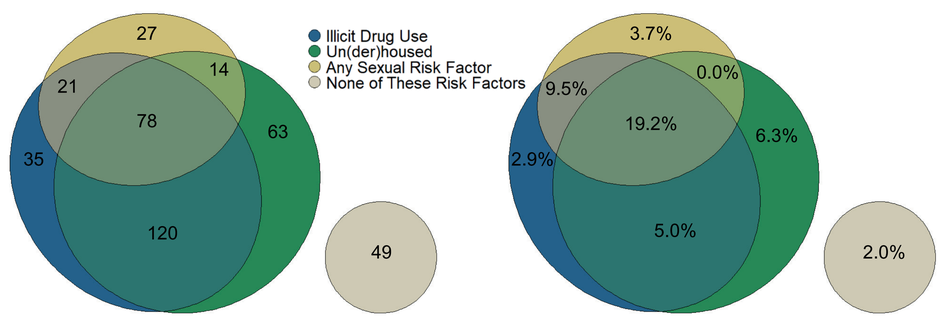
Covariate		Adjusted PR (95% CI)
Sex	Male	Ref
	Female	**1.62 (0.94, 2.80)**
Sexual Risk Factors	Multiple sexual partners	**2.24 (1.28, 3.92)**
	Anonymous sexual partners	**2.74 (1.49, 5.05)**
	Sex trade work (current)	1.03 (0.33, 3.23)
	Sex work (previous)	**3.55 (1.52, 8.28)**
Drug Use Risk Factors	Illicit drug (any)*	**2.26 (0.93, 5.50)**
	Intravenous drug use	1.24 (0.70, 2.20)
	Crack and/or cocaine*	1.00 (0.40, 2.51)
	Fentanyl*	1.29 (0.59, 2.83)
	Crystal methamphetamine*	**2.88 (1.31, 6.33)**
Risk Factors (Other)	Un(der)housed	1.80 (0.93, 3.52)
	GBMSM	1.81 (0.75, 4.40)

*Collected starting 26/04/2024 n=426

Intersecting Risks

Seroprevalence was substantially higher among those who reported sexual risk factors, illicit drug use, and being un(der)housed (19.2% [95% CI 11.2, 29.7]).

Those with all three were four times as likely to be seropositive than any factor alone (aPR 4.41 (95% CI 1.76, 11.03)).



A) The number (n) of SPRITE participants by self-reported risk factors, reflected by circle size. B) Syphilis seroprevalence (%) by risk factor(s).

Conclusion

These findings shed light on the rapidly evolving dynamics of syphilis transmission, emphasizing the urgency of developing targeted prevention, screening, and intervention strategies to address the unique needs of street-involved individuals.

Acknowledgements

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