



Adapting and Scaling-up Peer Navigators to Targeted Populations of Street-Involved Youth in Kenya and Canada to Increase Engagement in HIV Prevention, Testing, and Treatment

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Accepted: 21 January 2026

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Abstract

Street-involved youth (SIY), particularly those who identify as 2-spirit, lesbian, gay, bisexual, transgender, queer, or other sexual and gender diverse identities (2SLGBTQ+), are among key populations disproportionately affected by HIV. We adapted and scaled-up a Peer Navigator intervention to targeted populations of SIY in six sites across Kenya (Eldoret, Huruma, Kitale) and Canada (London, Toronto, Vancouver), with the aim of increasing engagement in HIV prevention, testing, and treatment. This article presents the key quantitative findings, highlighting participant characteristics and their engagement in HIV testing and care before and after implementation of the Peer Navigator intervention. This implementation science study utilized a mixed-methods approach to investigate the adaptation, implementation, and evaluation of the Peer Navigator intervention. The PNs at each site completed study encounter forms with participants at enrollment and all follow ups between 2021 and 2024. Baseline sociodemographic characteristics were summarized separately using descriptive statistics for each study site. HIV testing and treatment outcomes are reported at baseline—reflecting participants' status prior to the intervention—and after their last encounter with Peer Navigators. A total of 686 SIY aged 16–29 years participated across all sites (Kenya, $n=631$; Canada, $n=55$). The Peer Navigator intervention improved access to and uptake of HIV prevention, testing, and treatment among SIY across Canada and Kenya. Participants' engagement in HIV testing increased from pre- to post-intervention across all sites, with the majority of participants reporting that they had been tested for HIV by the end of the study. This study highlights the need for access to ongoing and accessible HIV testing for all populations of SIY globally. The findings also underscore the critical need to create sustainable Peer Navigator roles to support SIY and expand the availability of widespread access to HIV testing.

Keywords HIV testing · Kenya · Housing · Youth · Implementation science · LGBTQIA

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Abbreviations

ART	Antiretroviral therapy
2SLGBTQ+	2-Spirit, lesbian, gay, bisexual, transgender, queer, and other sexual and gender diverse identities
PN	Peer navigator
PNP	Peer navigator project
PWID	People who inject drugs
SIY	Street-involved youth

Introduction

Approximately 65,000 people in Canada are living with HIV, with 10% unaware of their status and 15% not receiving treatment [1, 2]. In Canada, ~2,434 individuals are diagnosed with HIV each year, with certain populations and provinces being disproportionately impacted, including gay, bisexual, and other men who have sex with men (gbMSM), people who have ever injected drugs (PWID), and people experiencing homelessness, Indigenous people, Canadians of African descent, those born in HIV-endemic countries, and people under 30 years [1–3]. The highest numbers of newly diagnosed individuals with HIV are in Ontario, Quebec, and Saskatchewan [2].

Kenya has one of the highest current HIV burdens globally, with ~1.4 million people living with HIV, most in western regions including Eldoret and Kitale [4–6]. Key populations disproportionately affected include gbMSM, adolescent girls and young women, incarcerated people, sex workers and their clientele, PWID, and youth experiencing homelessness [4, 7]. The term ‘street-involved’ is used to describe youth who are housing insecure and may have intermittent access to family or housing. The term is used in place of ‘homeless’ to reflect cultural and contextual differences between Kenya and Canada.

Street-involved youth (SIY), particularly those who identify as 2-spirit,¹ lesbian, gay, bisexual, transgender, queer, and other sexual and gender diverse identities (2SLG-BTQ+), are also at a greater risk of contracting HIV, sexually transmitted infections, and blood-borne infections, due to various factors [9]. These factors include age, socioeconomic status, housing status, barriers to accessing health care services, and engagement in sexual practices and/or other practices that could elevate HIV exposure (e.g., transactional sex, condomless sex, injection drug use) [10–12]. Youth facing housing insecurity are 2–10 times more likely to contract HIV than those with stable housing in the US [13, 14]. In Canada, data on HIV prevalence among youth experiencing homelessness is limited; however, it is estimated that between 1.9% and 2.8% of youth experiencing homelessness are HIV positive across the country [3, 15, 16]. SIY are also underrepresented in HIV prevalence data across Africa. A point-in-time count of SIY under the age of 30 in Eldoret, Kenya conducted in 2016 found that 8.9% of young women and 2.7% of young men were living with HIV, which was the leading cause of death among SIY in Eldoret from 2009 to 2016 [17, 18].

This implementation science study was designed to adapt and scale-up a Peer Navigator (PN) intervention for SIY in each of six sites in Canada and Kenya. The study sites were: Eldoret, Huruma, and Kitale (Kenya), and London, Toronto, and Vancouver (Canada). This intervention emerged from shared challenges in Canada and Kenya, where street-involved and homeless youth experience intersecting structural vulnerabilities and disproportionately high burdens of uncontrolled HIV, creating a unique opportunity to examine how a peer-based navigation model can be adapted and scaled across distinct health system and sociocultural contexts to improve equitable access to HIV prevention and care. This article presents the main quantitative findings from the study, including participant characteristics, engagement in HIV testing before and after the intervention, reasons for not getting tested, and HIV care engagement among those who were HIV-positive.

Methods

Peer Navigator Project (PNP)

This longitudinal prospective study ran from 2018 to 2025. It employed a mixed-methods approach to investigate the adaptation, implementation, and evaluation of a PN model. This model was designed to improve access to and uptake of HIV prevention, testing, and treatment among SIY in Kenya and Canada. The PNP was successfully piloted in Eldoret, Kenya in 2016 [19]. PNs are defined as individuals who are currently, or formerly, from the target population of SIY impacted and/or living with HIV. From 2018 to 2021, our team adapted the intervention to each site using quantitative questionnaires, qualitative interviews and Theatre Testing with SIY, healthcare providers, and community stakeholders [20–22]. Theatre Testing is a method that involves presenting components of an intervention in a staged or simulated format to stakeholders, allowing them to provide feedback that informs local adaptation and implementation planning [21]. The target populations included all SIY youth in London, Eldoret, Huruma, and Kitale, and specifically 2SLGBTQ+SIY in Toronto and Vancouver. Each study site had a community organization or healthcare facility that served as the host for the PN intervention. PNs were hired at each host organization and participated in extensive training with the organization and the research team before beginning to support SIY and enrol participants in the study. Two PNs were hired in Eldoret based on findings from initial pilot data and the area’s larger population of SIY.

¹ Two-Spirit is an English umbrella term used by some Indigenous people to describe having both masculine and feminine spirits. It may encompass gender identity, sexual orientation, and/or spiritual identity. The term is a translation of the Anishinaabemowin phrase *niizh manidoowag* (“two spirits”) [8].

Participants

Participants were recruited in accordance with the following inclusion criteria across all sites: aged 16–29; experiencing homelessness or street-involved (e.g., sleeping rough, couch surfing, staying in a housing program/shelter) for at least one month. An additional inclusion criterion for participants in Toronto and Vancouver was identification as 2SLGBTQ+. The sole exclusion criterion for participation was currently experiencing a mental health challenge or state of mind that prevented the individual from adequately providing informed consent.

Recruitment was through direct referrals from health and social services, as well as community organizations, snowball sampling, and field outreach by the PNs. Participation in this study was anonymous and voluntary. Informed consent was obtained from all youth prior to their enrolment into the intervention. SIY were not required to participate in the research study to receive any component of the intervention, such as support, accompaniment to appointments, and referrals from the PN. Canadian participants received a \$30 CAD honorarium. Compensation was not provided in Kenya based on local ethical guidance.

Settings and Context

The PNP was implemented across multiple sites in Kenya and Canada. In Eldoret, PNs were hosted by a clinic that provided physical and mental health services, including HIV care and treatment. In Huruma and Kitale, the PNs were hosted by HIV clinics. In London, the PN was hosted at a Public Health Unit. In Toronto, the PN was hosted at a population-based housing program for 2SLGBTQ+ youth, and in Vancouver, at a community organization focused on HIV support, programming, and education.

Data Collection

The PNs at each site completed study encounter forms with participants at enrolment and follow ups. Study encounter forms captured information on sociodemographic characteristics, detailed housing characteristics (beginning in October 2022), health needs, and engagement in HIV testing and care. Encounters occurred as needed by participants or when prompted by the PN. Data collection for all sites in Kenya occurred from March 2021 to March 2024. Data were collected at different points in time across the Canadian sites: London, August 2021 to January 2024; Toronto, March 2021 to October 2023; Vancouver, April 2024 to December 2024.

Variables

Sociodemographic characteristics that were measured at enrolment included age, gender identity, sexual orientation, HIV status, highest level of education completed, current enrolment status in school, and relationship status. Additionally, sources of income, typical sleeping location(s), and total length of time experiencing street involvement or homelessness over their lifetime were also assessed, as well as the vital status of the participant's parents. At each encounter completed after October 2022, participants were asked to identify all the locations they had slept in for the past four weeks. They were also asked if they had slept somewhere they felt unsafe or did not want to sleep, and whether they had engaged in transactional sex in return for a safe place to sleep.

At baseline, participants were asked if they were willing to be tested for HIV and if they wanted a PN to accompany them for HIV testing. At each visit, participants were asked about their most recent HIV test. Participants who self-reported that they were living with HIV were asked questions regarding their engagement in HIV care, including the date of their last visit, date and result of their last viral load test, and Antiretroviral Therapy (ART) use. Total follow up time was defined as the time between the date of the participant's baseline encounter and the date of their final encounter with the PN.

Analysis

Sociodemographic characteristics at baseline were calculated for each study site. Median values and interquartile ranges were calculated for continuous characteristics, and frequencies and percentages are reported for categorical characteristics. HIV testing and HIV treatment results are reported at baseline, representing participants' status prior to their involvement in the PNP, and following their last encounter with the PNs, representing participants' status following the PNP. Only participants with at least one follow-up visit were included in the "following the PNP" category. Housing characteristics, HIV testing, and engagement in HIV care are presented with all three Canadian sites combined due to small sample sizes.

Ethics

Prior to data collection ethical approval was obtained from the following institutions in Kenya and Canada: Moi University (IREC #2018/107), University of Toronto (REB #00036063), Centre for Addiction and Mental Health (REB #159/2018), and University of British Columbia (BREB# H22-01663).

Table 1 Baseline characteristics of participants enrolled in the peer navigator program in Kenya and Canada

	Eldoret	Huruma	Kitale	London	Toronto	Vancouver
	<i>N</i> = 343	<i>N</i> = 110	<i>N</i> = 178	<i>N</i> = 38	<i>N</i> = 11	<i>N</i> = 6
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Age (median [IQR])	22 [20–27]	23 [19–28]	19 [17–22]	23 [21–26]	22 [21–22]	26 [26–28]
Age (categories)						
16–17	12 (3.8)	4 (3.6)	47 (26.4)	3 (7.9)	0 (0.0)	0 (0.0)
18–24	202 (58.9)	61 (55.5)	97 (54.5)	20 (52.6)	8 (72.7)	1 (16.7)
25–30	128 (37.3)	43 (39.1)	27 (15.2)	15 (39.5)	0 (0.0)	5 (83.3)
Missing	0 (0.0)	2 (1.8)	7 (3.9)	0 (0.0)	3 (27.3)	0 (0.0)
Follow up time, days (median [IQR])	950 [873–1030]	933.5 [897–1016]	677 [1–960.75.75]	162 [37–543.5]	8 [1–405]	108.5 [63–118]
Number of PN encounters per participant (median [IQR])	7 [6–8]	9 [7–10]	2 [1–5]	5 [3–11]	3 [1–4.5]	2.5 [2–3.75]
Gender identity						
Cis woman	170 (49.6)	63 (57.3)	26 (14.6)	27 (71.1)	5 (45.5)	1 (16.7)
Cis man	173 (50.4)	47 (42.7)	152 (85.4)	3 (7.9)	0 (0.0)	3 (50.0)
Trans woman	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Trans man	0 (0.0)	0 (0.0)	0 (0.0)	3 (7.9)	2 (18.2)	0 (0.0)
Gender diverse ^a	0 (0.0)	0 (0.0)	0 (0.0)	4 (10.5)	4 (36.4)	2 (33.3)
Write in/other response specified ^b	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.6)	0 (0.0)	0 (0.0)
Sexual orientation						
Straight	343 (100.0)	110 (100.0)	178 (100.0)	15 (39.5)	0 (0.0)	0 (0.0)
Asexual	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.6)	0 (0.0)	0 (0.0)
Bisexual	0 (0.0)	0 (0.0)	0 (0.0)	10 (26.3)	2 (18.2)	2 (33.3)
Gay	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.6)	1 (9.1)	2 (33.3)
Lesbian	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)
Pansexual	0 (0.0)	0 (0.0)	0 (0.0)	8 (21.1)	2 (18.2)	0 (0.0)
Queer	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (27.3)	1 (16.7)
Questioning	0 (0.0)	0 (0.0)	0 (0.0)	2 (5.3)	0 (0.0)	0 (0.0)
Two-spirit	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (16.7)
Write in/other response specified ^c	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.6)	2 (18.2)	0 (0.0)
Highest level of education completed						
Less than secondary school	284 (82.8)	91 (82.7)	153 (86.0)	25 (65.8)	2 (18.2)	2 (33.3)
Secondary school	57 (16.6)	13 (11.8)	21 (11.8)	12 (31.6)	9 (81.8)	1 (16.7)
Post-secondary school	1 (0.3)	2 (1.8)	3 (1.7)	1 (2.6)	0 (0.0)	3 (50.0)
Missing	1 (0.3)	4 (3.6)	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)
Currently in school						
Yes	11 (3.2)	6 (5.5)	9 (5.1)	6 (15.8)	5 (45.5)	3 (50.0)
No	331 (96.5)	104 (94.5)	169 (94.9)	32 (84.2)	6 (54.5)	3 (50.0)
Missing	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Relationship status						
Single	234 (68.2)	67 (60.9)	153 (86.0)	17 (44.7)	7 (63.6)	4 (66.7)
Dating	14 (4.1)	24 (21.8)	18 (10.1)	18 (47.4)	3 (27.3)	2 (33.3)

Table 1 (continued)

	Eldoret	Huruma	Kitale	London	Toronto	Vancouver
	<i>N</i> = 343	<i>N</i> = 110	<i>N</i> = 178	<i>N</i> = 38	<i>N</i> = 11	<i>N</i> = 6
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Married or living with partner(s)	95 (27.7)	19 (17.3)	5 (2.8)	3 (7.9)	1 (9.1)	0 (0.0)
Missing	0 (0.0)	0 (0.0)	2 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)
Source of income (check all)						
None	295 (85.7)	105 (95.4)	41 (23.0)	3 (7.9)	0 (0.0)	0 (0.0)
Formal full- or part-time employment	0 (0)	1 (0.9)	1 (0.6)	0 (0.0)	3 (27.3)	0 (0.0)
Casual labour or self-employment	49 (14.3)	5 (4.5)	136 (76.4)	8 (21.1)	2 (18.1)	1 (16.7)
Government assistance	0 (0)	1 (0.9)	0 (0.0)	33 (87)	7 (63.6)	5 (83.3)
Length of time homeless (lifetime)						
< 6 months	7 (2.0)	3 (2.7)	8 (4.5)	3 (7.9)	1 (9.1)	1 (16.7)
6 months – 1 year	23 (6.7)	12 (10.9)	22 (12.4)	2 (5.3)	2 (18.2)	1 (16.7)
1–2 years	47 (13.7)	11 (10.0)	61 (34.3)	6 (15.8)	3 (27.3)	3 (50.0)
2–5 years	94 (27.4)	34 (30.9)	45 (25.3)	9 (23.7)	2 (18.2)	0 (0.0)
>5 years	170 (49.6)	50 (45.5)	42 (23.6)	17 (44.7)	3 (27.3)	0 (0.0)
Missing	2 (0.6)	0 (0.0)	0 (0.0)	1 (2.6)	0 (0.0)	1 (16.7)
Vital status of parents						
Both parents alive	115 (33.5)	40 (36.4)	81 (45.5)	26 (68.4)	9 (81.8)	3 (50.0)
Father dead or vital status unknown	94 (27.4)	27 (24.5)	30 (16.9)	6 (15.8)	1 (9.1)	3 (50.0)
Mother dead or vital status unknown	32 (9.3)	18 (16.4)	32 (18.0)	0 (0.0)	0 (0.0)	0 (0.0)
Both parents dead or vital status unknown	94 (27.4)	24 (21.8)	29 (16.3)	1 (2.6)	0 (0.0)	0 (0.0)
Missing	8 (2.3)	1 (0.9)	6 (3.4)	5 (13.2)	1 (9.1)	0 (0.0)

^aInclusive of gender fluid and other gender diverse identities, including *n* = 2 two-spirit participant

^bOther gender written in: unicorn (*n* = 1)

^cOther sexuality written in: *n* = 1 demisexual, *n* = 1 bi/pan, *n* = 1 bisexual aromatic

Results

Over the course of the PNP, a total of 686 SIY participated across all study sites (Kenya, $n = 631$; Canada, $n = 55$). Across Kenya, the PNs recruited 343 SIY in Eldoret, 110 in Huruma, and 178 in Kitale. In Canada, 38 SIY were recruited in London, 11 in Toronto, and 6 in Vancouver (Table 1). Participant characteristics varied by site, with median age at enrolment ranging from 19 years in Kitale to 26 years in Vancouver. Cisgender women made up 49.6%, 57.3%, and 14.6% of participants in Eldoret, Huruma, and Kitale, with the remaining participants at these sites identifying as cisgender men. All participants across Kenya identified as heterosexual/straight. Participants across the Canadian sites represented a wider range of gender identities and sexual orientations, with 18.4%, 54.6%, and 33.3% of participants in London, Toronto, and Vancouver respectively identifying as transgender men, gender fluid, 2-Spirit, and other diverse gender identities. Only 20% of participants across Kenyan sites had completed secondary education, while 34.2% in London, 81.8% in Toronto, and 66.7% in Vancouver had completed secondary or post-secondary education. Participants across all sites reported primarily no income or income from casual work, while participants from the Canadian sites also reported government assistance as a source of income. In Eldoret (49.6%) and Huruma (45.5%), almost half of participants reported experiencing more than 5 years of homelessness while in Kitale only 23.6% had been homeless for more than 5 years. In London, 44.7% of participants had experienced more than 5 years of homelessness; 27.3% of participants in Toronto had experienced more than 5 years

of homelessness and in Vancouver, all participants reported less than 2 years of homelessness.

Table 2 presents housing characteristics of participants at baseline and over their participation in the PNP. Most participants in Kenya reported living in rented houses or shared squats with other SIY with the remainder of participants sleeping on the street, with family, or at a shelter run by a non-governmental organization. In Eldoret, 43.7% of participants reported typically sleeping on the street, in a park, or on the sidewalk. In Canada, 61.8% of participants reported living in an emergency shelter or transitional housing at baseline. Almost all participants from Eldoret (91.4%), Huruma (88.9%), and Kitale (87.5%) reported sleeping on the street, in a park, or in another public space at least one night over the course of follow-up, compared to 43.8% in Canada. A high proportion of participants (66%) across all sites reported sleeping somewhere they felt unsafe at least once over follow up. In Canada, 21.9% of participants reported engaging in transactional sex for a place to sleep at least once over follow up, while the prevalence of transactional sex ranged from 27.8% to 37.7% across the Kenyan sites.

PNs activities included encouraging and sometimes accompanying SIY to HIV testing. At each site, the proportion of participants who knew their HIV status (i.e., had been tested for HIV) increased from baseline to after the PNP (Table 3). By the end of the program, 100% of participants in Eldoret, 99% of participants in Huruma, 84% of participants in Kitale, and 90% of participants at the Canadian sites reported being tested for HIV. At baseline, there were 41 (11.9%) SIY living with HIV in Eldoret with six additional participants testing positive for HIV over follow

Table 2 Housing characteristics of street-connected youth enrolled in the peer navigator program at baseline and over follow up

	Eldoret	Huruma	Kitale	Canada
	$N = 343$	$N = 110$	$N = 178$	$N = 55$
	$N (\%)$	$N (\%)$	$N (\%)$	$N (\%)$
Typical sleeping location at baseline				
Rented house/apartment	153 (44.6)	6 (5.4)	17 (9.6)	9 (16.4)
Shared shelter/squat	34 (9.9)	95 (86.4)	136 (76.4)	1 (1.8)
On the street/park/sidewalk	150 (43.7)	0 (0.0)	20 (11.2)	2 (3.6)
Emergency shelter/NGO/transitional housing	0 (0.0)	8 (7.3)	1 (0.6)	34 (61.8)
Couch surfing	0 (0.0)	0 (0.0)	0 (0.0)	4 (7.3)
Friend, family, or intimate partner's home	6 (1.7)	1 (0.9)	4 (2.2)	5 (9.1)
At any point over follow up, slept in... ^a				
Abandoned building	177 (54.3)	95 (88.0)	1 (0.8)	6 (18.8)
Street/park/public space	298 (91.4)	96 (88.9)	105 (87.5)	14 (43.8)
Emergency shelter	167 (51.2)	94 (87.0)	1 (0.8)	10 (31.2)
At any point over follow up... ^a				
Slept somewhere felt unsafe	260 (79.8)	93 (86.1)	16 (13.3)	18 (56.2)
Slept somewhere didn't want to sleep	252 (77.3)	93 (86.1)	10 (8.3)	19 (59.4)
Engaged in transactional sex for place to sleep	123 (37.7)	30 (27.8)	38 (31.7)	7 (21.9)

^aEstimated among participants with a complete enhanced housing questionnaire ($n = 326$ in Eldoret, $n = 108$ in Huruma, $n = 120$ in Kitale, $n = 32$ across the 3 Canadian sites)

Table 3 Engagement in HIV testing pre- and post- peer navigator program

	Eldoret		Huruma	
	Before PN project	After PN project	Before PN project	After PN project
	<i>N</i> = 343	<i>N</i> = 341	<i>N</i> = 110	<i>N</i> = 109
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Ever tested for HIV	246 (71.7)	341 (100)	91 (82.7)	108 (99)
HIV status				
Positive	41 (11.9)	47 (13.8)	11 (10.0)	13 (11.9)
Negative	205 (59.8)	294 (86.2)	78 (70.9)	95 (87.2)
Unknown	97 (28.3)	0 (0.0)	21 (19.1)	1 (0.1)
Time since last test (days) ^a				
0–90 days	125 (41.4)	29 (9.9)	51 (51.5)	34 (35.4)
91–180 days	25 (8.3)	29 (9.9)	13 (13.1)	17 (17.7)
181–365 days	15 (5.0)	49 (16.7)	6 (6.1)	13 (13.5)
>365 days	40 (13.2)	135 (45.9)	10 (10.1)	31 (32.3)
Never tested/missing	97 (32.1)	52 (17.7)	19 (19.2)	1 (1.0)
Willing to be tested for HIV ^b	251 (83.1)	–	41 (41.4)	–

^aAmong those self-reporting HIV-negative or status unknown. For the “After PN project” column, this variable was calculated by subtracting the last date of an HIV test provided by a participant (at any non-baseline encounter) from the date of their last encounter

^bAmong those self-reporting HIV-negative or status unknown

^cAmong those willing to be tested

up, 11 (10.0%) SIY living with HIV in Huruma with 2 additional participants testing positive for HIV, and 8 (4.5%) participants living with HIV at baseline in Kitale. In Canada, 11 SIY (20%) were living with HIV at baseline, with no participants newly testing positive over follow up. While the proportion of SIY with a lifetime HIV test increased over follow-up in Huruma and Eldoret, the proportion of participants with a recent HIV test (past 180 days) decreased. At baseline, SIY who were not living with HIV were willing to get tested for HIV, ranging from 41.4% of participants in Huruma to 86.4% of participants in Canada. Among 38 participants who provided a reason for not testing at baseline, the most common reason was having recently been tested for HIV, followed by fear or shame. Almost all participants willing to get tested for HIV at their first encounter requested the accompaniment of the PN for testing.

PNs were also involved in motivating participants living with HIV to access and stay in treatment. Among participants living with HIV, engagement in care and ARV use varied by site and time (Table 4). While 92.7% of participants in Eldoret reported an HIV care visit in the past 180 days at baseline, only 42.5% reported HIV care visit in the past 180 days by their last PN encounter. Across the Canadian sites, the proportion of participants currently taking ARVs increased from 81.8% prior to the PNP to 100% at the end of the project. The proportion of participants reporting ever having a viral load test increased over the course of the program at all sites. By the end of the PNP, 86.4% of participants in Eldoret, 100% of participants in Huruma, 50% of participants in Kitale, and 63.6% of participants at

the Canadian sites reported that their most recent viral load test was undetectable.

Discussion

The main aim of this study was to adapt and scale-up a peer-based intervention (the PN intervention) among SIY in Kenya and Canada to increase uptake of HIV testing (primary/secondary prevention) and treatment (tertiary prevention). Participants' engagement in HIV testing increased from pre-PNP to post-PNP across all study sites, with the majority of participants reporting that they had been tested for HIV by the end of the PN intervention. New cases of HIV were identified through PN-arranged testing, suggesting the need for access to ongoing and accessible HIV testing services for all populations of SIY.

The notable variation in participant enrolment across Kenya ($n = 631$) and Canada ($n = 55$) is due to a variety of factors, including the COVID-19 pandemic, PN attrition, and differences in PN responsibilities. The PNs in the Canadian sites provided intensive, individualized support outside of HIV care, consistent with expectations of community-based workers. In the Kenyan sites, the much larger numbers of SIY resulted in the PNs spreading their support, both HIV-related and in response to other health and social needs, across a larger number of participants. Based on the main findings presented in this article, the characteristics and needs of participants varied by site. The median age of participants at enrolment was younger in Kenya compared to Canada and within the Kenyan sites, there was noticeable

Table 4 Engagement in HIV care pre- and post-peer navigator program, among self-report HIV-positive or testing positive for HIV during study

	Eldoret			Huruma			Kitale			Canada		
	Before PN project	After PN project	N = 41	Before PN project	After PN project	N = 11	Before PN project	After PN project	N = 8	Before PN project	After PN project	N = 11
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Ever in HIV care	41 (100.0)	–	–	11 (100.0)	–	–	6 (75.0)	–	–	10 (11.0)	–	–
Date of last HIV care visit												
0–90 days	29 (70.7)	11 (23.4)	11 (81.8)	9 (81.8)	11 (85.0)	11 (85.0)	5 (62.5)	0 (0.0)	0 (0.0)	8 (72.7)	9 (81.8)	9 (81.8)
91–180 days	9 (22.0)	9 (19.1)	2 (18.2)	2 (18.2)	1 (8.0)	1 (8.0)	1 (12.5)	0 (0.0)	0 (0.0)	1 (9.1)	2 (18.2)	2 (18.2)
181–365 days	2 (4.9)	11 (23.4)	0 (0.0)	0 (0.0)	1 (8.0)	1 (8.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
>365 days	1 (2.4)	15 (31.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Never	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (25)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
Missing	0 (0.0)	1 (2.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
Currently taking ARV's												
Yes	39 (95.1)	36 (76.6)	10 (90.9)	10 (90.9)	13 (100.0)	13 (100.0)	5 (62.5)	0 (0.0)	0 (0.0)	9 (81.8)	11 (100.0)	11 (100.0)
No	1 (2.4)	5 (10.6)	1 (9.1)	1 (9.1)	0 (0.0)	0 (0.0)	1 (12.5)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
Missing	1 (2.4)	6 (12.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (25.0)	3 (100)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
Ever had viral load test	37 (90.2)	44 (93.6)	6 (54.5)	6 (54.5)	11 (100)	11 (100)	2 (25.0)	2 (66.7)	2 (66.7)	10 (90.9)	11 (100)	11 (100)
Date of last viral load test												
0–90 days	14 (34.1)	3 (6.4)	4 (36.4)	4 (36.4)	2 (15.4)	2 (15.4)	1 (12.5)	0 (0.0)	0 (0.0)	6 (54.5)	9 (81.8)	9 (81.8)
91–180 days	17 (41.5)	7 (14.9)	0 (0.0)	0 (0.0)	4 (30.8)	4 (30.8)	0 (0.0)	0 (0.0)	0 (0.0)	2 (18.2)	2 (18.2)	2 (18.2)
181–365 days	2 (4.9)	14 (29.8)	0 (0.0)	0 (0.0)	4 (30.8)	4 (30.8)	1 (12.5)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
>365 days	0 (0.0)	18 (38.3)	2 (18.2)	2 (18.2)	1 (7.7)	1 (7.7)	0 (0.0)	1 (33.3)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)
Missing	4 (9.8)	3 (6.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.3)	1 (33.3)	1 (9.1)	0 (0.0)	0 (0.0)
Never	4 (9.8)	2 (4.3)	5 (45.5)	5 (45.5)	2 (15.4)	2 (15.4)	6 (75)	1 (33.3)	1 (33.3)	1 (9.1)	0 (0.0)	0 (0.0)
Undetectable viral load at most recent test	35/37 (94.6)	38/44 (86.4)	5/6 (83.3)	5/6 (83.3)	11 (100)	11 (100)	1/2 (50.0)	1/2 (50.0)	1/2 (50.0)	7/10 (70.0)	7/11 (63.6)	7/11 (63.6)

variation in the proportion of cisgender men and women. Participants from the three Canadian sites included greater representation of gender and sexual diversity, in part due to the study design as well as participant comfort levels in sharing these aspects of their identity with the PN. These findings are consistent with our earlier research [22], which highlighted the importance of understanding the demographic composition of SIY and their health and social needs in order to design and implement an effective PN intervention.

A key finding of this study was that the PNs across all study sites successfully supported SIY in accessing HIV testing. This is consistent with previous research on peers and peer-based interventions helping SIY navigate healthcare settings [19, 23, 24] and increase uptake of HIV prevention, testing, and treatment [25, 26]. Most participants who were willing to get tested for HIV at baseline requested that the PN accompany them to their appointment, indicating participants' support of and comfort with the PN intervention. This uptake in HIV testing occurred despite numerous challenges in access to testing. Over the course of this study, Kenya faced shortages of the laboratory reagents required for HIV tests, and testing was limited to individuals with known high-risk exposures or who were members of specific key populations. In Canada, HIV testing is often restricted to individuals from key populations or those who are willing to disclose high risk exposures. Since SIY are not considered a key population, they are often not prioritized for HIV testing, and due to stigma, may not feel safe disclosing aspects of their identities or behaviours to healthcare providers. In Kenya, shortages of HIV test kits, particularly in rural and under-resourced areas, have hindered timely diagnosis and early intervention efforts [27, 28]. While restrictive testing guidelines in Canada—including the requirement for individuals to meet specific risk criteria before being tested—can delay detection, especially among individuals who may be less likely to disclose or recognize their risk [29]. Participants who were not willing to get tested for HIV reported various reasons, including that they had recently been tested, fear, and shame. These findings align with previous research which has reported that HIV stigma impacts marginalized populations, including SIY, resulting in barriers to healthcare access [30, 31]. These challenges highlight the critical need to expand the availability of HIV test kits, and revise testing guidelines to ensure equitable and widespread access to HIV testing worldwide.

Engagement in HIV care and ARV use among HIV-positive participants varied by site and over time. The relatively high engagement in treatment at baseline may be partially explained by study recruitment strategies, which included referrals from healthcare providers of SIY living with HIV. However, over the course of the study, SIY living with HIV

continued to face difficulties achieving a sustained undetectable viral load, despite being nominally engaged in HIV care and on ARV treatment. Homelessness and housing insecurity are persistent barriers to medication adherence and healthcare access for people living with HIV and leading to decreased viral suppression and worse HIV care outcomes [32–34]. While peers play an important role in linkage to care, research has demonstrated that healthcare services must adapt to meet the needs of people living with HIV who are experiencing homelessness, including low-barrier care, trained and non-stigmatizing clinicians, and mobile clinics [35]. The PNs were able to support HIV care access by reminding participants about appointments, accompanying them to appointments, and providing treatment education and support. However, they were unable to address ongoing structural barriers such as limited healthcare services and lack of housing support for SIY. These results suggest that SIY living with HIV need comprehensive, wraparound support to enable their engagement in treatment and medication adherence.

Limitations

This study addresses a significant gap in research on the role of PN interventions in improving uptake and utilization of HIV prevention, testing, and treatment among SIY. However, this study also has several limitations. There was variability in the data collected across all sites, resulting in some sites having more data compared to others. For example, a portion of the data was missing from the Kitale site due to a lack of HIV-related questions included in the first year of data collection. Similarly, the Vancouver site had a shorter period of participant recruitment and data collection, as it was the last site to enter the study. The Toronto site experienced ongoing challenges recruiting participants throughout the study, resulting in a smaller sample size compared to other study sites. The COVID-19 pandemic also presented logistical and operational constraints that impacted the study in a variety of ways. For example, government issued shutdowns throughout 2021 resulted in major challenges with hiring and retaining PNs, as well as participant recruitment, especially in the Canadian sites. While in Kenya, police sweeps of SIY encampments led to challenges maintaining contact with existing participants. Additionally, the criminalization of LGBTQ+ identities in Kenya may have affected participants' comfort in disclosing their sexual orientation or gender identity.

Future research can explore how the needs and experiences among SIY working with PNs differ based on setting, context, and population.

Conclusions

This study found that PNs across all sites successfully supported SIY in accessing HIV testing and care. We found that the PN model improved access to and uptake of HIV prevention, testing, and treatment among SIY across Canada and Kenya. Our study highlights the need for ongoing and accessible HIV testing for SIY, and the need to create sustainable PN roles that support youth in becoming leaders in HIV.

Acknowledgements We would like to express our deepest gratitude to Dr. Paula Braitstein, the original Principal Investigator of this study, whose vision, dedication, and leadership laid the foundation for this important work. We honor her legacy by the completion of this study and the dissemination of these findings. We would also like to express our gratitude to the late Professor David Ayuku, who served as the original Principal Investigator for the Kenya site. Professor Ayuku's profound knowledge and commitment to this research helped shape this study in many ways. A very special thank you to all the youth participants for their valuable contributions to this study. Thank you to the Peer Navigators for their commitment to this study and for all the care they put into their work with the youth participants. Thank you to our community and health partners for hosting the PNs and for their support with participant recruitment. Thank you to Lin Yu for her support with data analysis.

Author Contributions AA, DA, and KM conceptualized the manuscript. AA led the writing of the first draft with critical input from DA. Data curation was completed by DA and MN. DA analyzed the quantitative data. All authors read and approved the final version of the manuscript.

Funding This study was funded by the Canadian Institutes of Health Research (CIHR) HIV Implementation Science Component II Grant.

Data Availability The data generated and analyzed for this manuscript are not publicly available due to limits of regulatory approvals but are available from the corresponding author (in collaboration with key research team members responsible for data collected in their respective site) on reasonable request. Requests to access the data must be approved by the research ethics boards responsible for overseeing responsible data management.

Declarations

Competing Interests The authors have no competing interests to declare that are relevant to the content of this article.

Ethical Approval Prior to data collection ethical approval was obtained from the following institutions in Kenya and Canada: Moi University (IREC #2018/107), University of Toronto (REB #00036063), Centre for Addiction and Mental Health (REB #159/2018), and University of British Columbia (BREB# H22-01663).

Consent to Participate Informed consent was obtained from all individual participants included in the study.

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References

1. Public Health Agency of Canada. Canada's progress towards ending the HIV epidemic [Internet]. 2024 [cited 2025 Jul 2]. <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/canada-progress-towards-ending-hiv-epidemic.html>
2. Challacombe L. CATIE - Canada's source for HIV and hepatitis C information. 2025 [cited 2025 Jul 2]. The Epidemiology of HIV in Canada. <https://www.catie.ca/the-epidemiology-of-hiv-in-canada>
3. Public Health Agency of Canada. HIV in Canada: 2023 surveillance highlights [Internet]. 2024 [cited 2025 Jul 2]. <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/hiv-2023-surveillance-highlights-infographic.html>
4. Banadakoppa Manjappa R, Bhattacharjee P, Shaw SY, Gitonga J, Kioko J, Songok F, et al. A sub-national HIV epidemic appraisal in Kenya: a new approach for identifying priority geographies, populations and programmes for optimizing coverage for HIV prevention. *J Int AIDS Soc*. 2024;27(S2):e26245.
5. Statista S. 2024 [cited 2025 Jul 2]. Number of HIV-positive people in select countries Africa 2023. <https://www.statista.com/statistics/1305217/number-people-with-hiv-african-countries/>
6. Young PW, Musingila P, Kingwara L, Voetsch AC, Zielinski-Gutierrez E, Bulterys M, et al. HIV incidence, recent HIV infection, and associated factors, Kenya, 2007–2018. *AIDS Res Hum Retroviruses*. 2023;39(2):57–67.
7. Moyo E, Moyo P, Murewanhema G, Mhango M, Chitungo I, Dzinamarira T. Key populations and sub-Saharan Africa's HIV response. *Front Public Health*. 2023;11:1079990.
8. The Canadian Encyclopedia. Two Spirit [Internet]. 2024 [cited 2025 Dec 15]. <https://www.thecanadianencyclopedia.ca/en/article/two-spirit>
9. Keuroghlian AS, Shtasel D, Bassuk EL. Out on the street: a public health and policy agenda for lesbian, gay, bisexual, and transgender youth who are homeless. *Am J Orthopsychiatry*. 2014;84(1):66–72.
10. Kashani M, Bien M, Mosites E, Meehan AA. What we (Don't) know about the infectious disease burden among youth experiencing homelessness in the United States and Canada. *J Infect Dis*. 2025;231(1):49–60.
11. Marshall BD, Kerr T, Shoveller JA, Montaner JS, Wood E. Structural factors associated with an increased risk of HIV and sexually transmitted infection transmission among street-involved youth. *BMC Public Health*. 2009;9(1):7.
12. Freaney C, Watters P, Thomas J, Streed C. HIV pre-exposure prophylaxis among sexual and gender minority homeless youth. *Pediatrics*. 2025;155(6):e2024070414.
13. Young SD, Rice E. Online social networking technologies, HIV knowledge, and sexual risk and testing behaviors among homeless youth. *AIDS Behav*. 2011;15(2):253–60.

14. Hsu HT, Fulginiti A, Rice E, Rhoades H, Winetrobe H, Danforth L. But everyone is doing it (sort of)! Perceived sexual risks in the social environment and the impact on homeless youth engagement in concurrent sexual relationships. *AIDS Behav.* 2018;22(11):3508–18.
15. Marshall BD, Kerr T, Livingstone C, Li K, Montaner JS, Wood E. High prevalence of HIV infection among homeless and street-involved Aboriginal youth in a Canadian setting. *Harm Reduct J.* 2008;5(1):35.
16. Schwartz D, James C, Wagner A, Hart T. Chapter 2. Sexual Risk Behaviours and Sexual Health Outcomes among Homeless Youth in Canada. In: *Homelessness & Health in Canada*. Les Presses de l'Université d'Ottawa | University of Ottawa Press; 2014. p. 35–55.
17. Braitstein P, Ayuku D, DeLong A, Makori D, Sang E, Tarus C, et al. HIV prevalence in young people and children living on the streets, Kenya. *Bull World Health Organ.* 2019;97(1):33–41.
18. Embleton L, Ayuku D, Makori D, Kamanda A, Braitstein P. Causes of death among street-connected children and youth in Eldoret, Kenya. *BMC Int Health Hum Rights.* 2018;18(1):19.
19. Shah P, Kibel M, Ayuku D, Lobun R, Ayieko J, Keter A, et al. A pilot study of peer navigators to promote uptake of HIV Testing, care and treatment among Street-Connected children and youth in Eldoret, Kenya. *AIDS Behav.* 2019;23(4):908–19.
20. Khan M, MacEntee K, Kiptui R, Van Berkum A, Oudshoorn A, Ayuku DO, et al. Barriers to and facilitators of accessing HIV services for street-involved youth in Canada and Kenya. *BMC Public Health.* 2022;22(1):1901.
21. MacEntee K, Lee EOJ, Oudshoorn A, Abramovich A, Kiptui R, Ayuku D, et al. Using scenario videos with Theatre Testing method to adapt a peer navigation model to improve street-connected youth's access to HIV care in Kenya and Canada. *Front Public Health.* 2022;10:975117.
22. Lee EOJ, Tang TS, Fuentes-Bernal J, MacEntee K, Wachira J, Apondi E, et al. Optimal characteristics of peer navigators: adapting peer-based intervention with street-involved youth in Canada and Kenya with the aim of increasing HIV prevention, testing and treatment. *Health Res Policy Syst.* 2025;23(1):45.
23. Embleton L, Di Ruggiero E, Logie CH, Ayuku D, Braitstein P. Piloting an evidence-based intervention for HIV prevention among street youth in Eldoret, Kenya. *Int J Public Health.* 2020;65(4):433–43.
24. Mangan J, Del Cid Nunez P, Daou S, Richandi GEK, Siddiqui A, Wong J et al. P <P>Paudyal editor 2024 Peer and Lay health work for people experiencing homelessness: A scoping review. *PLOS Glob Public Health* 4 6 e0003332.
25. Genberg BL, Shangani S, Sabatino K, Rachlis B, Wachira J, Braitstein P, et al. Improving engagement in the HIV care cascade: a systematic review of interventions involving people living with HIV/AIDS as peers. *AIDS Behav.* 2016;20(10):2452–63.
26. Medley A, Kennedy C, O'Reilly K, Sweat M. Effectiveness of peer education interventions for HIV prevention in developing countries: a systematic review and meta-analysis. *AIDS Educ Prev.* 2009;21(3):181–206.
27. Otieno D. Kenya's HIV and TB response in crisis as U.S. Aid cut threaten lifesaving treatments. *Kelin Kenya* [Internet]. 2025. <https://tinyurl.com/mvka2yz9>
28. Nation Africa. Kenya faces healthcare crisis as ARVs, condoms and baby vaccines run out. *Citiz* [Internet]. 2025. https://www.thecitizen.co.tz/tanzania/news/east-africa-news/healthcare-crisis-bites-as-arvs-condoms-baby-vaccines-run-out-4888446#google_vignette
29. Laprise C, Bolster-Foucault C. Understanding barriers and facilitators to HIV testing in Canada from 2009–2019: a systematic mixed studies review. *CCDR.* 2021;47(2):105–25.
30. Henriques E, Schmidt C, Pascoe R, Liss K, Begun S. Counter-narratives of structural oppressions, stigma and resistance, and reproductive and sexual health among youth experiencing homelessness. *Qual Health Res.* 2022;32(10):1447–63.
31. Ochs A, Barman-Adhikari A, Hsu HT, Petering R, Shelton J, Narendorf S, et al. Untangling regional disparities: HIV and STI testing patterns among youth experiencing homelessness in seven U.S. cities. *Youth.* 2024;4(4):1774–86.
32. Clemenzi-Allen A, Geng E, Christopoulos K, Hammer H, Buchbinder S, Havlir D, et al. Degree of housing instability shows independent dose-response with virologic suppression rates among people living with human immunodeficiency virus. *Open Forum Infect Dis.* 2018. <https://doi.org/10.1093/ofid/ofy035/4934745>.
33. Marziali ME, Hansen S, Kooij KW, Budu M, Ye M, Tam C, et al. Housing matters: the long-term impact of stable housing on mortality among people with HIV in British Columbia, Canada. *Soc Sci Med.* 2025;367:117713.
34. Galárraga O, Rana A, Rahman M, Cohen M, Adimora AA, Sosanya O, et al. The effect of unstable housing on HIV treatment biomarkers: an instrumental variables approach. *Soc Sci Med.* 2018;214:70–82.
35. Dombrowski JC, Corcorran MA, Carney T, Parczewski M, Gandhi M. The impact of homelessness and housing insecurity on HIV. *Lancet HIV.* 2025;12(6):e449–58.

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